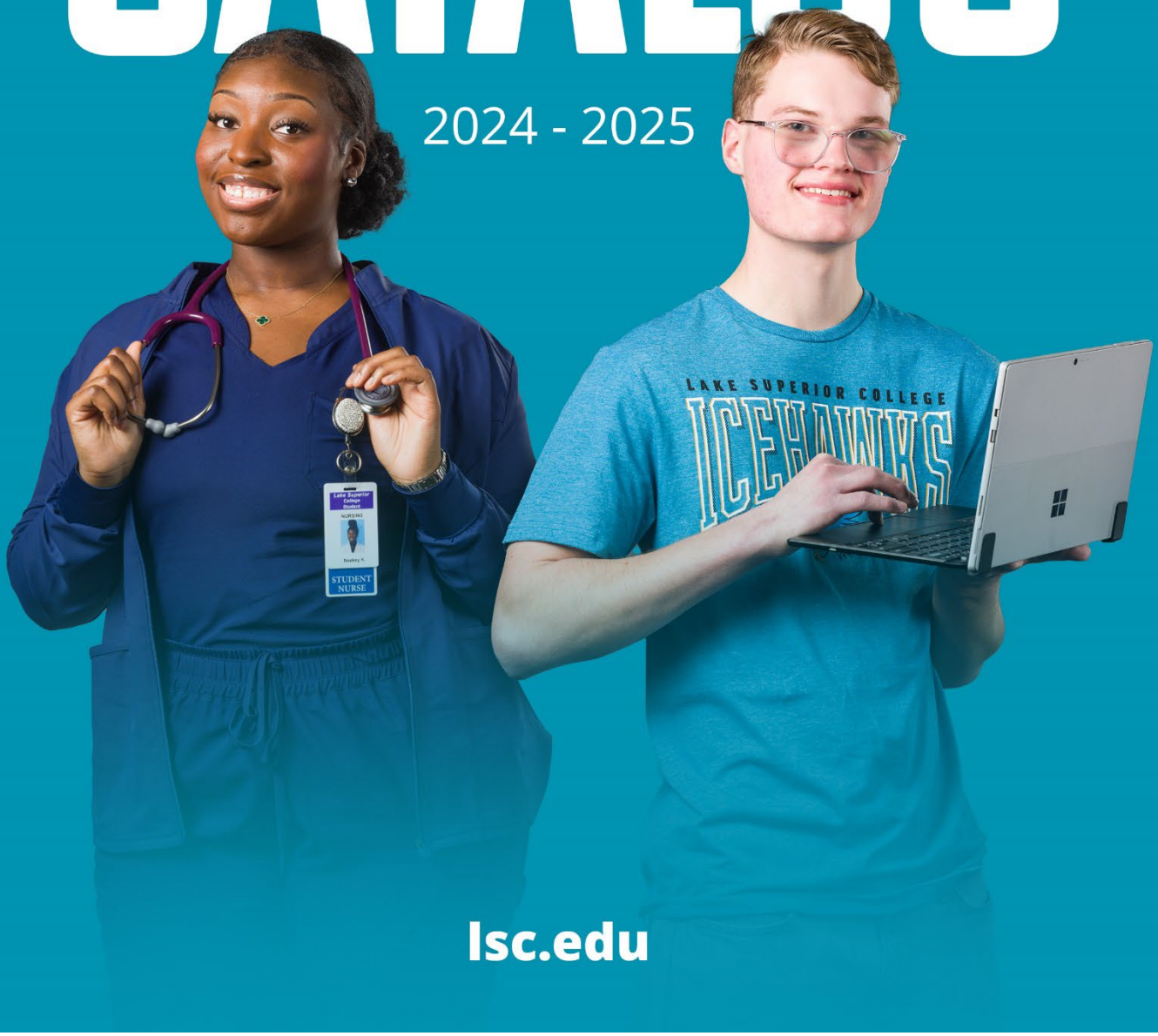
Lake Superior College

A member of Minnesota State

CATALOG

2024 - 2025



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Lake Superior College
General Catalog
2024 - 2025

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An affirmative action, equal opportunity educator and member of the Minnesota State system.

The Lake Superior College (LSC) Catalog is an official document of the College. The catalog provides information on the College's academic programs, courses, and faculty credentials. The College reserves the right to change catalog content, including academic or other college requirements, as needed. Updated information and formal changes to the catalog will be posted in the online catalog addendum. The most recently published LSC catalog is the governing version.

The catalog in effect when a student declares his or her major is considered to be that student's catalog of entry. This catalog is used to determine program requirements. The catalog of entry remains in effect for a student unless he or she is out of school for a full semester or longer. Students may officially declare a subsequent catalog as their catalog of entry. A student who wishes to exercise this option must officially change his or her designated catalog of entry through LSC Advising Services.

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Resources:

About LSC – (http://www.lsc.edu/about-lsc/)
Student Handbook – (http://www.lsc.edu/current-students/student-handbook/)

Table of Contents

Program Guides

Liberal Arts and Science (University Transfer)

Associate of Arts Degree AA Degree - 60 credits
Minnesota Transfer Curriculum MTC - 40 credits

Program Website: (https://degrees.lsc.edu/associate-of-arts-a-a/)

I. Associate of Arts Degree and M.T.C. Requirements:

A.A. = 60 Credits Total ~ Minimum requirements in parentheses (includes HPER & FYE) - 40 credit minimum required in Goal Areas 1-10.

M.T.C. = 40 Credits Total ~ Minimum requirements in parenthesis. Credits must total 40 in Goal Areas 1-10.

II. Associate of Science and Associate of Applied Science Degree Requirements:

A.S. = See Program Guide for specific requirements.

A.A.S. = See Program Guide for specific requirements.

NOTES:

- Credits for a course will count in ONLY one goal area (see your advisor for questions or clarification).
- A listed course may count once in Goal Areas 1 through 6, AND once in Goal Areas 7 through 10 (see your advisor for clarification).
- *Denotes Literature course.
- 2.0 minimum G.P.A. required for M.T.C. and all degrees.
- D grades are included in this calculation.

FIRST YEAR EXPERIENCE (Course is required.)

FYE 1000	First Year Experience	(1)

1. COMMUNICATION (CO)
(Nine credit minimum.)

ENGL 1106	College Composition I (Required for AA/MTC)	(3)
ENGL 1109	College Composition II (Required for AA/MTC)	(3)

AND

At least one of the following to reach the minimum of 9 credits (required for AA/MTC):

COMM 1100	Introduction to Communication	(3)
COMM 1105	Interpersonal Communication	(3)
COMM 1110	Public Speaking	(3)
COMM 1115-DI	Intercultural Communication	(3)
COMM 1125	Small Group Communication	(3)
COMM 1601	Interviewing Procedure and Practice	(1)
ENGL 1100	Creative Writing	(3)
ENGL 1102	Social Media Writing	(3)

2. CRITICAL THINKING (CT)
(Completion of the full 40 credit MTC meets this requirement OR the following will meet this requirement:)

BIOL 2170	Pathophysiology	(3)
PHIL 1140	Critical Thinking	(3)
READ 1102	Critical Reading for Academics	(1)

3. NATURAL SCIENCES (NS)
(Six credit minimum. Select two courses from at least two different areas.)

ASTR 1101	Introduction to Astronomy	(4)
BIOL 1007-ET	Biology and Society	(4)
BIOL 1009	Intro Forensic Bio: Concepts/Techniques	(3)
BIOL 1105-DI	Biology of Women	(3)
BIOL 1110-EN	The Ecology of Minnesota	(4)
BIOL 1120	General Biology 1	(4)
BIOL 1130	General Biology 2	(4)
BIOL 1140	Human Anatomy and Physiology I	(4)
BIOL 1141	Human Anatomy and Physiology II	(4)
BIOL 1170	Microbiology	(3)
BIOL 2400	Topics in Biology	(.5-3)
CHEM 1110	Aspects of Chemistry I	(3)
CHEM 1111	Aspects of Chemistry II	(2)
CHEM 1210	General Chemistry I	(5)
CHEM 1211	General Chemistry II	(5)
ENSC 1200-EN	The Environment and Sustainability	(4)
ENSC 2010-EN	World Health and the Environment	(3)
GEOG 1120-EN	Physical Geography	(4)
GEOG 1202-EN	Introduction to Maps	(3)
GEOL 1110-EN	Introduction to Geology	(4)
GEOL 1115-EN	Minnesota's Geology	(4)
GEOL 1125-EN	Geology of Natural Disasters	(4)
GEOL 1130-GL	Earth's Resources	(4)

GEOL 1135-EN	Intro to Weather and Climate	(4)
PHYS 1001	Fundamental Concepts of Physics	(4)
PHYS 1201	Introduction to Physics I	(5)
PHYS 1202	Introduction to Physics II	(5)
PHYS 2201	General Physics I	(5)
PHYS 2202	General Physics II	(5)

4. MATHEMATICAL / LOGICAL REASONING (MA)
(Three credit minimum. One course is required.)

MATH 1100	College Algebra	(4)
MATH 1105	Mathematical Reasoning	(3)
MATH 1115	Contemporary Mathematics	(4)
MATH 1125	Finite Mathematics and Survey of Calculus	(5)
MATH 1130	Trigonometry	(3)
MATH 1150	Pre-Calculus	(4)
MATH 2204	Calculus I	(5)
MATH 2205	Calculus II	(5)
MATH 2206	Calculus III	(4)
MATH 2210	General Statistics	(3)
MATH 2220	Differential Equations with Linear Algebra	(4)
PHIL 1125	Logic	(3)

5. HISTORY (HI) & SOCIAL AND BEHAVIORAL SCIENCES (SB)
(Nine credit minimum. Select courses from at least two different areas.)

ANTH 1110-GL	Cultural Anthropology	(3)
COMM 1120-GL	Media and Society	(3)
COMM 1600-DI	Communication in the Workplace	(3)
COMM 2205-GL	Relationship Communication	(3)
ECON 1100-GL	Introduction to Economics	(3)
ECON 1150-GL	Principles of Econ: Macroeconomics	(3)
ECON 1160	Principles of Econ: Microeconomics	(3)
ECON 2030-GL	Economics of Sustainability	(3)
GEOG 1110-GL	Human Geography	(3)
GEOG 1130-GL	World Regional Geography	(3)
HIST 1110-DI	European History: Ancient to 1500	(3)
HIST 1120-GL	European History: 1500 to Present	(3)
HIST 1130-GL	World History, Ancient to 1500	(3)
HIST 1135-GL	World History: 1500 to Present	(3)
HIST 1200-DI	Women in American History	(3)
HIST 1210-DI	United States' History to 1877	(3)
HIST 1220-DI	United States' History since 1877	(3)
HIST 1230-GL	World History since 1945	(3)
HIST 2110-EN	Minnesota History	(3)
HIST 2125-GL	The World Wars 1914-1945	(3)
HIST 2130-ET	America's War in Vietnam	(3)
PSCI 1110-ET	American Government and Politics	(3)
PSCI 1120-ET	Introduction to Political Science	(3)
PSCI 1140-GL	International Relations and Global Issues	(3)
PSYC 1015	Mind Matters	(3)
PSYC 1120-DI	General Psychology	(3)
PSYC 1135-DI	Lifespan Developmental Psychology	(3)
PSYC 1140-DI	Abnormal Psychology	(3)
PSYC 1145-DI	Health Psychology	(3)
PSYC 2135	Child Psychology	(3)
PSYC 2145-DI	Social Psychology	(3)
PSYC 2155	Forensic Psychology	(3)
PSYC 2165	Statistics for Psychology	(3)
SOC 1111-DI	Introduction to Sociology	(3)
SOC 1114-ET	Criminal Justice in Society	(3)
SOC 1125-GL	Social Deviance	(3)
SOC 1130-ET	Juvenile Delinquency	(3)
SOC 1140-DI	Marriages and Families	(3)
SOC 1145-DI	Race, Class, and Gender	(3)
SOC 1155-DI	Human Sexuality	(3)
SOC 1165-ET	Patterns of Domestic Violence	(3)
SOC 1170-GL	Drugs and Society	(3)
SOC 1185-DI	Gender, Power and Society	(3)
SOC 2103-DI	Body Culture	(3)
SOC 2120-ET	Social Problems	(3)
SOC 2123-EN	People and the Environment	(3)
SOC 2125-GL	Social Movements	(3)
SOC 2127	Race, Power, and Justice	(3)

6. HUMANITIES & FINE ARTS (HU)
(Nine credit minimum MUST include one Literature course. Asterisk denotes Literature course. No more than three one-credit courses from Art, Humanities, Music, Spanish, or Theater.)

ART 1110	Introduction to Art and Design	(3)
ART 1111	Introduction to Digital Art	(3)
ART 1112	Introduction to Sculpture Design	(3)
ART 1113	Drawing I	(3)
ART 1118-GL	Art Appreciation	(3)
ART 1120-GL	Art History: Prehistoric to 1400 A.D.	(3)
ART 1122-GL	Art History: Renaissance to the Present	(3)
ART 1125	Watercolor	(3)
ART 1138	Ceramics I	(3)
ART 1162	Introduction to Fused Glass	(3)
ART 1165	Metal Art/Jewelry I	(3)
ART 1168	Painting I	(3)
ART 1500	Digital Photography I	(3)
ART 1510	Digital Painting I	(3)
ART 1520	Digital Graphic Design I	(3)
ART 2100	Sculpture I	(3)
ENGL 1112*	Introduction to Literature	(3)
ENGL 1132-GL*	Utopian/Dystopian Literature	(3)
ENGL 1134-DI*	Modern Fantasy	(3)
ENGL 1136-DI*	Folklore	(3)
ENGL 2000	Poetry Writing	(3)
ENGL 2002	Creative Nonfiction Writing	(3)
ENGL 2004	Fiction Writing	(3)
ENGL 2020*	Introduction to the Short Story	(3)
ENGL 2022*	Introduction to the Novel	(3)
ENGL 2024*	Introduction to Drama	(3)
ENGL 2026*	Introduction to Poetry	(3)
ENGL 2101*	British Literature 12th to 17th Century	(3)
ENGL 2102*	British Literature 18th Century to Present	(3)
ENGL 2105*	American Lit: Pre-Colonial to Civil War	(3)

ENGL 2106*	American Lit: Civil War to the Present	(3)
ENGL 2108*	American Gothic Literature	(3)
ENGL 2114-DI*	Adolescent Literature	(3)
ENGL 2115-DI*	Children's Media	(3)
ENGL 2116-DI *	American Immigrant Literature	(3)
ENGL 2118*	From Literature to Film	(3)
ENGL 2120-DI*	African-American Literature	(3)
ENGL 2130-DI*	Native American Literature	(3)
ENGL 2132*	Minnesota Literature	(3)
ENGL 2140-GL*	World Literature	(3)
ENGL 2160-EN*	Environmental Literature	(3)
HUM 1105-GL	Introduction to Popular Culture	(3)
HUM 1110-GL*	The Bible as Literature	(3)
HUM 1123	Film Genres: Science Fiction & Fantasy	(3)
HUM 1130-GL	World Religion	(3)
HUM 1160-GL*	Classical Greek and Roman Mythology	(3)
HUM 1180-GL*	World Mythology	(3)
HUM 2015-GL	Film Appreciation	(3)
MCOM 1410	Intro to Digital Multimedia	(3)
MUSC 1108	History of Rock and Roll	(3)
MUSC 1110	Appreciation of Music	(3)
MUSC 1120	Fundamentals of Music	(3)
MUSC 1130	Introduction to World Music	(3)
MUSC 1200	Concert Choir	(1)
MUSC 1210	Chamber Singers	(1)
PHIL 1120	Introduction to Philosophy	(3)
PHIL 1130-ET	Ethics	(3)
PHIL 2140	Philosophy of Religion	(3)
PHIL 2150-ET	Political Philosophy	(3)
THTR 1210-GL	Theatre Appreciation	(3)

7. HUMAN DIVERSITY (DI)
(One course minimum.)

BIOL 1105	Biology of Women	(3)
COMM 1115	Intercultural Communication	(3)
COMM 1600	Communication in the Workplace	(3)
ENGL 1134*	Modern Fantasy	(3)
ENGL 1136*	Folklore	(3)
ENGL 2114*	Adolescent Literature	(3)
ENGL 2115*	Children's Media	(3)
ENGL 2116*	American Immigrant Literature	(3)
ENGL 2120*	African-American Literature	(3)
ENGL 2130*	Native American Literature	(3)
HIST 1110	European History: Ancient to 1500	(3)
HIST 1120	European History: 1815 to Present	(3)
HIST 1200	Women in American History	(3)
HIST 1210	United States' History to 1877	(3)
HIST 1220	United States' History since 1877	(3)
PSYC 1120	General Psychology	(3)
PSYC 1135	Lifespan Developmental Psychology	(3)
PSYC 1140	Abnormal Psychology	(3)
PSYC 1145	Health Psychology	(3)
PSYC 2145	Social Psychology	(3)
SOC 1111	Introduction to Sociology	(3)
SOC 1140	Marriages and Families	(3)
SOC 1145	Race, Class, and Gender	(3)
SOC 1155	Human Sexuality	(3)
SOC 1185	Gender, Power and Society	(3)
SOC 2103	Body Culture	(3)
SOC 2127	Race, Power, and Justice	(3)

8. GLOBAL PERSPECTIVE (GL)
(One course minimum.)

ANTH 1110	Cultural Anthropology	(3)
ASL 1200	American Sign Language I	(3)
ASL 1210	American Sign Language II	(3)
ART 1118	Art Appreciation	(3)
ART 1120	Art History: Prehistoric to 1400 A.D.	(3)
ART 1122	Art History: Renaissance to the Present	(3)
COMM 1120	Media and Society	(3)
COMM 2205	Relationship Communication	(3)
ECON 1100	Introduction to Economics	(3)
ECON 1150	Principles of Econ: Macroeconomics	(3)
ECON 2030	Economics of Sustainability	(3)
ENGL 1132*	Utopian/Dystopian Literature	(3)
ENGL 2140*	Modern World Literature	(3)
GEOG 1110	Human Geography	(3)
GEOG 1130	World Regional Geography	(3)
GEOL 1130	Earth's Resources	(4)
GS 1200	Explorations Abroad	(1-3)
GS 1210	Global Service Learning	(3)
HIST 1120	European History: 1500 to Present	(3)
HIST 1130	World History: Ancient to 1500	(3)
HIST 1135	World History: 1500 to Present	(3)
HIST 1230	World History since 1945	(3)
HIST 2125	The World Wars 1914-1945	(3)
HUM 1105	Introduction to Popular Culture	(3)
HUM 1110*	The Bible as Literature	(3)
HUM 1130	World Religion	(3)
HUM 1160*	Classical Greek and Roman Mythology	(3)
HUM 1180*	World Mythology	(3)
HUM 2015	Film Appreciation	(3)
MUSC 1130	Introduction to World Music	(3)
PSCI 1140	International Relations and Global Issues	(3)
SOC 1125	Social Deviance	(3)
SOC 1170	Drugs and Society	(3)
SOC 2125	Social Movements	(3)
SPAN 1010	Beginning Spanish I	(4)
SPAN 1020	Beginning Spanish II	(4)
SPAN 2010	Intermediate Spanish I	(4)
SPAN 2020	Intermediate Spanish II	(4)
THTR 1210	Theatre Appreciation	(3)

9. ETHIC & CIVIC RESPONSIBILITY (ET)
(One course minimum.)

BIOL 1007	Biology and Society	(4)
HIST 2130	America's War in Vietnam	(3)
MCOM 1400	Introduction to Mass Communication	(3)
PHIL 1130	Ethics	(3)
PHIL 2150	Political Philosophy	(3)
PSCI 1110	American Government and Politics	(3)
PSCI 1120	Introduction to Political Science	(3)
PSYC 2155	Forensic Psychology	(3)
SOC 1114	Criminal Justice in Society	(3)
SOC 1130	Juvenile Delinquency	(3)
SOC 1165	Patterns of Domestic Violence	(3)
SOC 2120	Social Problems	(3)
SOC 2779	Community Service Collaboration	(1-2)

10. PEOPLE & THE ENVIRONMENT (EN)
(One course minimum.)

BIOL 1110	The Ecology of Minnesota	(4)
BIOL 2200	General Ecology	(4)
ENGL 2160*	Environmental Literature	(3)
ENSC 1200	The Environment and Sustainability	(4)
ENSC 2010	World Health and the Environment	(3)
GEOG 1120	Physical Geography	(4)
GEOG 1202	Introduction to Maps	(3)
GEOL 1110	Introduction to Geology	(4)
GEOL 1115	Minnesota's Geology	(4)
GEOL 1125	Geology of Natural Disasters	(4)
GEOL 1135	Intro to Weather and Climate	(4)
HIST 2110	Minnesota History	(3)
SOC 2123	People and the Environment	(3)

PHYSICAL EDUCATION / HEALTH REQUIREMENTS
(Minimum of two credits required for A.A. Any HPER course may be used to fulfill this requirement. All HPER courses may be repeated one time for credit toward an A.A. degree, except where an advanced level exists.)

ADDITIONAL ELECTIVES
(MUST BE NUMBERED 1000 OR ABOVE - do not include developmental classes. A maximum of 4 workshop credits will count toward the A.A., and 18 credits may come from occupational courses. CEUs will not be converted to credit. Students who wish credit for CEUs will pursue "Credit by Exam" or "Credit for Prior Learning.")

LEGEND	
*Denotes Literature course	
DI =	Human Diversity
EN =	People & the Environment
ET =	Ethic & Civic Responsibility
GL =	Global Perspective
MA =	Mathematical/Logical Reasoning

Art Transfer Pathway AFA Degree - 60 credits

Program Website: (https://degrees.lsc.edu/art-transfer-pathway /)

Program Description

The Art Transfer Pathway AFA offers students a powerful option: the opportunity to complete an Associate of Fine Arts degree with course credits that directly transfer to designated art bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate of fine arts degree will directly transfer and apply to the designated bachelor's degree programs in a related field.

Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

Upon graduation, students will be able to

- Create, perceive, and respond to art utilizing a critical foundation of art knowledge and skills.
- Demonstrate advanced techniques of personal expression and the ability to think critically and creatively.
- Address concrete and abstract ideas with creative problem-solving skills.
- Demonstrate a balanced exposure of art which includes studio courses in 2-D and 3-D mediums.
- Demonstrate an understanding of art in an historical context.
- Demonstrate a critical foundation of knowledge that broadens their definition of art.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
ART 1110	Introduction to Art and Design	3	6
ART 1112	Introduction to Sculpture Design	3	6
ART 1113	Drawing I	3	6
ART 1120	Art History: Prehistoric to 1400 A.D.	3	6, 8
ART 1122	Art History: Renaissance to Present	3	6, 8
ART 1111 or ART 1500 or ART 1510 or ART 1520	Introduction to Digital Art Digital Photography I Digital Painting I Digital Graphic Design I	3	6
ART	Restricted Art Electives (See Table 1)	12	6
ART	Unrestricted Art Electives (See Table 2)	6	6
COMM 1100 or COMM 1110 or COMM 1105 or COMM 1115	Introduction to Communication Public Speaking Interpersonal Communication Intercultural Communication	3	1 1 1 1, 7
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
	Goal 3: Natural Sciences (this course must also fulfill Goal 10)	3	3, 10
	Goal 4: Mathematical/Logical Reasoning	3	4
	Goal 5: History & Social Behavioral Sciences. (one course must fulfill Goal 9)	6	5, 9
	Goal 6: Literature Course	3	6
Total Credits		**60**	

Courses May Require a Prerequisite

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:
A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math. Connect with your advisor for assistance with course placement.

Table 1:
Restricted Art Electives - 12 minimum credits required. Select a minimum of 4 courses from below.

Student must select a minimum of one 2-dimensional course and a minimum of one 3-dimensional course.

Course	Course Title	Credits
	2-Dimensional Art	
ART 1168	Painting I	3
ART 1500	Digital Photography I	3
ART 1520	Digital Graphic Design I	3
ART 2113	Drawing II	3
	3-Dimensional Art	
ART 1138	Ceramics I	3
ART 2100	Sculpture	3

Table 2:
Unrestricted Art Electives: Choose a minimum of 6 additional credits of studio art courses**.**

Course	Course Title	Credits
ART 1111	Intro to Digital Art	3
ART 1125	Watercolor	3
ART 1160	Painting I	3
ART 1162	Introduction to Fused Glass	3
ART 1165	Metal Art Jewelry I	3
ART 1138	Ceramics I	3
ART 1500	Digital Photography I	3
ART 1510	Digital Painting I	3
ART 1520	Digital Graphic Design	3
ART 2100	Sculpture I	3
ART 2102	Sculpture II	3
ART 2112	Watercolor II	3
ART 2113	Drawing II	3
ART 2139	Ceramics II	3
ART 2140	Ceramics III	3
ART 2165	Metal Art/Jewelry II	3
ART 2168	Painting II	3
ART 2500	Digital Photography II	3
ART 2510	Digital Painting II	3
ART 2521	Digital Graphic Design II	3

Biology Transfer Pathway AS Degree - 60 credits

Program website: (https://degrees.lsc.edu/biology-transfer-pathway/)

Program Description

The Biology Transfer Pathway AS offers students a powerful option: the opportunity to complete an Associate of Science degree whose course credits will directly transfer to designated Biology bachelor's degree programs at Minnesota State universities. The entire curriculum has been carefully designed to guarantee junior-year status to students who have been admitted to one of the seven Minnesota State universities. There, students can complete their bachelor's degree by earning 60 additional credits. Students planning to transfer outside of the Minnesota State system are advised to consult with their intended transfer institution to determine transferability of the courses in this curriculum. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Biology Transfer Pathway AS and transferring into a designated bachelor's program in biology at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State university's designated program in biology you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: College Level

Required Courses

Course	Course Title	Credits	MnTC Goal
FYE 1000	First Year Experience	1	
BIOL 1120	General Biology I	4	3
BIOL 1130	General Biology II	4	
BIOL 2210	Genetics	4	
BIOL 2005 or BIOL 2200	Cell and Molecular Biology General Ecology	4	 10
COMM 1100 or COMM 1105 or COMM 1110 or COMM 1115	Intro to Communication Interpersonal Communication Public Speaking Intercultural Communication	3	1 1 1 1,7
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
MATH 1100 or higher	College Algebra (refer to university requirements)	3-5	4
MATH 2210	General Statistics	3	4
CHEM 1210	General Chemistry I	5	3
CHEM 1211	General Chemistry II	5	
	History, Social and Behavioral Sciences – one course	3	5
	Humanities and Fine Arts – one course	3	6
	Unrestricted Elective Courses	10-12	
Total Credits		**60**	

Suggested unrestricted electives

Course	Course Title	Credits	MnTC Goal
BIOL 1140	Human Anatomy and Physiology I	4	3
BIOL 1141	Human Anatomy and Physiology II	4	3
CHEM 2110	Elementary Organic Chemistry I	5	
CHEM 2111	Elementary Organic Chemistry II	5	
ENSC 1200	The Environment and Sustainability	4	3, 10
ENSC 2010	World Health and the Environment	3	10
GEOG 1120	Physical Geography	4	3, 10
GEOL 1110	Introduction to Geology	4	3, 10
PHYS 1201	Introduction to Physics	5	3

Chemistry Transfer Pathway AS Degree - 60 credits

Program website: (https://degrees.lsc.edu/chemistry-transfer-pathway/)

Program Description

The Chemistry Transfer Pathway AS offers students a powerful option: the opportunity to complete an Associate of Science degree with course credits that directly transfer to designated Chemistry bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
CHEM 1210	General Chemistry I	5	3
CHEM 1211	General Chemistry II	5	3
CHEM 2110	Organic Chemistry I	5	
CHEM 2111	Organic Chemistry II	5	
MATH 2204	Calculus I	5	4
MATH 2205	Calculus II	5	4
PHYS 2201	General Physics	5	3
PHYS 2202	General Physics II	5	3
COMM 1100 or COMM 1105 or COMM 1110 or COMM 1115	Introduction to Communication or Interpersonal Communication or Public Speaking or Intercultural Communication	3	1 1 1 1, 7
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
Goal Area 5	History, Social and Behavioral Sciences – one course	3	5
Goal Area 6	Humanities and Fine Arts – one course	3	6
Goal Areas 5-10	Unrestricted Elective Courses	4	
Total Credits		**60**	

Courses may require a prerequisite

Program Outcomes

- Demonstrate basic knowledge and understanding of the fundamentals of experimental and theoretical chemistry.
- Explain and apply skills in analytical thinking and problem solving, and apply scientific methods to experimental data.
- Demonstrate skills in laboratory operations including making accurate and precise measurements, preparing solutions, operating instrumentation, experimental design, and the interpretation and reporting of quantitative and qualitative data and results.
- Communicate their own data and analysis in oral and written communications that uses tables and graphs, describes detailed experimental procedures, and clearly explains conclusions, in order to create clear and compelling papers, posters, or presentations.
- Work both independently and collaboratively in the classroom and in the laboratory.
- Apply learned concepts to everyday situations and experiences and critically evaluate contributions to science reported in the media; identify valid approaches to scientific problem solving and reporting.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: MATH 1130, with a C or better, or MATH 1150, with a C or better.

Communication Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/communication-transfer-pathway/)

Program Description

The Communication Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated Communication bachelor's degree programs at most Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Communication Transfer Pathway AA and transferring into a designated bachelor's program in communication at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits.

In order to graduate and be guaranteed admission to a Minnesota State university's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
COMM 1105	Interpersonal Communication	3	
COMM 1110	Public Speaking	3	1
COMM 1115	Intercultural Communication	3	1,7
COMM 1125	Small Group Communication	3	
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
MCOM 1400	Intro to Mass Communication	3	9
COMM 1120	Media & Society	3	5, 8
COMM 2205 or COMM 1600	Relationship Communication Communication in the Workplace	3	5
	Goal 3: Natural Science (one course that also fulfills Goal 10)	6	3, 10
	Goal 4: Mathematical/Logical Reasoning	3	4
	Goal 5: History & Social Behavioral Sciences – non COMM Course	3	5
	Goal 6: Humanities & Fine Arts (must include 3 credit literature course)	9	6
	HPER - Physical Education/Health course(s)	2	
	General electives	9	
Total Credits		**60**	

Courses may require a prerequisite

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math. Connect with your advisor for assistance with course placement.

Criminal Justice Transfer Pathway AS Degree - 60 credits

Program website: (https://www.lsc.edu/degrees/criminal-justice-transfer-pathway-as/)

Program Description

The Criminal Justice Transfer Pathway AS offers students a powerful option: the opportunity to complete an Associate of Science degree with course credits that directly transfer to designated Criminal Justice bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field.

Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and math.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:

A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math. Connect with your advisor for assistance with course placement.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
SOC 1111	Intro to Sociology	3	5, 7
SOC 1114	Criminal Justice in Society	3	5, 9
SOC 1125 or SOC 1165 or SOC 1185	Social Deviance or Patterns of Domestic Violence or Gender, Power and Society	3	5, 8 5, 9 5, 7
SOC 1130	Juvenile Delinquency	3	5, 9
SOC 1170	Drugs and Society	3	5, 8
SOC 2127	Race, Power, and Justice	3	7
SOC 2123 or Goal Area 10 course	People and the Environment	3	5, 10
COMM 1100 or COMM 1105	Intro to Communication or Interpersonal Communication	3	1
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
HPER	HPER course(s)	2	
MATH 2210	General Statistics	3	4
PHIL 1130	Ethics	3	6, 9
PSYC 1120	General Psychology	3	5, 7
	Goal Area 3: Natural Science	6	3
	Goal 6: Humanities & Fine Arts	6	6
	Unrestricted Electives	6	
Total Credits		**60**	

Courses may require a prerequisite

Economics Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/economics-transfer-pathway-2/)

Program Description

The Economics Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated Economics bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field.

Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Minnesota State Economics Transfer Pathway and transferring into a designated bachelor's program in Economics at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State University's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
ECON 1150	Principles of Economics: Macroeconomics	3	5, 8
ECON 1160	Principles of Economics: Microeconomics	3	5
MATH 1100 or higher	College Algebra (refer to designated university requirements)	4-5	4
MATH 2210	General Statistics	3	4
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
	Goal 1: Communication	3	1
	Goal 2: Met by completion of the full 40 MTC		2
	Goal 3: Natural Sciences (must include one course that also fulfills Goal 10)	6-9	3, 10
	Goal 5: History & Social and Behavioral Sciences (not ECON)	3	5
	Goal 6: Humanities & Fine Arts (must include one literature course)	9	6
	Goal 7: Human Diversity (may be met by COMM 1115)	0-3	7
	Goal 9: Ethic & Civic Responsibility	0-3	9
	HPER course(s)	2	
	General Electives	7-17	
Total Credits		**60**	

Courses may require a prerequisite

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Completion of MATH 0970 – Intermediate Algebra, with a C or better (or equivalent or higher). MATH 0970 may not be taken concurrently with Semester I coursework. Completion of MATH 0970 – Intermediate Algebra, with a C or better (or equivalent or higher). MATH 0970 may not be taken concurrently with Semester I coursework.

English Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/english-transfer-pathway-2/)

Program Description

The English Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated English bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Minnesota State English Transfer Pathway and transferring into a designated bachelor's program in English at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State University's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework

Mathematics:

A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
COMM 1100 or COMM 1110	Introduction to Communication Public Speaking	3	1
MATH 1100 or PHIL 1125	College Algebra (4 cr) or higher (refer to university requirements) Logic (3 cr)	3-4	4
ENGL 2020 or ENGL 2022 or ENGL 2024 or ENGL 2026	Introduction to the Short Story Introduction to the Novel Introduction to Drama Introduction to Poetry	3	6
ENGL 2101 or ENGL 2102 or ENGL 2105 or ENGL 2106	British Literature: 12th-17th Century British Literature: 18th Century to Present American Literature: Pre-Colonial to Civil War American Literature: Civil War to the Present	3	6
ENGL 2140	World Literature	3	8
ENGL 2116 or ENGL 2120 or ENGL 2130	American Immigrant Literature African- American Literature Native American Literature	3	7
ENGL 2000 or ENGL 2002 or ENGL 2004	Poetry Writing Creative Nonfiction Writing Fiction Writing	3	6
ENGL 2160	Environmental Literature	3	10
ENGL 1100	Creative Writing	3	1
ENGL 1102	Social Media Writing	3	1
Goal Area 3	Natural Sciences (from two different areas)	6	3
Goal Area 5	History & Social and Behavioral Sciences—3 courses	9	5
Goal Area 9	Ethic & Civic Responsibility	3	9
HPER	Physical Education/Health course	2	
	Unrestricted Electives	3	
Total Credits		**60**	

Courses may require a prerequisite

Exercise Science Transfer Pathway AS Degree - 60 credits

Program website: (https://degrees.lsc.edu/exercise-science-transfer-pathway/)

Program Description

The Exercise Science Transfer Pathway AS offers students a powerful option: the opportunity to complete an Associate of Science degree with course credits that directly transfer to designated Exercise Science bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Minnesota State Exercise Science Transfer Pathway and transferring into a designated bachelor's program in Exercise Science at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State University's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
HPER 1100	Career Exploration in Exercise Science	3	
HPER 1324	Personal Wellness	3	
HPER 1116	Resistance Training	1	
HPER 1302	Nutrition	3	
PTA 1460*	Functional Kinesiology I	2	
PTA 1562*	Functional Kinesiology II	3	
ALTH 1410	Medical Terminology	1	
Exercise Science Electives HPER 1330 HPER 1334 HPER 1332 HPER 1304 HPER 1326 ALTH 1430	Choose a minimum of 6-8 credits from the following: Fundamentals of Training Theory (2) Assessment of Physical Fitness (3) Introduction to Exercise Science (3) Nutrition in Athletic Performance (2) Lifetime Fitness (2) First Aid & CPR/AED for Health Care Professionals (1)	6-8	
ENGL 1106	College Composition I	3	1
ENGL 1109*	College Composition II	3	1
COMM 1105	Interpersonal Communication	3	1
MATH 2210*	General Statistics	3	4
BIOL 1120	General Biology I	4	3
CHEM 1110 or CHEM 1210	Aspects of Chemistry I or General Chemistry I	3 (5)	3
BIOL 1140	Human Anatomy & Physiology I	4	3
BIOL 1141	Human Anatomy & Physiology II	4	3
PSYC 1120	General Psychology	3	5,7
SOC 1170	Drugs and Society	3	5,8
SOC 2120 or SOC 2123	Social Problems or People and the Environment	3	5, 9 or 10
Total Credits		**60**	

*Courses may require a prerequisite

Health Science Broad Field AS Degree - 60 credits

Program website: (https://www.lsc.edu/degrees/health-sciences-broad-field-as/)

Program Description

Associate of Science Degree is awarded upon completion of a 60-credit academic program in scientific, technological, or other professional fields. The associate of science degree requires a minimum of 30 credits selected from at least six of the ten goal areas of the Minnesota Transfer Curriculum. The Associate of Science degree is designed to transfer in its entirety to one or more related baccalaureate degree programs. Students who intend to pursue an Associate of Arts (A.A.) degree along with this degree are advised to work closely with an advisor, to assure that all ten goal areas of the Minnesota Transfer Curriculum will be met.

Program Outcomes

Upon graduation, students will be able to transfer into a four-year college as a junior in a baccalaureate program designed for careers in the medical field.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework

Required Courses

Course	Course Title	Credits
BIOL 1120*	General Biology I	4
BIOL 1140*	Human Anatomy and Physiology I	4
BIOL 1141*	Human Anatomy and Physiology II	4
BIOL 1170*	Microbiology	3
CHEM 1210*	General Chemistry I	5
COMM 1115*	Intercultural Communication	3
ENGL 1106*	College Composition I	3
ENGL 1109*	College Composition II	3
FYE 1000	First Year Experience	1
HPER 1302	Nutrition	3
MATH 1100*	College Algebra	4
MATH 2210*	General Statistics	3
PHIL 1130*	Ethics	3
PSYC 1120*	General Psychology	3
PSYC 1135*	Lifespan Developmental Psychology	3
SOC 1111*	Introduction to Sociology	3
	General Education Electives	8
Total credits		**60**

*Requires a prerequisite

History Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/history-transfer-pathway)

Program Description

The History Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated History bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field.

Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's History Transfer Pathway AA and transferring into a designated bachelor's program at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits.

In order to graduate and be guaranteed admission to a Minnesota State University's designated program in mathematics you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: College Level

Required Courses

Course	Course Title	Credits	MnTC Goal
FYE 1000	First Year Experience	1	
HIST 1210 or HIST 1220	United States History to 1877 United States History since 1877	3	5,7 5,7
HIST 1130 or HIST 1135 or HIST 1110 or HIST 1120	World History, Ancient to 1500 World History, 1500 to Present European History: Ancient to 1500 European History: 1500 to Present	3	5,8 5,8 5,7 5,8
HIST	One additional course to complete a sequence; acceptable sequences include: • HIST 1210 & HIST 1220 • HIST 1130 & HIST 1135 • HIST 1110 & HIST 1120	3	5,7, or 8
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
MATH 2210	General Statistics (see transfer institution if pursuing Social Studies Ed)	3	4
	Goal 1: Communication	3	1
	Goal 3: Natural Sciences, six credits from 2 areas	6	3
	Goal 5: History & Social and Behavioral Sciences, one non-History course	3	5
	Goal 6: Humanities & Fine Arts, at least one literature course	9	6
	Goal 8 Course (if not fulfilled by HIST 1130, 1135 or 1120)	0-3	8
	Goal 9: Ethics & Civic Responsibility	3	9
	Goal 10: People & the Environment	3	10
HPER	Physical Education/Health	2	
	Electives	9-12	

Total Credits **60**

Courses may require a prerequisite

Suggested unrestricted electives:

Course	Course Title	Credits	MnTC
HIST 1230	World History Since 1945	3	5, 8
HIST 2110	Minnesota History	3	5,10
HIST 2125	The World Wars 1914-1945	3	5, 8
HIST 2130	America's War in Vietnam	3	5, 7
PSCI 1140	International Relations and Global Issues	3	5, 8

Mathematics Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/mathematics-transfer-pathways/)

Program Description

The Mathematics Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated Mathematics bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Mathematics Transfer Pathway AA and transferring into a designated bachelor's program at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits.

In order to graduate and be guaranteed admission to a Minnesota State University's designated program in mathematics you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math.

Required Courses

Course	Course Title	Credits	MnTC Goal
FYE 1000	First Year Experience	1	
MATH 2204	Calculus I	5	4
MATH 2205	Calculus II	5	4
MATH 2206	Calculus III	4	
MATH 2220	Differential Equations with Linear Algebra	4	
COMM 1100 or COMM 1105 or COMM 1110 or COMM 1115	Introduction to Communication or Interpersonal Communication or Public Speaking or Intercultural Communication	3	1
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
	Goal Area 3: Natural Sciences. Select two courses from at least two different areas – one course must also satisfy Goal Area 10: People & Environment	6	3, 10
	Goal Area 5: History, Social and Behavioral Sciences – one course must also satisfy Goal Area 7: Human Diversity, AND one course must also satisfy Goal Area 9: Ethic & Civic Responsibility	9	5, 7, 9
	Goal Area 6: Humanities and Fine Arts – one course must also satisfy Goal Area 8: Global Perspective and must include one literature course	9	6, 8
HPER	Physical Education/ Health credits	2	
	Unrestricted elective credits	3-6	

Total Credits **60**

Courses may require a prerequisite

Suggested unrestricted electives:

Course	Course Title	Credits	MnTC Goal
CIS 1415	Introduction to Programming	4	
MATH 2210	General Statistics	3	4
PHYS 1201	Intro to Physics I	5	3
PHYS 1202	Intro to Physics II	5	3

Media Studies and Production Diploma - 27 credits

Program website: (https://degrees.lsc.edu/video-production/)

Program Description

This program is designed to prepare the graduate for a wide variety of positions in media production. Graduates are trained for jobs ranging from on-air personalities to positions on production or news teams. Graduates can also gain skills needed for careers in multimedia and film style production, and media project & production management. Lake Superior College media studies students receive valuable hands-on experience in LSC's own audio and video studios, as well as through internships and experiences at local broadcast stations and media agencies.

Program Outcomes

Upon graduation, students will be able to:

- Create, produce, record, and edit video projects and productions.
- Voice, produce, record, and edit audio projects and productions.
- Work collaboratively in teams to produce media productions.
- Apply industry terminology and techniques common to media production and process.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
ENGL 1106*	College Composition I	3
MCOM 1400	Intro to Mass Communication	3
MCOM 1420*	Digital Video Production	3
MCOM 1422*	Audio for the Media	3
MCOM 1424	Digital Video Editing	3
MCOM 1426	Project/Production Management	3
MCOM 1435	Video Graphics and Animation	3
MCOM 1797*	Media Studies Internship	3
	Electives (refer to Table 1)	3
Total credits		**27**

*Requires a prerequisite or instructor's consent

Table 1: Electives

Choose 6 credits from the following:

Course	Course Title	Credits
ART 1111*	Introduction to Digital Art	3
ART 1500*	Digital Photography I	3
CIS 1406*	HTML & CSS	3
CIS 1412*	Web Graphics I	3
COMM 1125*	Small Group Communication	3
ELTN 1422*	Media and Cabling	2
ENGL 1102	Social Media Writing	3
HUM 2015*	Film Appreciation	3
MUSC 1110	Appreciation of Music	3

*Requires a prerequisite

Personal Training Certificate - 16 credits

Program website: (https://degrees.lsc.edu/personal-trainer/)

Program Description

The Personal Training Certificate is a one-year program designed to prepare students for a career in the fitness industry. Graduates of the Personal Training Certificate program are trained to assess, design, and implement individual and group exercise fitness programs for individuals who are apparently healthy and those with controlled disease. They are skilled in evaluating health behaviors and risk factors, conducting fitness assessments, writing appropriate exercise prescriptions, and motivating individuals to modify negative health habits and maintain positive lifestyle behaviors for health promotion. Upon successful completion of this certificate, the student should be well prepared to sit for the National Council on Strength & Fitness certification exam.

Program Outcomes

Upon graduation, students will have successfully completed:

- An understanding of the characteristics, structure, and function of all components of anatomy, cardiorespiratory, and energy systems of the human body.
- The application of critical thinking skills to develop appropriate fitness prescriptions for clients that minimizes risk and maximizes benefits.
- The demonstration of the ability to design safe individualized fitness programs to meet specific outcomes including dietary recommendations.
- The practice of operating within a field of understanding along with the rights and responsibilities to follow established guidelines.

Required Courses

Course	Course Title	Credits
HPER 1116	Resistance Training	1
HPER 1304	Nutrition in Athletic Performance	2
HPER 1326	Lifetime Fitness	2
HPER 1330	Fundamentals of Training Theory	2
HPER 1322	Personal Training	3
HPER 1332	Introduction to Exercise Science	3
	Choose one of the following:	3
HPER 1100	Career Exploration in Exercise Science	
HPER 1302	Nutrition	
HPER 1306	Tobacco, Alcohol and Other Drugs	
HPER 1324	Personal Wellness	
HPER 1334	Assessment of Physical Fitness	
Total Credits		**16**

Psychology Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/psychology-transfer-pathway/)

Program Description

The Psychology Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated psychology bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Minnesota State Psychology Transfer Pathway and transferring into a designated bachelor's program in psychology at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State University's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math. Connect with your advisor for assistance with course placement.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
PSYC 1120	General Psychology	3	5,7
PSYC 1135 or PSYC 1140 or PSYC 2145	Lifespan Developmental Psychology Abnormal Psychology Social Psychology	3	5,7 5,7 5,7
PSYC 2165	Statistics for Psychology or MATH 2210, General Statistics if PSYC 2165 is not available (3 cr)	4	5
PSYC	Any additional PSYC course	3	5
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
COMM 1100 or COMM 1105	Introduction to Communication Interpersonal Communication	3	1 1
MATH 2210 or MATH 1100	General Statistics (3 cr) College Algebra (4 cr) or higher	3-4	4
HPER	HPER course(s)	2	
	Goal Area 3: Natural Sciences – two courses	6-8	3
	Goal Area 5: History, Social, and Behavioral Sciences – non-PSYC course	3	5
	Goal Area 6: Humanities and Fine Arts – three courses (must include a literature course)	9	6
	Unrestricted Electives (Courses satisfying goal areas 8, 9, & 10 if not completed above)	12-14	
Total Credits		**60**	

Courses may require a prerequisite

Sociology Transfer Pathway AA Degree - 60 credits

Program website: (https://degrees.lsc.edu/sociology-transfer-pathway-2/)

Program Description

The Sociology Transfer Pathway AA offers students a powerful option: the opportunity to complete an Associate of Arts degree with course credits that directly transfer to designated sociology bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field. Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University Moorhead; Southwest Minnesota State University; St. Cloud State University; and Winona State University.

Program Outcomes

A student completing Lake Superior College's Minnesota State Sociology Transfer Pathway and transferring into a designated bachelor's program in psychology at a Minnesota State university will have junior standing and may complete the bachelor's degree within an additional 60 credits. In order to graduate and be guaranteed admission to a Minnesota State University's designated program you must earn an overall grade point average as indicated by the university to which you will transfer.

Pre-program Requirements

To begin this program, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics: A college level math course is required for graduation. Students must satisfy course pre-requisites for college level math courses, which may require more than one semester of additional math.

Required Courses

Course	Course Title	Credits	MnTC Goal Area
FYE 1000	First Year Experience	1	
SOC 1111	Intro to Sociology	3	5, 7
SOC 1114 or SOC 2120	Criminal Justice in Society or Social Problems	3	5, 9 or 5, 9
SOC 1125 or SOC 1170 or Goal Area 8 course	Social Deviance or Drugs and Society	3	5, 8 or 5, 8
SOC 1145 or SOC 1165 or SOC 1185	Race, Class, and Gender or Patterns of Domestic Violence or Gender, Power and Society	3	5, 7 or 5,9 or 5,7
SOC 1155 or Goal Area 7 course	Human Sexuality	3	5, 7
SOC 2123 or Goal Area 10 course	People and the Environment	3	5, 10
COMM 1100 or COMM 1105	Intro to Communication or Interpersonal Communication	3	1
ENGL 1106	College Composition I	3	1
ENGL 1109	College Composition II	3	1
HPER	HPER course(s)	2	
PSYC 2145 or non-Sociology Goal Area 5 course	Social Psychology	3	5, 7
	Goal Area 3: Natural Science	6	3
	Goal Area 4: Mathematical/Logical Reasoning	3	4
	Goal 6: Humanities & Fine Arts	9	6
	Unrestricted Electives	9	
Total Credits		**60**	

Courses may require a prerequisite

Health

Dental Hygiene AAS Degree - 82 credits

Program Website: (https://degrees.lsc.edu/dental-hygienist/)

Program Description

The dental hygiene program provides academic and clinical educational opportunities for capable individuals to acquire the knowledge, skills, and attitude for the professional practice of dental hygiene. The curriculum focuses on basic sciences, as well as essential technical and clinical skills in preparation for providing preventive dental hygiene services to the public. Dental hygienists are preventive oral health professionals, licensed in dental hygiene, who provide educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health.

Due to the nature of the clinical experiences in the dental hygiene program, students will be participating in a work environment that has the potential of exposure to bloodborne pathogens. All students accepted into the dental hygiene program are provided with written policy and instruction on infection control protocol to reduce the risk of disease transmission. Policies and procedures on the dental hygiene program's infection control protocol are available to all applicants upon request. Other work-related disorders associated with the practice of dental hygiene could result from repetitive activities and exposure to high decibel sounds. Advancements in design and technology in the profession are continually evolving to minimize the effects. The program complies with all institutional, local, state, and federal policies.

Program Outcomes

- To prepare graduates with the knowledge and clinical competence required to provide current comprehensive dental hygiene services.
- Interact effectively with patients, peers, and dental health care members utilizing professional, written, and oral communication.
- Develop an identity of self, supportive of continuous learning and professional endeavor.
- Exhibit ethical behavior consistent with professional conduct.
- Initiate and assume responsibility for health promotion and disease prevention activities.

Pre-Program Courses

Course	Course Title	Credits
BIOL 1140	Human Anatomy and Physiology I	4
BIOL 1141	Human Anatomy and Physiology II	4
BIOL 1170	Microbiology	3
CHEM 1110	Aspects of Chemistry I	3
ENGL 1106 ENGL 1109	College Composition I (or) College Composition II	3
PSYC 1135 PSYC 1120	Lifespan Developmental Psychology (or) General Psychology	3

Required Courses

Course	Course Title	Credits
DENH 1401	Dental Anatomy	2
DENH 1405	Developmental Head & Neck Anatomy	2
DENH 1420	Dental Hygiene Theory and Practice I	5
DENH 1425	Dental Hygiene Practice I SimLab	1
DENH 1470	Medical and Dental Emergencies	1
DENH 2550	Community Dental Health	2
COMM 1100 or COMM 1105 or COMM 1110	Introduction to Communication or Interpersonal Communication or Public Speaking	3
DENH 1505	General and Oral Pathology	2
DENH 1511	Dental Materials	4
DENH 1520	Dental Hygiene Theory II	2
DENH 1528	Dental Hygiene Practice II	4
DENH 1530	Dental Radiology	3
DENH 1560	Periodontology I	1
DENH 2401	Pharmacology for the Dental Hygienist	2
DENH 2420	Dental Hygiene Theory III	2
DENH 2428	Dental Hygiene Practice III	6
DENH 2431	Radiographic Interpretation	2
DENH 2460	Periodontology II	2
DENH 2501	Pain Management	2
DENH 2520	Dental Hygiene Theory IV	2
DENH 2528	Dental Hygiene Practice IV	6
HPER 1302	Nutrition	3
SOC 1111	Introduction to Sociology	3
Total Credits		**82**

Courses may require a prerequisite

- Acquire and synthesize information in a critical, scientific, and effective manner.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

Admission to the Dental Hygiene Program is competitive, based on pre-program course GPA.

Prior to application to the program, all pre-program courses listed above must be completed with a grade of "C" or better. The minimum cumulative GPA of pre-program courses must be 3.0 or better.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:
- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: You will need a recent physical examination including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required upon acceptance. ALTH1430 will satisfy this requirement. Background Study approval is required from the State of Minnesota. Students must complete 20 hours of a job shadowing experience prior to taking any DENH course.

Limited X-Ray Machine Operator (LXMO) Diploma – 40 credits

Program Website: (https://www.lsc.edu/degrees/limited-xray-machine-operator-lxmo-diploma/)

Program Description

A Limited X-Ray Machine Operator (LXMO) is a professional with a restricted scope certificate who performs diagnostic x-ray procedures on specific anatomical sites. Success in this field requires excellent communication, critical thinking, and a compassionate nature, along with a strong aptitude for science. While their knowledge must be on par with general radiographers, LXMOs have limitations in their duties, focusing solely on specific radiography content areas.

Limited X-Ray Machine Operators (LXMO) graduates can apply their expertise in anatomy, physiology, and physics to produce essential images that aid physicians in diagnosing various medical conditions, injuries, and diseases.

Career and continuing education opportunities are diverse. Radiographer R.T.(R) credential completion, Hospitals, clinics, health care facilities, industrial plants, educational centers, research centers, and government agencies offer employment.

Program Outcomes

- Students will analyze images for accuracy and appropriateness.
- Students will develop communication skills for effective clinical competence.
- Students will demonstrate clinical competence in anatomy specific areas.
- Students will demonstrate competency in the principles of radiation protection standard.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
ALTH 1440	Medical Ethics and the Law	1
BIOL 1140	Human Anatomy and Physiology I	4
BIOL 1141	Human Anatomy and Physiology II	4
RADT 1402	Introduction to Medical Imaging	1

Required Courses

Course	Course Title	Credits
ENGL 1106 or ENGL 1109	College Composition I or College Composition II	3
PSYC 1135 or SOC 1111	Lifespan Developmental Psychology or Introduction to Sociology	3
RADT 1404	Patient Care in Medical Imaging	1
RADT 1453	Radiographic Procedures I	3
RADT 1455	Concepts of Image Production I	1
RADT 1480	Radiation Biology & Protection	2
RADT 1463	Radiograpic Procedures II	4
RADT 1559	Clinical Radiography Theory I	0.5
RADT 1538	LXMO Clinical Radiography I	2.5
RADT 1560	Concepts of Image Production II	3
RADT 1548	LXMO Clinical Radiography II	5.5
RADT 1569	Clinical Radiography Theory II	0.5
Total credits		**40**

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All pre-program courses in the program need to be completed with a grade of "C" or better to progress into the next semester. To be considered program ready for fall, the minimum cumulative GPA of pre-program courses must be 3.0 or better.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. Program students will be required to complete CPR prior to the start of the first semester of the program.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework.

There are other ways to qualify. Visit Course Placement (lsc.edu/course-placement) to find out more.

NOTE: You will need to sign a health declaration form including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. Program students will be required to complete CPR prior to the start of the first semester of the program. Background Study approval is required from the State of Minnesota and/or Wisconsin. A national criminal background study is required by all clinical sites. Students assigned to a clinical site requiring a criminal background study will be informed of this requirement prior to the start of the clinical experience.

Massage Therapy Diploma – 36 credits

Program Website: (https://degrees.lsc.edu/massage-therapy/)

Program Description

The Massage Therapist Program prepares the graduate for a career in massage. The graduate therapist is able to conduct a thorough assessment of clients, create a treatment plan, implement the treatment plan, and observe the client's response to the treatment. Therapeutic massage, as well as many specialty techniques are used. Documentation is done to record session information, and treatment's effects on the body. Career development, including the creation of a business plan, is taught. Therapists may find opportunities to work in a variety of settings, from running their own business, to working in wellness/fitness centers, clinical environments, and spas.

Program Outcomes

- Knowledge and ability to observe and assess the client's musculoskeletal, connective tissue and lymphatic systems.
- Propose and implement a treatment plan based on the client's goals.
- Observe and document the client's response to the treatment.
- Produce a comprehensive personalized business plan for starting, managing and promoting a massage practice.
- Demonstrate comfort with ethical issues of running a business and massage as a touch-based profession.
- Demonstrate the ability to adapt massage techniques to pregnant, infant, athletic, and medically fragile populations.
- Apply hot stone, lymphatic facilitation, neuromuscular retraining, and Reflexology techniques.
- Demonstrate self-awareness and the theoretical understanding of how to prevent therapist injury and burnout.
- Recognize massage contraindications and cautions.
- Complete 776 hours of instruction, 125 of which are Supervised Clinical Instruction.

Required Courses

Course	Course Title	Credits
ALTH 1430	First Aid and CPR/AED for Health Care Professionals	1
MTP 1004	Massage Therapy Pathology	3
MTP 1026	Basic Therapeutic Massage	4
MTP 1028	Massage Therapy Clinical Preparation	1.5
MTP 1030	Massage Therapy Anatomy I, Physiology and Kinesiology	4
MTP 1035	Ethics, Communication and Professionalism in Massage Therapy	1.5
MTP 1037	Adjunctive Therapies of the Massage Profession	2
MTP 1039	Massage Therapy Awareness and Injury Prevention I	1
MTP 1044	Massage Therapy Anatomy II	3
MTP 1045	Advanced Therapeutic Massage	4
MTP 1051	Specialty Sessions in Massage Therapy	4
MTP 1053	Massage Therapy Student Clinic	2
MTP 1054	Eastern Healing and Modality Overview	1
MTP 1059	Massage Therapy Awareness and Injury Prevention II	1
MTP 1060	Successful Career Development for Massage Practitioners	3
Total Credits		**36**

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

All courses on the guide need to be completed with a grade of "C" or better to progress into the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: You will need a recent physical examination including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. ALTH1430 will satisfy this requirement. Background Study approval is required from the State of Minnesota.

***Medical Assistant Diploma - 40 credits – PROGRAM UNDER REDESIGN

Program Website: (https://degrees.lsc.edu/medical-assistant/)

Program Description

The Medical Assistant program is a 40-credit diploma program that prepares students for work in ambulatory care or medical office settings. The medical assistant is a multi-skilled professional with abilities in clinical, laboratory, and secretarial areas. This program includes coursework in communication, anatomy and physiology, medical office, laboratory, and clinical skills.

Program Outcomes

- Comply with safety and compliance procedures and policies.
- Demonstrate organized work skills resulting in efficient time and material management and utilization.
- Employ quality assurance techniques to monitor procedures, equipment, and competency.
- Demonstrate specimen collection and processing practices employed in the medical assistant profession.
- Model professional behaviors, ethics and appearance.
- Perform mathematical functions required by medical assistants in medication preparation.
- Perform information processing functions in the ambulatory care environment to include Electronic Medical Record functions.
- Communicate verbally and in written format with colleagues and patients in a professional manner.
- Perform administrative and clinical procedures according to standard operating procedures.
- Relate basic biological, ethical, legal, and sociological principles to clinical facility and patient situations.

Pre-Program Courses

Course	Course Title	Credits
ADSC 1430	Business Computers/Microsoft Office	3
ALTH 1410	Medical Terminology	1
BIOL 1000 or BIOL 1005 and BIOL 1140 and BIOL 1141	Human Body in Health and Disease or Introduction to Cell Biology and Human Anatomy and Physiology I and Human Anatomy and Physiology II	5 1 4 4

Required Courses

Course	Course Title	Credits
ALTH 1440	Medical Ethics and Law	1
MEDA 1405	Medical Assistant Administrative Procedures I	3
MEDA 1406	Medical Assistant Administrative Procedures II	3
MEDA 1410	Professionalism & Safety in Healthcare	1
MLTN 1574	Collection Skills	2
PSYC 1135	Lifespan Developmental Psychology	3
MEDA 1505	Medical Assistant Clinical Procedures I	2
MEDA 1506	Medical Assistant Clinical Procedures II	3
MEDA 1510	Pharmacology and Math for Medical Assistants	2
MLTN 1518	Medical Laboratory Procedures	3
COMM 1100 or COMM 1105 or ENGL 1106	Introduction to Communication or Interpersonal Communication or College Composition I	3
MEDA 2417	Medical Assistant Externship	4
MEDA 2420	Medical Assistant Certification Exam Review	1

Total Credits 40

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:
- MATH 0950/0955 – Essentials of Mathematics: Intermediate/Advanced

NOTE: You will need a recent physical examination including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association BLS Healthcare Provider OR American Red Cross BLS/CPR for Healthcare Providers and First Aid is required for all clinical courses. ALTH1430 will satisfy this requirement. Background Study approval is required from the State of Minnesota/or Wisconsin. A national criminal background study is required by some clinical sites. Students assigned to a clinical site requiring a criminal background study will be informed of this requirement prior to the start of the clinical experience.

Medical Laboratory Assistant Certificate - 24 credits

Program Website: (https://www.lsc.edu/degrees/medical-laboratory-assistant-certificate/)

Program Description

A Medical Laboratory Assistant (MLA) is a multi-skilled person whose skills are focused on assisting in the medical laboratory. Competencies include medical terminology, phlebotomy skills, blood and body fluid processing, ability to assess validity of samples collected for laboratory tests and maintain validity of samples through the processing phase. MLAs must understand and comply with government regulations and safety in regard to human testing. Other skills include loading automated instrumentation, performing waived level laboratory testing, engaging in communication with laboratory staff as well as staff throughout the healthcare environment in a professional and effective manner. MLAs solve problems and complete tasks using verbal and non-verbal skills including computer systems. This program includes completion of the Phlebotomy Certificate and prepares students for certification as an MLA. Students may also prepare for entry into the MLT program.

Program Outcomes

- Prepare blood and body fluid specimens for analysis according to industry standards and prepare reagents, standards, and controls.
- Perform data entry using a Laboratory Information System (LIS).
- Perform phlebotomy following CLSI guidelines.
- Display behaviors and communication skills appropriate for the healthcare environment.
- Demonstrate HIPAA/confidentiality in the classroom and during clinical practicum.
- Demonstrate compliance with safety principles and guidelines as well as other laboratory regulations that may impact clinical site accreditation and patient safety.
- Demonstrate achievement in entry level competencies in performance of clinical laboratory waived testing procedures.
- Demonstrate the ability to pipet, prepare patient dilutions, prepare reagents, controls, standards, and other materials in support of clinical laboratory personnel performing moderate and high complexity analyses.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
ALTH 1440 or PHIL 1130	Medical Ethics Ethics (MLT/MLS track)	1 (3)
MEDA 1410	Professionalism and Safety in Healthcare	1
MTLN 1574	Collection Skills	2

Required Courses

Course	Course Title	Credits
MLTN 2577	Phlebotomy Internship	1
COMM 1105 or ENGL 1106	Interpersonal Communication or College Composition I (MLT/MLS track)	3 (3)
BIOL 1000 or BIOL 1005 BIOL 1140 BIOL 1141	Human Body in Health and Disease or (MLT/MLS track) Introduction to Cell Biology Human Anatomy and Physiology I Human Anatomy and Physiology II	5 (1) (4) (4)
CHEM 1110 or CHEM 1210	Aspects of Chemistry I (MLT track) or General Chemistry I (MLS track)	3 (5)
MLTN 1610	Medical Laboratory Assistant Basics	4
MLTN 1612	Medical Laboratory Assistant Clinical Practicum	3
Total Credits		**24**

Courses may require a pre-requisite. Refer to course outline or check with an advisor

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

You may be required to complete additional (or less) coursework, dependent upon the results of your Computerized Placement Test (CPT) and/or previous coursework completed, or certifications awarded.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Prior to participating in MLA program courses, all pre-program courses listed must be completed with a GPA of 2.6 or better. A minimum of "C" is required in all college level courses. All program courses must be completed with a "C" or better to advance in the program.

Pre-Program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra or MATH 1100 – College Algebra or
- Completion of MATH 0955 or equivalent with a "C" or better. May not be taken concurrent with program courses.

NOTE: You will need current immunizations and current negative Tuberculosis (TB) screening. Background Study approval is required from the State of Minnesota/or Wisconsin. A national criminal background study is also required.

Medical Laboratory Technician AAS Degree - 67 credits

Program Website: (https://degrees.lsc.edu/mlt/)

Program Description

The Medical Laboratory Technician (MLT) program provides students with entry level knowledge and technical skills required to work in a medical laboratory. MLTs are responsible for completing clinical tests on blood and body fluids that provide important results to physicians for the diagnosis, treatment and monitoring of disease. MLTs use automated instruments and manual laboratory methods to accomplish accurate and timely testing in each department of the clinical laboratory. Skills learned include counting and identifying cells in Hematology, using sophisticated instrumentation to perform chemical analysis, matching patient blood types to donors for transfusion and preparing samples in Microbiology. Students will also gain skills in coagulation testing, urinalysis, molecular diagnostics and blood collection (phlebotomy). MLTs must work with Medical Laboratory Scientists (MLS), physicians, phlebotomists, nurses and other healthcare professionals as they collect patient samples, communicate test results and resolve diagnostic discrepancies. Students should have a strong interest in science and math, strong communication skills, ability to work independently and as part of a team, ability to prioritize workloads and make accurate decisions under pressure, possess moral and intellectual integrity, and good motor coordination. Upon completion of the MLT program, national certification is through the American Society for Clinical Pathology (ASCP) Board of Registry exam. This is generally a requirement for employment. Students who possess a bachelor of Science in Biology, chemistry or a related field, earn the MLT AAS and pass the MLT Board of Certification (BOC) exam upon graduation, can often sit for the Medical Laboratory Scientist (MLS) BOC in one year. St. Cloud State University offers their Medical Laboratory Scientist (MLS) program in an online/hybrid format for MLTs who are certified and working. Students who plan to continue in the MLS program should discuss this with their advisor before registering for coursework.

Program Outcomes

- Comply with laboratory safety and compliance procedures and policies.
- Demonstrate knowledge of principles, operations, and maintenance of laboratory equipment and instruments.
- Demonstrate organized work skills resulting in efficient time and material management and utilization.
- Employ quality assurance techniques to monitor procedures, equipment, and competency.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
BIOL 1140	Human Anatomy & Physiology I	4
BIOL 1141	Human Anatomy & Physiology II	4
CHEM 1110 or CHEM 1210	Aspects of Chemistry I or General Chemistry I (MLS track)	3 (5)
ENGL 1106	College Composition I	3
MEDA 1410	Professionalism and Safety in Healthcare	1
MTLN 1574	Collection Skills	2
PHIL 1130	Ethics	3

Required Courses

Course	Course Title	Credits
BIOL 1170	Microbiology	3
MLTN 1400	Intro to Medical Laboratory Techniques and Instrumentation	2
MLTN 1410	Immunology and Serology	3
MLTN 1424	Urinalysis and Body Fluids	3
MLTN 1420	Hematology	3
MTLN 1422	Medical Microbiology	4
MTLN 1426	Immunohematology	2
MLTN 1428	Clinical Chemistry	2
MLTN 1430	Molecular Diagnostics	1
MLTN 2420	Special Hematology	3
MLTN 2422	Special Medical Microbiology	2
MLTN 2426	Special Immunohematology	2
MLTN 2428	Special Clinical Chemistry	2
MLTN 2444	Medical Laboratory Skill Development	2
MLTN 2500	Medical Laboratory Technician Seminar	1
MLTN 2505	Medical Laboratory Technician Clinical Practicum	11
Total Credits		**67**

Courses may require a pre-requisite.

- Correlate laboratory findings to common disease processes.
- Demonstrate standard specimen collection and processing practices employed in medical laboratory professions.
- Model professional behaviors, ethics, and appearance.
- Identify pre-analytical, analytical, and post-analytical variables that affect test accuracy and take appropriate actions.
- Perform mathematical functions as required by laboratory procedures.
- Perform information processing functions in the clinical laboratory.
- Communicate verbally and in written format with colleagues and patients in a professional manner.
- Perform a variety of diagnostic and screening test procedures according to standard operating procedures.
- Relate basic discipline principles (hematologic, chemical, immunologic, etc.) to laboratory test procedures and test results.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Prior to taking any Medical Laboratory Technician required program courses, all pre-program courses listed must be completed with a GPA of 2.8 or better. A minimum of "C" is required in all college level courses. All program courses must be completed with a "C" or better to advance to the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:
- Completion of MATH 0970 - Intermediate Algebra with a "C" or better (or equivalent or higher). MATH 0970 may not be taken concurrently with Semester I coursework.

NOTE: You will need a recent physical examination including current immunizations and current negative Tuberculosis (TB) screening. Students are not required to complete CPR training, but completion of BLS CPR training is highly encouraged. Background Study approval is required from the State of Minnesota/or Wisconsin. A national criminal background study is required by some clinical sites. Students assigned to a clinical site requiring a criminal background study will be informed of this requirement prior to the start of the clinical experience.

***Nursing Assistant: NUNA 1400 - 3 credits – PROGRAM UNDER REDESIGN

Program Website: (https://degrees.lsc.edu/nursing-assistant/)

Program Description

The nursing assistant course is designed to prepare students for basic entry level employment in a long-term-care facility, hospital, and other medical settings. This course introduces concepts of basic human needs, health/illness continuum, and basic nursing skills. It is designed to prepare students for the entry level as a nursing assistant. This course includes a mandatory 60 hours of class/lab portion, and 16 hours of supervised practical training portion in a facility, to total 76 mandatory hours. The student needs to be 16 years of age or older to take this class.

Pre-Program Courses

Course	Course Title	Credits
None		

Required Courses

Course	Course Title	Credits
NUNA 1400	Nursing Assistant	3
Total Credits		**3**

This course serves as an introduction to the nursing sequence for students who choose to advance in nursing and other medical professions. Upon successful completion of this course, the student may take the Minnesota State Nursing Assistant Test Out (NATO). Passing of NATO is required to be on the Minnesota State Registry. Please note, this course meets Minnesota's requirements. Please check with the Nurse Aide Registry of other states to see if the course meets the state requirements for that state.

Program Outcomes

- Describe health care workers' roles and responsibilities within a health care organization.
- Describe basic human needs and how to assist someone meet those needs.
- Describe appropriate communication techniques with residents/clients and staff, including reporting and recording methods.
- Describe and demonstrate infection control principles/asepsis in the healthcare setting.
- Demonstrate good body mechanics.
- Demonstrate the appropriate steps of the skills listed by the MN Nursing Assistant Competency Evaluation Program.
- Describe Resident and Client Bill of Rights.
- Demonstrate organizing time schedule in a facility and/or home environment.
- Describe basic body systems.
- Demonstrate accountability, civility and responsibility for own professional behavior and development.
- Identify emergency situations and implementation of appropriate procedures.

NOTE: Students must show proof of a negative tuberculosis (TB) screening within 90 days prior to the clinical rotation, a lifting requirement, state background check, and be at least 16 years of age or older. Per Minnesota Department of Health standards, this Nurse Aide Training and Competency Evaluation program (NATCEP) is taught in English and exams are in English.

Phlebotomy Certificate - 9 credits

Program Website: (https://degrees.lsc.edu/phlebotomy/)

Program Description

The Phlebotomy certificate prepares students to work as a phlebotomist. The primary duties of a phlebotomist are to obtain blood specimens using various venipuncture and dermal puncture techniques, facilitate the collection of other clinical specimens, and to ensure timely and safe transport of specimens to the laboratory. Phlebotomists may also be required to process samples for the laboratory, use computers when collecting or receiving samples and to perform some waived laboratory testing within a very limited scope of practice.

Required Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
ALTH 1440	Medical Ethics and Law	1
MEDA 1410	Professionalism and Safety in Healthcare	1
MLTN 1574	Collection Skills	2
MLTN 1518	Medical Laboratory Procedures	3
MLTN 2577	Phlebotomy Internship	1
Total Credits		**9**

Courses may require a pre-requisite.

Phlebotomy is an excellent first step into healthcare for students who are unsure of their long-term goals, but know they want to work in healthcare. MLTN 1574, MEDA 1410 and MLTN 1518 are required for the Medical Assistant program. These program courses transfer directly to the MA program. MLTN 1574 is required for MLT students. Phlebotomy may also be beneficial for Radiologic Technicians, Nurses, and Certificate Nursing Assistants.

The Phlebotomy program works on a rolling admission, 8-week course schedule. Students must take MEDA 1410 and MLTN 1574 together. MLTN 2577 may not be taken until all health and background information is complete and approved, and the student has passed MLTN 1574, MEDA 1410, and ALTH 1440 with a “C” or better.

Program Outcomes

- Comply with laboratory safety and compliance procedures and policies.
- Demonstrate organized work skills resulting in efficient time and material management utilization.
- Employ quality assurance techniques to monitor procedures, equipment and competency.
- Demonstrate standard specimen collection processes and practice.
- Model professional behaviors, ethics and appearance.
- Identify pre-analytical (specimen collection) variables affecting test accuracy and take appropriate corrective actions.
- Perform information processing functions in the clinical laboratory.
- Communicate verbally and in writing with colleagues and patients in a professional manner.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: Students must have proof of current immunizations and a current negative Tuberculosis (TB) screening. Background study approval is required from the State of Minnesota and/or Wisconsin. A national criminal background study is required. The cost of any immunizations, the TB test, and background studies are the responsibility of the student. Students are required to carry their own health insurance. Students are not required to complete CPR training, but completion of BLS CPR training is highly encouraged. All courses in the program need to be completed with a grade of “C” or better.

Physical Therapist Assistant AAS Degree - 74 credits

Traditional and Military Bridge Tracks

Program Website: (https://degrees.lsc.edu/physical-therapy-assistant/)

Program Description

The Physical Therapist Assistant (PTA) program provides an opportunity to become an educated health care provider who delivers physical therapy services under the supervision of a physical therapist. The PTA is able to observe and assess the patient's condition, teach exercises and activities of daily living, use specialized equipment, demonstrate professional skills while implementing treatment procedures, observe the patient's response to treatment, and document. Physical therapy practitioners minimize physical disability, movement dysfunction, and pain. Physical therapist assistants may find opportunity to work in a variety of settings.

Program Outcomes

- Work under the supervision of a physical therapist in an ethical, legal, safe, and effective manner.
- Implement a comprehensive treatment plan developed by a physical therapist.
- Communicate regularly with supervising physical therapists about the patient's progress and the need for adjustments to be made by the physical therapist in treatment procedures in accordance with changes in patient status.
- Perform appropriate data collection techniques within the knowledge and limits of practice to assist supervising physical therapists in monitoring and modifying the plan of care.
- Interact with patients and families in a manner which provides the desired psychosocial support including the recognition of cultural and socioeconomic differences.
- Participate in the teaching of other health care providers, patients and families.
- Document relevant aspects of patient treatment.
- Participate in discharge planning and follow-up care.
- Demonstrate effective written, oral and nonverbal communication with patients and their families, colleagues, health care providers, and the public.

Pre-Program Courses

Course	Course Title	Traditional	Military Bridge
ALTH 1410	Medical Terminology	1	1 #
BIOL 1005	Introduction to Cell Biology	1	1 #
BIOL 1140	Human Anatomy & Physiology I	4	4 #
ENGL 1106	College Composition I	3	3

Required Courses

Course	Course Title	Traditional	Military Bridge
BIOL 1141	Human Anatomy & Physiology II	4	4
PTA 1000	Introduction to Health and Medical Literature	1	1 #
PTA 1400	Documentation for PTAs	1	1 #
PTA 1410	Intro to Physical Therapist Assisting	2	2 #
PTA 1411	Procedures for PTAs I	2	2 #
PTA 1417	Clinical Experience I	2	2 #
PTA 1421	Pathophysiology for PTAs I	1	1 #
PTA 1431	Therapeutic Exercise I	2	2 #
PTA 1460	Functional Kinesiology I	2	2 #
PTA 1512	Procedures for PTAs II	2	2 #
PTA 1522	Pathophysiology for PTAs II	1	1 #
PTA 1527	Clinical Experience II	2	2 #
PTA 1532	Therapeutic Exercise II	4	4 #
PTA 1541	Issues in Physical Therapy Practice I	1	NR
PTA 1562	Functional Kinesiology II	3	3 #
PTA 1564	Manual Therapy Techniques	2	2 #
COMM 1105 COMM 1100	Interpersonal Communication (or) Introduction to Communication	3	3
PSYC 1135	Lifespan Developmental Psychology	3	3
PTA 2613	Procedures for PTAs III	2	2 #
PTA 2623	Pathophysiology for PTAs III	2	NR
PTA 2637	Clinical Experience III	2	NR
PTA 2642	Issues in Physical Therapy Practice II	1	NR
PTA 2650	Rehabilitation and Functional Therapy	4	4 #
PTA 2651	Advanced Physical Therapy Techniques	3	3 #
PTA 2680	Physical Therapy for Special Populations	NR	3

Continued on next page

- Demonstrate an understanding of levels of authority and responsibility; planning, time management, supervisory process, performance evaluations, policies and procedures; fiscal considerations for physical therapy providers and consumers; continuous quality improvement; and evidence-based practice.
- Demonstrate professional behaviors required for success in the field of physical therapy.
- Identify career development and life-long learning opportunities.
- Demonstrate knowledge of physical therapy principles and concepts

Course	Course Title	Traditional	Military Bridge
PTA 2682	Legal and Ethical Aspects of Physical Therapy Practice	NR	2
PTA 2780	PTA Basic Refresher (must be taken in final semester)	NR	2
PTA 2790	Clinical Internship I	6	6 #
PTA 2792	Clinical Internship II	6	6 #
PTA 2840	Professional Integration	1	NR
	Total Credits	**74**	**74**

*Courses may require a prerequisite.
# = With approved training and work experience, Military Bridge track students will receive a total of 54 credits for courses indicated with a #.
NR = Not required for this track.

Pre-program Requirements

Traditional PTA Program (On-Campus)

Background Study approval is required from the State of Minnesota. Prior to acceptance into the program, students will need to complete the following:

- All Pre-Program courses, with a minimum cumulative GPA of 3.0 or better (excluding BIOL 1005).
- A Verification of Volunteer Work form.
- Submit a program application.

Upon acceptance into the program, students participating in clinicals must have the following:

- A recent physical examination including current immunizations and current negative Tuberculosis (TB) screening.
- Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. ALTH 1430 will satisfy this requirement for one year.

Military Bridge Track (Online)

Pre-Program courses may be completed concurrently with the program courses. Prior to acceptance into the program, students must complete the following:

- Completion of an approved military training program per current program admission criteria.
- Submit a program application, including a recommendation from a supervising physical therapist verifying six-months post-training work experience, and a skills documentation log.

With approved training and work experience, Military Bridge track students will receive a total of 54 credits for courses indicated with a (**#**).

Federal background study approval is required through a designated provider.

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENG/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework

Mathematics:

- Eligible for MATH 0950/0955 – Essentials of Mathematics: intermediate/Advanced

Practical Nursing Diploma - 40 credits

Program Website: (https://degrees.lsc.edu/nurse/)

Program Description

The Practical Nursing Program is designed for students to complete a two-semester program of study, after completing pre-technical courses/ requirements, in practical nursing that utilizes both theory and clinical course work as well as laboratory simulation. Upon completion of this program, graduates are eligible to take the NCLEX-PN (National Council Licensure Examination for Practical Nurses). Once licensed, graduates of this program are eligible to apply to LSC's Nursing AS Advanced Standing LPN Track to further their education in nursing.

Program Outcomes

- The practical nurse graduate will adapt to the diverse and ever-changing roles in a variety of health care systems.
- The practical nurse graduate will apply critical reasoning and evidence-based practice while providing safe and competent care to clients in all stages of development and at any point in the health/illness continuum.
- The practical nurse graduate will use the nursing process in meeting the health care needs of individuals of diverse sociocultural identities across the lifespan.
- The practical nurse graduate will participate as a member of the interdisciplinary health care team through effective communication in the delivery of client care.
- The practical nurse graduate will demonstrate professional behaviors and accountability to legal and ethical nursing practice standards while being mindful of each client's inherent worth and dignity.
- The practical nurse graduate will monitor patterns and activities that may lead to unsafe practice.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology*	1
BIOL 1000 OR BIOL 1005 and BIOL 1140 and BIOL 1141	Human Body in Health and Disease * OR Introduction to Cell Biology and Human Anatomy and Physiology I* and Human Anatomy and Physiology II*	5 1 4 4
ENGL 1106	College Composition I*	3

Required Courses

Course	Course Title	Credits
NUPN 1410	Adult Nursing I	4
NUPN 1420	PN Technical Skills I	3
NUPN 1430	Medication Concepts	3
NUPN 1440	Psychosocial Nursing	2
NUPN 1458	Practical Nursing Clinical I	1
NUPN 1468	Practical Nursing Clinical II	3
NUPN 1500	Nursing Trends	1
NUPN 1510	Adult Nursing II	4
NUPN 1520	PN Technical Skills II	1
NUPN 1531	Maternal/Child Nursing	2
NUPN 1538	Maternal/Child Clinical	1
NUPN 1540	Gerontology in Nursing	2
NUPN 1558	Practical Nursing Clinical III	2
NUPN 1568	Practical Nursing Clinical IV	2
Total Credits		**40**

*Indicates courses used to calculated program minimum cumulative GPA requirement of 2.4 to enter the program. Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Note: BIOL 1005, BIOL 1140 & BIOL 1141 are required for progression to Associated Degree Nursing

Admission to the Practical Nursing program is competitive, based on pre-program GPA requirements and TEAS score.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

TEAS Exam with a score at or above 58.6% on ATI TEAS required for program entry.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework

Mathematics:
- Eligible for MATH 0950/0955 – Essentials of Mathematics: Intermediate/Advanced.

NOTE: All of the following are required upon acceptance into the nursing program:
- Current immunizations and current negative Tuberculosis (TB) screening.
- Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers and First Aid is required upon acceptance into the nursing program. ALTH 1430 will satisfy this requirement.
- Proof of current registration as a CNA, Military Medic, CMA, COTA, PTA, Rad Tech, Respiratory Tech, or EMT/Paramedic.
- Background Study approval is required from the State of Minnesota/or Wisconsin. A National criminal background study is also required.

Professional Nursing AS Degree - 64 credits

Program Website: (https://degrees.lsc.edu/rn/)

Program Description

The Professional Nursing program is an Associate of Science Degree Program. The AS Nursing Program prepares students to complete a program of study in professional nursing that utilizes both theory and clinical course work as well as laboratory simulation. Upon completion of this program, graduates are eligible to take the NCLEX-RN (National Council Licensure Examination for Registered Nurses). Graduates of this program may apply to another college or university to pursue a bachelor's degree in nursing after completing their AS degree and becoming a registered nurse.

Program Outcomes

- Adapt to the diverse and evolving roles of the professional nurse.
- Provide safe and effective evidence-based care to clients in all stages of development at any point in the health/illness continuum.
- Utilize clinical judgment to meet the health care needs of diverse populations.
- Collaborate and interact effectively with clients and members of the healthcare team.
- Uphold the ethics and values of the nursing profession while advocating for the client's inherent worth and dignity.
- Evaluate outcomes of care processes to continually improve the quality and safety of healthcare systems.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

Admission to the Professional Nursing program is competitive, based on pre-technical GPA requirements and TEAS score.

TEAS Exam with a score at or above 58.6% on ATI TEAS required prior to online application deadline.

Pre-Program Courses

Course	Course Title	Credits
BIOL 1005	Introduction to Cell Biology	1
BIOL 1140	Human Anatomy and Physiology I *	4
BIOL 1141	Human Anatomy and Physiology II *	4
ENGL 1106 or ENGL 1109	College Composition I * or College Composition II *	3
BIOL 1170	Microbiology	3

Required Courses

Course	Course Title	Credits
ADN 1415	Nursing Care of the Adult I	3
ADN 1417	Fundamentals of Nursing Care	4
ADN 1422	Introduction to Pharmacology	1
ADN 1450	AD Clinical I	1
BIOL 2170	Pathophysiology	3
READ 1102	Critical Reading for Academics***	1
ADN 1460	AD Clinical II	2
ADN 1510	Professional Nursing Concepts	1.5
ADN 1515	Nursing Care of the Adult II	2
ADN 1520	Pharmacological Interventions	2.5
ADN 2420	Advanced Nursing Skills	1
COMM or ENGL	Any 3-credit Goal Area 1 Course**	3
ADN 2415	Nursing Care of the Adult III	2
ADN 2431	Behavioral Health Nursing	2
ADN 2432	Behavioral Health Clinical	1
ADN 2471	Family Nursing	2
ADN 2472	Family Nursing Clinical	1
PSYC or SOC	Any PSYC or SOC course from Goal Areas 5 or 7**	3
ADN 2481	Advanced Nursing Care	3
ADN 2483	Advanced Nursing Care Clinical	2
ADN 2491	Leadership and Management	1
ADN 2600	Clinical Capstone Experience	1
MATH	Any Goal Area 4 Math course**	3
	Any course from Goal Areas 6, 8, 9 or 10 **	3
Total Credits		**64**

Courses may require a prerequisite. Refer to the course outline or check with an advisor

*Indicates courses used to calculate program minimum cumulative GPA requirement of 3.0 to enter program.

**Check with an advisor for preferred courses. You must meet 6 MnTC Goal Areas.

***If you have already taken COMM 1601, you do not need to take READ 1102.

General Education courses within the program may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework

Mathematics:
- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: All of the following are required upon acceptance into the nursing program:
- Current immunizations and current negative Tuberculosis (TB) screening.
- Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required upon acceptance into the nursing program. ALTH 1430 will satisfy this requirement.
- Proof of current registration as a CNA, Military Medic, Paramedic, EMT, PTA, Radiology Technologist, Respiratory Therapist, Certified Occupational Therapy Assistant, or CMA.
- Background Study approval is required from the State of Minnesota and, in some cases, Wisconsin. A National criminal background study is also required. Review a list of disqualifying offenses (https://www.revisor.mn.gov/statutes/cite/245C.15).

Professional Nursing, Advanced Standing LPN Track AS Degree - 64 credits

Program Website: (https://degrees.lsc.edu/rn/)

Program Description

The Professional Nursing program is an Associate of Science Degree Program. The AS Nursing/Advanced Standing LPN Track Program prepares students who are Licensed Practical Nurses to complete a program of study in professional nursing that utilizes both theory and clinical course work as well as laboratory simulation. Upon completion of this program, graduates are eligible to take the NCLEX-RN (National Council Licensure Examination for Registered Nurses). Graduates of this program may apply to another college or university to pursue a bachelor's degree in nursing after completing their AS degree and becoming a registered nurse.

Program Outcomes

- Adapt to the diverse and evolving roles of the professional nurse.
- Provide safe and effective evidence-based care to clients in all stages of development at any point in the health/illness continuum.
- Utilize clinical judgment to meet the health care needs of diverse populations.
- Collaborate and interact effectively with clients and members of the healthcare team.
- Uphold the ethics and values of the nursing profession while advocating for the client's inherent worth and dignity.
- Evaluate outcomes of care processes to continually improve the quality and safety of healthcare systems.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

Admission to the Professional Nursing Advance Standing LPN Track Nursing program is competitive, based on pre-technical GPA requirements and TEAS score.

TEAS Exam with a score at or above 58.6% on ATI TEAS required prior to online application deadline.

Pre-Program Courses

Course	Course Title	Credits
BIOL 1005	Introduction to Cell Biology	1
BIOL 1140	Human Anatomy and Physiology I *	4
BIOL 1141	Human Anatomy and Physiology II *	4
BIOL 1170	Microbiology	3
ENGL 1106 or ENGL 1109	College Composition I * or College Composition II*	3

Required Courses

Course	Course Title	Credits
ADN 1460	AD Clinical II	2
ADN 1510	Professional Nursing Concepts	1.5
ADN 1515	Nursing Care of the Adult II	2
ADN 1520	Pharmacological Interventions	2.5
ADN 1524	LPN/LVN to RN Role Transition	1
ADN 2420	Advanced Nursing Skills	1
BIOL 2170	Pathophysiology	3
READ 1102	Critical Reading for Academics***	1
ADN 2415	Nursing Care of the Adult III	2
ADN 2431	Behavioral Health Nursing	2
ADN 2432	Behavioral Health Clinical	1
ADN 2471	Family Nursing	2
ADN 2472	Family Nursing Clinical	1
PSYC or SOC	Any PSYC or SOC course from Goal Areas 5 or 7**	3
COMM or ENGL	Any 3-credit Goal Area 1 course**	3
ADN 2481	Advanced Nursing Care	3
ADN 2483	Advanced Nursing Care Clinical	2
ADN 2491	Leadership and Management	1
ADN 2600	Clinical Capstone Experience	1
MATH	Any Goal Area 4 Math course**	3
ANTH, HUM or ENSC	Any course from Goal Areas 6, 8, 9 or 10 **	3

Total Credits (8 credits awarded for LPN) 64

Courses may require a prerequisite. Refer to the course outline or check with an advisor

*Indicates courses used to calculate program minimum cumulative GPA requirement of 3.0 to enter program.

**Check with an advisor for preferred courses. You must meet 6 MnTC Goal Areas.

***If you have already taken COMM 1601, you do not need to take READ 1102.

General Education courses within the program may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework

Mathematics:
- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework

NOTE: All of the following are required upon acceptance into the nursing program:
- Current immunizations and current negative Tuberculosis (TB) screening.
- Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required upon acceptance into the nursing program. ALTH 1430 will satisfy this requirement.
- Proof of current unencumbered LPN License in the State of Minnesota.
- Background Study approval is required from the State of Minnesota and, in some cases, Wisconsin. A National criminal background study is also required. Review a list of disqualifying offenses (https://www.revisor.mn.gov/statutes/cite/245C.15).

Radiologic Technology AAS Degree - 78 credits

Program Website: (https://degrees.lsc.edu/radiologic-technologist/)

Program Description

Radiologic Technology, the foundation of medical imaging, is an exciting blend of advanced technology and patient care. Excellent communication and critical thinking skills, an aptitude for science, and a compassionate nature are essential for success in the field. As Radiographers, graduates have opportunities to use their knowledge of anatomy, physiology, and physics to create permanent images that help physicians diagnose illness, injury, and disease. The Radiographer is an integral member of the health care team during emergencies and surgery as well as during standard radiographic and fluoroscopic procedures.

Career and continuing education opportunities are diverse. Hospitals, clinics, health care facilities, industrial plants, educational centers, research centers, and government agencies offer employment.

Program Outcomes

Students will:

- Students will cultivate critical thinking skills for effective clinical competency.
- Students will develop communication skills for effective clinical competency.
- Students will exhibit awareness of the importance for professional growth and development.
- Students will demonstrate clinical competence.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All pre-program courses in the program need to be completed with a grade of "C" or better to progress into the next semester. To be considered program ready for fall, the minimum cumulative GPA of pre-program courses must be 3.0 or better.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
ALTH 1440	Medical Ethics and the Law	1
BIOL 1140	Human Anatomy and Physiology I	4
BIOL 1141	Human Anatomy and Physiology II	4
ENGL 1106 or ENGL 1109	College Composition I or College Composition II	3
RADT 1402	Introduction to Medical Imaging	1

Required Courses

Course	Course Title	Credits
READ 1102	Critical Reading for Academics	1
RADT 1404	Patient Care in Medical Imaging	1
RADT 1453	Radiographic Procedures I	3
RADT 1455	Concepts of Image Production I	1
RADT 1480	Radiation Biology & Protection	2
RADT 1558	Clinical Radiography I	4.5
RADT 1559	Clinical Radiography Theory I	0.5
RADT 1463	Radiograpic Procedures II	4
RADT 1560	Concepts of Image Production II	3
RADT 1568	Clinical Radiography II	7.5
RADT 1569	Clinical Radiography Theory II	0.5
RADT 1578	Clinical Radoography III	5.5
RADT 1579	Clinical Radiography Theory III	0.5
RADT 2555	Concepts of Image Production III	3
RADT 2453	Radiographic Procedures III	4
RADT 2558	Clinical Radiography IV	7.5
RADT 2559	Clinical Radiography Theory IV	0.5
RADT 2455	Radiographic Pathology	1
RADT 2552	Advance Medical Imaging	2
RADT 2568	Clinical Radiography V	7.5
RADT 2569	Clinical Radiography Theory V	0.5
RADT 2572	Directed Studies in Radiologic Tech.	1
PSYC 1135 or SOC 1111	Lifespan Developmental Psychology or Introduction to Sociology	3
Total Credits		**78**

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:
- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: You will need a recent physical examination including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. Program students will complete CPR during the first semester for RADT 1558 Clinical Radiography I. Proof of current registration as a Certified Nursing Assistant or Certified Medical Assistant. Background Study approval is required from the State of Minnesota and/or Wisconsin. A national criminal background study is required by some clinical sites. Students assigned to a clinical site requiring a criminal background study will be informed of this requirement prior to the start of the clinical experience.

Respiratory Therapy AAS Degree - 78 credits

Program Website: (https://degrees.lsc.edu/respiratory-therapist/)

Program Description

Respiratory Therapists are health care specialists who work with a variety of patients suffering from cardiopulmonary disorders. Working as part of the healthcare team, respiratory therapists assist in the evaluation, treatment, management, and rehabilitation of these disorders. Patients treated by respiratory therapists range from premature infants to the elderly. Therapists enjoy tremendous opportunity for diversity in their practices. Working in hospitals, diagnostic labs, clinics, and home care; respiratory therapist fill a vital role in our nation's health care system.

The clinical experience is diverse, with opportunities for training in a variety of areas and hospitals in the region. Upon graduation, the student will receive an Associate in Applied Science degree in Respiratory Therapy. The graduate is then eligible to sit for the NBRC credentialing exams, which are required for licensure. Upon successful completion of the exams, the graduate will be awarded the credentials of Registered Respiratory Therapist (RRT).

Program Outcomes

- Communicate effectively in verbal, nonverbal, written, and visual forms in the professional setting.
- Demonstrate professional behaviors and ethical principles of the respiratory therapist profession.
- Display knowledge and clinical competence required to provide best practices in respiratory therapy.
- Demonstrate the ability to critically think and problem solve in the profession.
- Communicate effectively in diverse groups while respecting beliefs and values of all persons, regardless of cultural background, religion, age or lifestyle.

Qualified applicants should be aware that program class sizes are limited, which may delay acceptance into the program.

General Education courses that are required may be taken prior to entering the program, as long as the specific prerequisites for that course have been met. Please check with your advisor. All courses in the program need to be completed with a grade of "C" or better to progress into the next semester.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
BIOL 1140	Human Anatomy and Physiology I	4
BIOL 1141	Human Anatomy and Physiology II	4

Required Courses

Course	Course Title	Credits
RESP 1405	Introduction to Respiratory Therapy Clinical	1
RESP 1410	Cardiopulmonary Anatomy & Physiology	4
RESP 1420	Principles and Practice of Respiratory Therapy I	4
RESP 1430	Assessment of the Pulmonary Patient	3
ENGL 1106	College Composition I	3
RESP 1520	Principles and Practice of Respiratory Therapy II	4
RESP 1530	Pathophysiology for Respiratory Therapy	4
RESP 1560	Respiratory Therapy Clinical I	4
RESP 1620	Pharmacology for Respiratory Therapy	3
PSYC 1135 or PSYC 1120 or SOC 1111	Lifespan Developmental Psychology or General Psychology or Introduction to Sociology	3
RESP 1660	Respiratory Therapy Clinical II	2
ALTH 1440	Medical Ethics and Law	1
CHEM 1110	Aspects of Chemistry I	3
RESP 2410	Mechanical Ventilation	5
RESP 2420	Adult Critical Care	3
RESP 2460	Respiratory Therapy Clinical III	7
RESP 2430	Special Topics in Respiratory Therapy	1
RESP 2440	Neonatal/Pediatric Respiratory Therapy	2
RESP 2510	Directed Studies in Respiratory Therapy	3
RESP 2560	Respiratory Therapy Clinical IV	6
BIOL 1170	Microbiology	3
Total Credits		**78**

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below.

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:
- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may not be taken concurrently with Semester I coursework.

NOTE: You will need a recent physical examination including current immunizations and a current negative Tuberculosis (TB) screening. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required for all clinical courses. ALTH1430 will satisfy this requirement. Background Study approval is required from the State of Minnesota/or Wisconsin. A national criminal background study is required by some clinical sites. Students assigned to a clinical site requiring a criminal background study will be informed of this requirement prior to the start of the clinical experience.

Surgical Technology, AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/scrub/)

Program Description

Surgical technologists are allied health professionals who are an integral part of the team of medical practitioners providing surgical care to patients. They work under the supervision and delegatory authority of a surgeon to facilitate the safe and effective conduct of surgical procedures, ensuring a safe operating room environment.

Surgical technologists may function in either the first or second scrub role. The first scrub surgical technologist gathers, opens, and handles the instruments, supplies, and equipment necessary during the surgical procedure. They must anticipate the needs of the surgeon and are constantly on vigil for maintenance of the sterile field. The second scrub surgical technologist assists the surgeon during the operative procedure by carrying out tasks including holding retractors, cutting sutures, sponging, and suctioning.

Surgical technologists are experts in the theory and application of the principles of asepsis and sterile technique to combine the knowledge of human anatomy, surgical procedures, and implementation, tools and technologies to facilitate a physician's performance of invasive therapeutic and diagnostic procedures.

Pre-Program Courses

Course	Course Title	Credits
ALTH 1410	Medical Terminology	1
BIOL 1005	Introduction to Cell Biology	1
BIOL 1140	Human Anatomy and Physiology I	4

Required Courses

Course	Course Title	Credits
BIOL 1141	Human Anatomy and Physiology II	4
PSYC 1120 PSYC 1135	General Psychology or Lifespan Developmental Psychology	3
BIOL 1170	Microbiology	3
SURG 1210	Introduction to Surgical Technology	3
SURG 1212	Surgical Lab I	2
BIOL 2170	Pathophysiology	3
COMM 1105	Interpersonal Communication	3
SURG 1310	Surgical Techniques I	3
SURG 1312	Surgical Lab II	4
SURG 2210	Techniques II	3
SURG 2212	Clinical I	4
SURG 2214	Surgical Procedures	6
SURG 2312	Clinical II	12
SURG 2320	Professional Preparation and Review	1
Total Credits		**60**

Courses may require a prerequisite. Refer to the course outline or check with an advisor.

Successful surgical technologist must work with speed, accuracy, and skill. In addition, they must possess excellent communication and critical thinking skills. Surgical technologists must be able to respond effectively and efficiently to emergency situations and work well under pressure.

Program Outcomes

- Demonstrate acceptable knowledge-based competencies in accordance with national standards for surgical technology.
- Demonstrate professional behaviors consistent with national standards and employer expectations.
- Demonstrate safe patient care practices consistent with national standards and employer expectations.
- Demonstrate compassion for the patient and maintain confidentiality.
- Exhibit a strong sense of ethical behavior and surgical conscience.
- Exhibit self-direction and responsibility for actions.
- Work under difficult and sometimes stressful situations and maintain composure.
- Join the Association of Surgical Technologists for continuing education opportunities.
- Successfully scrub 120 surgical procedures as outlined by the Association of Surgical Technologists (AST).

- Participate in the national certification exam conducted by the National Board of Surgical Technology and Surgical Assisting (NBSTSA).

Pre-program Requirements

You may be required to complete additional coursework dependent upon the results of your Computerized Placement Test (CPT) and/or previous coursework completed, or certifications awarded. Pre-program courses must be completed prior to entry into the Surgical Technology Program with a grade of "C" or higher. Students are highly encouraged to take BIOL 1140 & 1141 in person, not on-line. All SURG courses must be taken in sequence and completed with a grade of "C" or higher.

Qualified applicants should be aware that program class size is limited, which may delay acceptance into the program.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may not be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0950/0955 – Essentials of Mathematics: Intermediate/Advanced.

NOTE: You will need current immunizations to attend clinicals, including a current negative Tuberculosis (TB) screening, proof of TDAP, 2 MMR's, and Varicella. A flu vaccination will also be required. Hepatitis B vaccinations are highly recommended, but not required. Current certification in American Heart Association: BLS Healthcare Provider or American Red Cross: BLS/CPR for Healthcare Providers is required. ALTH 1430 will satisfy this requirement. Background Study approval is required from the State of Minnesota/or Wisconsin. A national criminal background study is required by some clinical sites.

Business

Accountant AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/accountant/)

Program Description

The AAS Accountant degree prepares students for successful entry into the job market upon graduation or for continuation onto their Bachelor's degree.

A solid understanding of ethics and the ability to apply critical thinking skills to problem resolution is interwoven throughout the curriculum. Students demonstrate the mastery of their accounting skills through hands-on experiences as they complete comprehensive problems and case studies involving payroll, tax return preparation, transaction analysis, financial statement preparation and analysis, budget preparation and analysis, and business simulations using software programs that are popular in the industry. Managerial accounting, nonprofit accounting, internal control analysis, and spreadsheet skills are also essential components developed within our accounting program.

Many of the courses in the Accounting AAS Degree are offered on-site and all of the courses are offered online.

Program Outcomes

Students will possess a strong background in GAAP (Generally Accepted Accounting Principles), accounting theory, accounting practices, and be able to:

- Examine and apply the laws, regulations, and the codes of the governing bodies that have an impact on the business and accounting environment.
- Apply current accounting principles and practices to understand an organization's financial data.
- Analyze and properly record routine to advanced business transactions within the accounting cycle both manually and with industry software.
- Complete the accounting cycle and prepare advanced/complex financial statements both manually and with industry software.

Required Courses

Course	Course Title	Credits
ACCT 1400	Business Math	2
ACCT 1410	Financial Accounting Principles I	3
ACCT 1500	Personal Finance	3
ADSC 1430	Business Computers/ Microsoft Office	3
LGST 1420	Business Law	3
ACCT 1510*	Financial Accounting Principles II	3
ACCT 1540*	Fundamentals of Taxation	4
ECON 1160	Principles of Economics: Microeconomics	3
ENGL 1106	College Composition I	3
Elective	Minnesota Transfer Curriculum Goal Areas 1-10	3
ACCT 1530*	Payroll Accounting	2
ACCT 2420*	Intermediate Accounting I	4
ACCT 2430*	Managerial Accounting	3
ECON 1150	Principles of Economics: Macroeconomics	3
MATH	MATH 1100 or higher Preferred: MATH1100 or MATH 2210	3
ACCT 2410*	Spreadsheet Concepts and Applications for Accounting	3
ACCT 2460*	Computerized Applications in Accounting	2
ACCT 2520*	Intermediate Accounting II	4
ACCT 2697*	Accounting Capstone	3
Technical Electives ACCT 2470* ACCT 2480* ACCT 2695* ADSC 1420 CIS 1430	Choose 3 credits from the following: Governmental and Nonprofit Accounting (3 credits) Fraud Prevention (3 credits) Accounting Internship (1-3 credits) Business Communications (3 credits) Data Analytics Fundamentals (3 credits)	3
Total Credits		**60**

*Requires a prerequisite

- Describe federal and state laws related to payroll issues; including determination of taxable wages, taxes on wages, and exemptions from taxes.
- Prepare federal individual tax returns with accompanying schedules both manually and using industry software.
- Apply analytical methods and techniques to drive effective, data-driven solutions to business problems using industry or spreadsheet software.
- Evaluate and prepare financial and non-financial information used to support strategic management and internal decision making.
- Utilize accounting information to diagnose the financial health of a business and offer solutions with ethical and sound reasoning.
- Interpret ethical principles in decision making.
- Demonstrate effective communication skills.
- Demonstrate the ability to work effectively in a team environment.

***Administrative Office Specialist AAS Degree - 60 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

This program prepares students to be a highly successful team member in a variety of office settings. Administrative Office Specialists develop correspondence, record meeting minutes, perform research, collect data, generate reports, and maintain budgets. They participate in event planning, manage travel itineraries, and coordinate business travel. Students in this program will prepare and give presentations, create business publications, support web pages, and social networking for the business. In addition, they will learn payroll software while using accounting applications.

Program Outcomes

- Exhibit leadership, supervisory responsibilities, ethical behavior, positive self-image, and professional conduct in the business office
- Demonstrate accurate document formatting proficiency
- Plan and deliver verbal presentations using correct English skills
- Plan and produce professionally written business correspondence using correct English and proofreading skills
- Apply Association of Records Managers and Administrators International (ARMA) indexing and filing procedures and rules
- Demonstrate advanced utilization of office related computer productivity software and desktop publishing applications
- Develop a job search plan, related documents, and appropriate interview skills
- Apply learned program skills and knowledge to work environment or simulated situations
- Analyze and record business transactions, generate reports, and prepare financial statements; calculate payroll earnings and deductions
- Create web pages and develop web-based social networking for business

Required Courses

Course	Course Title	Credits
ADSC 1414	Keyboarding	2
ADSC 1419	Business English	3
ADSC 1421	Business Presentations	3
ADSC 1430	Business Computers/ Microsoft Office	3
ADSC 1440	Office Protocol	3
ADSC 1715	Document Production/MS Word	3
ADSC 1420*	Business Communications	3
ADSC 1433*	Advanced Microsoft Office Suite	2
ADSC 1442	Records Management	2
ADSC 1720*	Advanced Document Production/ MS Word	3
COMM 1105	Interpersonal Communication	3
COMM 1601	Interviewing Procedures and Practice	1
ENGL 1106	College Compostion I	3
ACCT 1400	Business Math	2
ADSC 2440*	Advanced Office Protocol	2
BUS 2402 or BUS 1448	Principles of Management or Leadership Development	3
ADSC 2450	Digital Content Management	3
ADSC 1432	Office Capstone	3
ENGL 1109*	College Composition II	3
ADSC 2498	Internship	1
Technical Electives	Choose any course from BUS or ADSC courses	3
General Education Electives	Choose from Minnesota Transfer Curriculum Goal Areas 2-10 (at least 2 goal areas)	6
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently.

***Administrative Office Diploma - 31 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

The Administrative Office Diploma successfully prepares students to serve as the primary support in the professional office setting. Applicable coursework will build on the foundations established through the certificate by further developing students' skills in advanced Microsoft software applications, increase speed and accuracy in keying and advanced formatting procedures while using correct business communication skills. Additional coursework focuses on maintaining records management, including alphabetical, numerical, geographic, and color-coded record management rules, along with retention, storage, and retrieval of records.

The Administrative Office Diploma transfers seamlessly into LSC's Administrative Office Specialist AAS degree.

Required Courses

Course	Course Title	Credits
ADSC 1414	Keyboarding	2
ADSC 1419	Business English	3
ADSC 1421	Business Presentations	3
ADSC 1430	Business Computers/ Microsoft Office	3
ADSC 1440	Office Protocol	3
ADSC 1715	Document Production/MS Word	3
ADSC 1420	Business Communications	3
ADSC 1433*	Advanced Microsoft Office Suite	2
ADSC 1442	Records Management	2
ADSC 1720*	Advanced Document Production/ MS Word	3
COMM 1105	Interpersonal Communication	3
COMM 1601	Interviewing Procedures and Practice	1
Total Credits		**31**

*Requires a prerequisite or a concurrent course

Program Outcomes

Apply skills to create business web pages

- Develop skills for positive business social networking
- Create professional posters and business materials using graphic design software
- Demonstrate advanced utilization of Microsoft computer productivity software for business applications
- Demonstrate accurate formatting proficiency
- Plan and produce professional written business correspondence
- Deliver skilled verbal and written presentations
- Apply correct rules for filing and record keeping per the Association of Records Managers and Administrators International
- Transcribe various types of material into mailable documents using English skills
- Develop a job search plan, related documents, and exhibit appropriate interview skills
- Exhibit ethical behavior, positive self-image, and professional conduct

Pre-program Requirements

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently.

***Administrative Office Certificate - 17 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

The Administrative Office Certificate program is designed to prepare the student for employment in an office setting in as little as one semester. Classes consist of computer skills, including Microsoft Word, PowerPoint, Excel, Access, and Outlook applications. Keying speed will increase while using correct English skills to produce correctly formatted documents, such as letters, reports, and forms. Students will learn confidence in utilizing office protocol to communicate through written and verbal presentations. This certificate prepares the student to succeed in a variety of roles and provides a practical way to gain entry-level employment in many different fields.

Required Courses

Course	Course Title	Credits
ADSC 1414	Keyboarding	2
ADSC 1419	Business English	3
ADSC 1421	Business Presentations	3
ADSC 1430	Business Computers/ Microsoft Office	3
ADSC 1440	Office Protocol	3
ADSC 1715	Document Production/ Microsoft Word	3
Total Credits		**17**

The Administrative Office Certificate transfers seamlessly into LSC's Administrative Office Diploma and the Administrative Office Specialist AAS degree programs.

Program Outcomes

- Plan and produce correctly formatted and mailable professional written business correspondence
- Exhibit positive communication skills
- Plan and deliver professional presentations using correct English skills
- Increase keyboarding production and proficiency
- Exhibit critical and creative thinking skills, ethical behavior, positive self-image, and professional
- conduct
- Utilize Microsoft software for business applications such as Microsoft Word, PowerPoint, Excel, Access, Outlook, and identify increase knowledge of computer systems

Pre-program Requirements

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently.

Bookkeeper Diploma – 31 credits

Program Website: (https://degrees.lsc.edu/bookkeeper/)

Program Description

The Bookkeeper Diploma is a one-year program designed to prepare students for a career in bookkeeping and accounting fields. This 31-credit diploma emphasizes the double entry accounting system, federal income taxation, payroll taxation, computerized accounting systems, and other computerized business applications. Upon completion of the Bookkeeper Diploma, the student should be well prepared to sit for the Certified Bookkeeper Exam: a comprehensive examination administered by the American Institute of Professional Bookkeepers. Sitting for this professional exam is highly recommended, but not a requirement of the LSC program.

The Bookkeeper Diploma transfers seamlessly into LSC's Accountant AAS Degree. Many of the courses in the Bookkeeper Diploma are offered on- site and all of the courses are offered online.

Program Outcomes

Students will possess a solid understanding of GAAP (Generally Accepted Accounting Principles), accounting practices, and be able to:

- Interpret routine economic events and transactions to determine their impact on a company's financial position while applying industry professional standards.
- Complete the accounting cycle and prepare formal financial statements both manually and with industry software.
- Describe federal and state laws related to payroll issues; including determination of taxable wages, taxes on wages, and exemptions from taxes.
- Prepare federal individual tax returns with accompanying schedules both manually and using industry software.
- Apply analytical methods and techniques to drive effective, data-driven solutions to business problems using industry or spreadsheet software.
- Evaluate and prepare financial and non-financial information used to support strategic management and internal decision making.
- Interpret ethical principles in decision making.
- Demonstrate effective communications skills.
- Demonstrate the ability to work effectively in a team environment.

Required Courses

Course	Course Title	Credits
ACCT 1400	Business Math	2
ACCT 1410	Financial Accounting Principles I	3
ACCT 1500	Personal Finance	3
ACCT 1530*	Payroll Accounting	2
ADSC 1430	Business Computers/ Microsoft Office	3
ACCT 1510*	Financial Accounting Principles II	3
ACCT 1540*	Fundamentals of Taxation	4
ACCT 2410*	Spreadsheet Concepts and Applications for Accounting	3
ACCT 2430*	Managerial Accounting	3
ACCT 2460*	Computerized Applications in Accounting	2
Technical Electives ACCT 2470* ACCT 2480* ACCT 2695* ADSC 1420 CIS 1430	Choose 3 credits from the following: Governmental and Nonprofit Accounting (3 credits) Fraud Prevention (3 credits) Accounting Internship (1-3 credits) Business Communications (3 credits) Data Analytics Fundamentals (3 credits)	3
Total Credits		**31**

*Requires a prerequisite or a concurrent course

Business Transfer Pathway AS Degree – 60 credits

Program Website: (https://degrees.lsc.edu/business-transfer-pathway)

Program Description

The Business Transfer Pathway AS offers students a powerful option: the opportunity to complete an Associate of Science degree with course credits that directly transfer to designated business bachelor's degree programs at Minnesota State universities. The curriculum has been specifically designed so that students completing this pathway degree and transferring to one of the seven Minnesota State universities enter the university with junior-year status. Emphasis is on contemporary business practices through coursework in management, marketing, economics, accounting, technology and communications. All courses in the Transfer Pathway associate degree will directly transfer and apply to the designated bachelor's degree programs in a related field.

Universities within the Minnesota State system include Bemidji State University; Metropolitan State University; Minnesota State University, Mankato; Minnesota State University, Moorhead; Southwest State University; St. Cloud State University; and Winona State University.

Program Outcomes

- Apply effective business administration concepts and tools.
- Understand contemporary business strategies.
- Demonstrate analytical skills in identifying and solving problems.
- Apply marketing, management, and economic concepts in a business setting.
- Apply accounting principles and practices.
- Demonstrate financial management skills.
- Demonstrate administrative management skills.
- Demonstrate interpersonal communication skills.
- Plan, prepare, and deliver effective oral and written communications.
- Make business decisions in compliance with the law.
- Create statistically reliable and valid data.
- Demonstrate understanding of statistical data for business decisions.
- Utilize effective software applications for business administration.

Required Courses

Course	Course Title	Credits
FYE 1000	First Year Experience	1
BUS 1410*	Introduction to Business and Entrepreneurship	3
BUS 1448	Leadership Development	3
ADSC 1430*	Business Computers/ Microsoft Office	3
LGST 1420*	Business Law	3
ACCT 1410	Financial Accounting Principles I	3
ACCT 1510*	Financial Accounting Principles II	3
ACCT 2430*	Managerial Accounting	3
BUS 2402*	Principles of Management	3
BUS 2400*	Principles of Marketing	3
ENGL 1106 *	College Composition I	3
ENGL 1109*	College Composition II	3
COMM 1110*	Public Speaking	3
PHIL 1130*	Ethics	3
ECON 1150*	Principles of Economics: Macroeconomics	3
ECON 1160*	Principles of Economics: Microeconomics	3
MATH 1100*	College Algebra	4
MATH 2210*	General Statistics	3
	Business Administration has 25 credits of Minnesota Transfer Curriculum embedded in the courses listed above. Please choose an additional 7 credits from the MnTC.	7
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Legal Secretary Certificate - 18 credits

Program Website: (https://www.lsc.edu/degrees/legal-secretary-certificate/)

Program Description

This program is designed to prepare the student for employment as a Legal Secretary. The Legal Secretary's primary function is to assist in preparation of legal correspondence and documents and meeting deadlines. Other duties may include public/client relations, timekeeping, gathering information from the clients, filing, and general office duties. Legal Secretaries transcribe from dictation and draft copy using computers.

This is an advanced certificate; in addition to possessing college-level reading and writing skills, students should have recent office experience or have taken courses in office procedures, keyboarding/word processing, and business communications.

Required Courses

Course	Course Title	Credits
LGST 1400*	Legal Studies I: Terminology and Procedures	3
ADSC 1515	Law Office Applications	3
ADSC 1525	Legal Transcription/Word Processing Applications	3
ADSC 1517*	Computers in the Law Office	3
LGST 1410*	Legal Studies II: Introduction to Research	3
ADSC 2520*	Legal Document Processing	3
Total Credits		**18**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Demonstrate keyboarding production proficiency.
- Perform general office tasks in the legal environment.
- Demonstrate proficiency in using a variety of computer software programs.
- Transcribe material containing legal terminology into mailable documents using correct English skills.
- Produce professional written business correspondence using correct English and proofreading skills.
- Exhibit ethical behavior, positive self-image, and professional conduct.
- Develop a job search plan, appropriate documents, and exhibit appropriate interview skills.
- Assist in legal research tasks.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English and reading.

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Paralegal Studies AAS Degree - 60 credits

Program Website: (https://www.lsc.edu/degrees/paralegal-studies-aas/)

Program Description

The Paralegal Studies program is a course of study for those interested in becoming non-lawyer legal professionals. A paralegal (sometimes called a legal assistant) is, in the words of the American Bar Association, a person "who performs specifically delegated substantive legal work for which a lawyer is responsible." Paralegal employers prefer applicants who have completed a formal paralegal training program. Students learn to use the technology and software commonly found in a modern law office and receive practical instruction in legal terminology, state and federal court systems, legal document preparation, substantive and procedural law, legal research, and client interaction.

The Paralegal Studies Associate in Applied Science degree is recommended for those students intending to go directly into the workforce on graduation.

Program Outcomes

- Demonstrate knowledge of legal terminology, the American legal system, and state and federal court structure, rules, and procedures.
- Exhibit understanding of the paralegal's role in the delivery of legal services, including systems for organizing documents, maintaining client relationships, conflict of interest management, calendaring, and billing.
- Exhibit ability to utilize technology and legal-specific software commonly used by paralegals in the delivery of legal services.
- Demonstrate ability to prepare, draft, and properly format client correspondence and other legal doucments using principles of writing, rules of English grammar, and proper citation form.

Required Courses

Course	Course Title	Credits
LGST 1400*	Legal Studies I: Terminology and Procedures	3
LGST 1420*	Business Law: An Introduction	3
ADSC 1420*	Business Communications	3
ADSC 1515	Law Office Applications	3
ENGL 1106*	College Composition I	3
LGST 1410*	Legal Studies II: Introduction to Research	3
LGST 1425*	Business Law: Commercial Topics	2
ADSC 1517*	Computers in the Law Office	3
ENGL 1109*	College Composition II	3
LGST 1429*	Legal Writing	3
LGST 1455*	Civil Litigation	3
ADSC 1525	Legal Transcription/Word Processing Applications	3
LGST 1430*	Advanced Legal Research	3
LGST 1460*	Criminal Law and Procedure	3
LGST 2997*	Paralegal Capstone	1
ADSC 2520*	Legal Document Processing	3
Program Electives	Choose any two LGST elective courses	6
General Education Requirement	The Paralegal AAS embeds 6 credits from Goal Area 1 of the Minnesota Transfer Curriculum (MTC). Please choose 9 additional credits from the MTC that includes courses from at least two of the MTC Goal Areas 2-10 (see lsc.edu/transfer-degrees/)	9
Total Credits		**60**

*Requires a prerequisite or a concurrent course

- Exhibit oral communication skills that allow paralegals to interact effectively with clients, attorneys, witnesses, co-workers, court personnel, and the public in a variety of situations.
- Demonstrate knowledge of legal principles and procedures in at least one specialty area, such as family law, bankruptcy law, real property law, torts and personal injury law, or wills and probate.
- Recognize and apply the legal and ethical principles that apply to the conduct of paralegals involved in the delivery of legal services.
- Analyze procedural and substantive legal problems by identifying the key facts and applying the appropriate rule of law to the problem.
- Demonstrate ability to prepare and carry out a legal research plan using print and electronic resources to identify, locate, cite, and verify the reliability of legal authorities.
- Develop job-seeking and job-keeping skills appropriate for employment in the legal field and prepare a professional portfolio documenting acquired paralegal skills and knowledge.

Pre-program Requirements
Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework

Paralegal Studies Certificate - 30 credits

Program Website: (https://www.lsc.edu/degrees/paralegal-studies-certificate/)

Program Description

The Paralegal Studies program is a course of study for those interested in becoming non-lawyer legal professionals. A paralegal (sometimes called a legal assistant) is, in the words of the American Bar Association, a person "who performs specifically delegated substantive legal work for which a lawyer is responsible." Paralegal employers prefer applicants who have completed a formal paralegal training program. Students learn to use the technology and software commonly found in a modern law office and receive practical instruction in legal terminology, state and federal court systems, legal document preparation, substantive and procedural law, legal research, and client interaction.

This 30-credit Certificate seamlessly transfers to the Paralegal Studies AS (60 credits) and Paralegal Studies AAS (60 credits).

Required Courses

Course	Course Title	Credits
LGST 1400*	Legal Studies I: Terminology and Procedures	3
LGST 1420*	Business Law: An Introduction	3
ADSC 1517*	Computers in the Law Office	3
LGST 1410*	Legal Studies II: Introduction to Research	3
LGST 1425*	Business Law: Commercial Topics	2
LGST 1429*	Legal Writing	3
LGST 1455*	Civil Litigation	3
LGST 1430*	Advanced Legal Research	3
LGST 1460*	Criminal Law and Procedure	3
LGST 2997*	Paralegal Capstone	1
Program Electives	Choose any LGST elective course	3
Total Credits		**30**

*Requires a prerequisite or a concurrent course

The 30-credit Paralegal Studies Certificate is an advanced program that prepares students with prior background for paraprofessional positions in the legal field. Graduates will leave with a solid education in basic legal principles.

Program Outcomes

- Demonstrate knowledge of legal terminology, the American legal system, and state and federal court structure, rules, and procedures.
- Exhibit understanding of the paralegal's role in the delivery of legal services, including systems for organizing documents, maintaining client relationships, conflict of interest management, calendaring, and billing.
- Exhibit ability to utilize technology and legal-specific software commonly used by paralegals in the delivery of legal services.
- Demonstrate ability to prepare, draft, and properly format client correspondence and other legal documents using principles of writing, rules of English grammar, and proper citation form.
- Exhibit oral communication skills that allow paralegals to interact effectively with clients, attorneys, witnesses, co-workers, court personnel, and the public in a variety of situations.
- Demonstrate knowledge of legal principles and procedures in at least one specialty area, such as family law, bankruptcy law, real property law, torts and personal injury law, or wills and probate.
- Recognize and apply the legal and ethical principles that apply to the conduct of paralegals involved in the delivery of legal services.
- Analyze procedural and substantive legal problems by identifying the key facts and applying the appropriate rule of law to the problem.
- Demonstrate ability to prepare and carry out a legal research plan using print and electronic resources to identify, locate, cite, and verify the reliability of legal authorities.
- Develop job-seeking and job-keeping skills appropriate for employment in the legal field and prepare a professional portfolio documenting acquired paralegal skills and knowledge.

Pre-program Requirements

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Computers

Business and Technology AS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/business-and-technology/)

Program Description

This is a transfer degree intended to prepare students to continue their studies at a baccalaureate institution. The degree combines 30 credits of business and computer technology courses with 30 credits of General Education.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
Business and Technology Courses		
ACCT 1400	Business Math	2
ACCT 1410	Financial Accounting Principles I	3
ADSC 1420*	Business Communications	3
CIS 1402*	Foundations of CIS	3
CIS 1521*	A+ Operating Systems Technologies	3
CIS 1522*	A+ Core Hardware	3
LGST 1420*	Business Law – An Introduction	3
CIS Technical Electives	Choose 10 credits from the following:	
CIS 1406* CIS 1410* CIS 1412* CIS 1415* CIS 1430*	HTML/CSS (3 credits) Web Site Design (3 credits) Web Graphics I (3 credits) Introduction to Programming (4 credits) Data Analytics Fundamentals (3 credits)	10
General Education Courses		
COMM 1600*	Communication in the Workplace	3
ENGL 1106*	College Composition I	3
ENGL 1109*	College Composition II	3
MATH 1100*	College Algebra	4
PSYC 1120*	General Psychology	3
SOC 1111*	Introduction to Sociology	3
	Natural Sciences Elective (Goal Area 3)	3
	History Elective (Goal Area 5)	3
	Humanities Elective (Goal Area 6)	3
	General Education Elective (Goal Areas 3, 5, or 6)	2
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Computer and Web Programming Certificate - 30 credits

Program Website: (https://www.lsc.edu/degrees/computer-and-web-programming-certificate/)

Program Description

Students are prepared to provide technical skills necessary to develop and maintain effective web sites. Students will be taught the elementary skills to create web-based or Windows application/software.

The Computer and Web Programming Certificate transfers seamlessly into LSC's Computer and Web Programming Diploma (57 credits), and Computer and Web Programming AAS Degree (72 credits).

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1406*	HTML/CSS	3
CIS 1410*	Web Site Design	3
CIS 1412*	Web Graphics I	3
CIS 1415*	Introduction to Programming	4
CIS 1408*	Scripting and Frameworks	4
CIS 1420*	Advanced Web Site Design	4
CIS 1430*	Data Analytics Fundamentals	3
CIS 2635*	Java Programming	3
Total Credits		**30**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Plan, create, and host a website that incorporates appropriate use of visual elements, graphics, and multimedia.
- Develop and apply both front-end and back-end web development techniques.
- Analyze and build elementary web-based or computer-based applications using appropriate programming languages and data.

Pre-program Requirements

Successful entry into this program requires a basic level of keyboarding skills and a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Computer and Web Programming Diploma - 57 credits

Program Website: (https://www.lsc.edu/degrees/computer-and-web-programming-diploma/)

Program Description

Students are prepared to provide technical skills necessary to develop and maintain effective web sites. Students will be taught the necessary skills to create mobile app and Windows software, as well as game development.

This program is offered on-campus and online.

The Computer and Web Programming Diploma transfers seamlessly into LSC's Computer and Web Programming AAS Degree (72 credits).

Program Outcomes

- Plan, create, and host a website that incorporates appropriate use of visual elements, graphics, and multimedia.
- Develop and apply both front-end and back-end web development techniques.
- Analyze and build web-based or computer-based applications using appropriate programming languages and data.
- Practice effective problem-solving methods to build and test computer or web programs to solve business problems.
- Model and construct interfaces between database systems and websites or application programs.
  Design and implement basic game development using suitable programming language and platform.

Pre-program Requirements

Successful entry into this program requires a basic level of keyboarding skills and a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ /09500955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1406*	HTML/CSS	3
CIS 1410*	Web Site Design	3
CIS 1415*	Introduction to Programming	4
CIS 1408*	Scripting and Frameworks	4
CIS 1420*	Advanced Web Site Design	4
CIS 1430*	Data Analytics Fundamentals	3
CIS 2635*	Java Programming	3
CIS 1412*	Web Graphics I	3
CIS 1610*	Server-side Scripting	4
CIS 2620*	Game Development and Object-Oriented Programming	4
CIS 2621*	Advanced Game Development and Object-Oriented Programming	4
CIS 2640*	Mobile App Development	3
CIS 2980*	Internship	1
CIS 2987*	CIS Capstone	3
Technical Electives *CIS* CIS 1745* CIS 1810* CIS 2972* CIS 2560* CIS 2976* CIS 2980* CIS 2999	Choose 8 credits from the following: Any CIS course (except CIS 1400) Unix System Administration (3 credits) Security Fundamentals (3 credits) SQL Server Administration (3 credits) Web Server Administration (3 credits) Emerging Technologies (1 credit) Internship (1-4 credits) Special Topics in Computer Information Systems (1-4 credits)	8
Total Credits		**57**

*Requires a prerequisite or a concurrent course

Computer and Web Programming AAS Degree - 72 credits

Program Website: (https://www.lsc.edu/degrees/computer-and-web-programming-aas/)

Program Description

Students are prepared to provide technical skills necessary to develop and maintain effective web sites. Students will be taught the necessary skills to create mobile app and Windows software, as well as game development. This program is offered on-campus and online.

Program Outcomes

- Plan, create, and host a website that incorporates appropriate use of visual elements, graphics, and multimedia.
- Develop and apply both front-end and back-end web development techniques.
- Analyze and build web-based or computer-based applications using appropriate programming languages and data.
- Practice effective problem-solving methods to build and test computer or web programs to solve business problems.
- Model and construct interfaces between database systems and websites or application programs.
- Design and implement basic game development using suitable programming language and platform.

Pre-program Requirements

Successful entry into this program requires a basic level of keyboarding skills and a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0955/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher. MATH 0950-0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1406*	HTML/CSS	3
CIS 1410*	Web Site Design	3
CIS 1415*	Introduction to Programming	4
CIS 1408*	Scripting and Frameworks	4
CIS 1420*	Advanced Web Site Design	4
CIS 1430*	Data Analytics Fundamentals	3
CIS 2635*	Java Programming	3
CIS 1412*	Web Graphics I	3
CIS 1610*	Server-side Scripting	4
CIS 2620*	Game Development and Object-Oriented Programming	4
CIS 2621*	Advanced Game Development and Object-Oriented Programming	4
CIS 2640*	Mobile App Development	3
CIS 2980*	Internship	1
CIS 2987*	CIS Capstone	3
Technical Electives CIS CIS 1745* CIS 1810* CIS 2972* CIS 2560* CIS 2976* CIS 2980* CIS 2999	Choose 8 credits from the following: Any CIS course (except CIS 1400) Unix System Administration (3 credits) Security Fundamentals (3 credits) SQL Server Administration (3 credits) Web Server Administration (3 credits) Emerging Technologies (1 credit) Internship (1-4 credits) Special Topics in Computer Information Systems (1-4 credits)	8
Minnesota Transfer Curriculum	College-level math or PHIL 1125 (Goal Area 4) (3-4 credits) Elective credits from two additional Goal Areas of the Minnesota Transfer Curriculum (select from Goal Areas 1-3 and 5-10)	15
Total Credits		**72**

*Requires a prerequisite or a concurrent course

Computer Technology AS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/it-degree/)

Program Description

This is a transfer degree intended to prepare students to continue their studies at a baccalaureate institution. The degree combines a 30-credit program degree (Computer and Web Programming Certificate, or Network Administration and Security, or Cyber Defense), with 30 credits of General Education.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

COMPLETE ONE OF THE FOLLOWING PROGAM CERTIFICATES	Credits
Computer and Web Programming or Network Administration and Security or Cyber Defense	30

Required General Education Courses

Course	Course Title	Credits
COMM 1105*	Interpersonal Communication	3
ENGL 1106*	College Composition I	3
ENGL 1109*	College Composition II	3
MATH 1100*	College Algebra	4
PSYC 1120*	General Psychology	3
SOC 1111*	Introduction to Sociology	3
	Natural Sciences Elective (Refer to Goal Area Three course options listed on AA planner)	3-5
	Humanities Elective (Refer to Goal Area Six course options listed on AA planner)	3
	General Education Elective (Refer to any Goal Area course options listed on AA planner)	3-5
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Cyber Defense Certificate - 30 credits

Program Website: (https://degrees.lsc.edu/cyber-defense/)

Program Description

The Cyber Defense certificate is designed to prepare participants with foundation-level skills for a job in computer networking and security. The curriculum in this program will help prepare students for the following certifications: CompTIA Net+, CompTIA Security+, Cisco Certified Entry Networking Technician (CCENT) and EC-Council Certified Ethical Hacker (CEH).

The 30-credit Cyber Defense Certificate transfers seamlessly into LSC's Network Administration and Security Diploma (58 credits), and AAS degree (72 credits).

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1946*	CISCO Networking I	3
CIS 1745*	UNIX System Administration	3
CIS 1810*	Security Fundamentals	3
CIS 1947*	CISCO Networking II	3
CIS 1952*	Windows Server Administration	3
CIS 2811*	Intrusion Detection/Prevention Systems Fundamentals	3
CIS 2812*	Network Security	3
CIS 2813*	Forensics and Incident Response	3
CIS 2814*	Ethical Hacking and Systems Defense	3
Total Credits		**30**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Describe the OSI Reference Model, layered communications principles and routing/switching principles with associated devices, as well as use these concepts effectively in verbal and written communication.
- Manage Cisco router hardware and the Cisco Internet Operating System (IOS), including planning, installation, configuration, management, upgrading and troubleshooting of routers and switches.
- Analyze organizational network needs, as well as design and implement networks that include hardware/software configuration and management and security (access control).
- Determine the factors involved in developing a secure information security strategy.
- Describe and identify common security threats and attacks and describe how to safeguard against them.
- Apply a common ethical hacking methodology to carry out a penetration test and describe how to implement countermeasures for these types of attacks.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Cyber Security Certificate - 18 credits

Program Website: (https://degrees.lsc.edu/cyber-security/)

Program Description

The Cyber Security certificate is designed to prepare participants with prior computer experience or a previous networking degree with fundamental requisite security concepts and best practices required to implement, administer, and harden operating systems. The curriculum in this program will help prepare students for the EC-Council Certified Ethical Hacker (CEH) certification.

The 18-credit Cyber Security Certificate transfers seamlessly into LSC's Cyber Defense Certificate (30 credits), Network Administration and Security Diploma (58 credits), and AAS degree (72 credits).

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1810*	Security Fundamentals	3
CIS 2811*	Intrusion Detection/Prevention Systems Fundamentals	3
CIS 2812*	Network Security	3
CIS 2813*	Forensics and Incident Response	3
CIS 2814*	Ethical Hacking and Systems Defense	3
Total Credits		**18**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Determine the factors involved in developing a secure information security strategy.
- Describe and identify common security threats and attacks and describe how to safeguard against them.
- Apply a common ethical hacking methodology to carry out a penetration test and describe how to implement countermeasures for these types of attacks.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Network Administration and Security Certificate - 30 credits

Program Website: (https://degrees.lsc.edu/ccna/)

Program Description

The Computer Networking Certificate is designed to prepare participants with foundation level skills for a job in computer networking. Students are prepared for CompTIA (A+, Network+, Security+), and Cisco RSTECH.

This 30-credit certificate seamlessly transfers to the Network Administration and Cybersecurity Diploma (58 credits) and the AAS (72 credits).

Program Outcomes

- Perform PC configuration and maintenance tasks, including hardware and OS installation and troubleshooting, and configuration for network services.
- Describe the OSI Reference Model, layered communications principles, and routing, bridging and switching principles and devices, and use these concepts effectively in verbal and written communication.
- Manage Cisco router hardware and the Cisco Internet Operating System (IOS), including planning, installation, configuration, management, upgrading and troubleshooting of routers and switches.
- Analyze organizational networking needs, and design and implement Local Area and Wide Area Networks (LANs and WANs), including hardware and software configuration and management, and security (access control).

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1521*	A+ Operating Systems Technologies	3
CIS 1522*	A+ Core Hardware	3
CIS 1946*	CISCO Networking I	3
CIS 1950*	Windows Client Administration	3
CIS 1745*	UNIX System Administration	3
CIS 1810*	Security Fundamentals	3
CIS 1947*	CISCO Networking II	3
CIS 1952*	Windows Server Administration	3
Technical Electives *CIS 1500** CIS 2560* CIS 2811* CIS 2812* CIS 2813* CIS 2814* CIS 2815* CIS 2973*	Choose one of the following: Computer User Support Web Server Administration Intrusion Detection and Prevention Systems Network Security Forensics and Incident Response Ethical Hacking and Systems Defense Cloud Computing Server Virtualization	3
Total Credits		**30**

*Requires a prerequisite or a concurrent course

Pre-Program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Network Administration and Cybersecurity Diploma - 58 credits

Program Website: (https://degrees.lsc.edu/network-administrator/)

Program Description

Students are prepared for CompTIA (A+, Network+, Security+), Cisco RSTECH, and EC-Council Certified Ethical Hacker (CEH) certifications. Students are prepared to provide technical support for computer networks in business environments. Students are taught server and network administration, hardware support skills, and cybersecurity essentials.

This program is offered on-campus or online. A 30-credit certificate, a 58-credit diploma, and a 72-credit Associate in Applied Science degree program give students the flexibility they need.

Program Outcomes

- Perform PC configuration and maintenance tasks, including hardware and OS installation and troubleshooting, and configuration for network services.
- Describe the OSI Reference Model, layered communications principles, and routing, bridging and switching principles and devices, and use these concepts effectively in verbal and written communication.
- Manage Cisco router hardware and the Cisco Internet Operating System (IOS), including planning, installation, configuration, management, upgrading and troubleshooting of routers and switches.
- Analyze organizational networking needs, and design and implement Local Area and Wide Area Networks (LANs and WANs), including hardware and software configuration and management, and security (access control).
- Design and implement basic network services such as DHCP, DNS, network shares and printing, remote access, user accounts and groups, and manage desktop and network security.
- Determine the factors involved in developing a secure information technology strategy.
- Describe and identify common security threats and attacks and describe how to safeguard against them.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1521*	A+ Operating Systems Technologies	3
CIS 1522*	A+ Core Hardware	3
CIS 1946*	CISCO Networking I	3
CIS 1950*	Windows Client Administration	3
COMM 1601	Interviewing Procedure and Practice	1
CIS 1500*	Computer User Support	3
CIS 1745*	UNIX System Administration	3
CIS 1810*	Security Fundamentals	3
CIS 1947*	CISCO Networking II	3
CIS 1952*	Windows Server Administration	3
CIS 2811*	Intrusion Detection and Prevention Systems Fundamentals	3
CIS 2812*	Network Security	3
CIS 2813*	Forensics and Incident Response	3
CIS 2814*	Ethical Hacking and Systems Defense	3
CIS 2815*	Cloud Computing	3
CIS 2980*	Internship	2
CIS 2987*	CIS Capstone	3
Technical Electives CIS 1415* CIS 2560* CIS 2972* CIS 2973* CIS 2976* CIS 2999*	Choose 7 credits from the following: Introduction to Programming Web Server Administration SQL Server Administration Server Virtualization Emerging Technologies in Information Systems Special Topics in Computer Science (1-3 credits)	7
Total Credits		**58**

*Requires a prerequisite or a concurrent course

- Apply a common ethical hacking methodology to carry out a penetration test and describe how to implement countermeasures for these types of attacks.

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:
- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:
- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Network Administration and Cybersecurity AAS Degree - 72 credits

Program Website: (https://www.lsc.edu/degrees/network-administration-and-cybersecurity-aas/)

Program Description

Students are prepared for CompTIA (A+, Network+, Security+), Cisco RSTECH, and EC-Council Certified Ethical Hacker (CEH) certifications. Students are prepared to provide technical support for computer networks in business environments. Students are taught server and network administration, hardware support skills, and cybersecurity essentials.

This program is offered on-campus or online. A 30-credit certificate, a 58-credit diploma, and a 72-credit Associate of Applied Science degree program give students the flexibility they need.

Program Outcomes

- Perform PC configuration and maintenance tasks, including hardware and OS installation and troubleshooting, and configuration for network services.
- Describe the OSI Reference Model, layered communications principles, and routing, bridging and switching principles and devices, and use these concepts effectively in verbal and written communication.
- Manage Cisco router hardware and the Cisco Internet Operating System (IOS), including planning, installation, configuration, management, upgrading and troubleshooting of routers and switches.
- Analyze organizational networking needs, and design and implement Local Area and Wide Area Networks (LANs and WANs), including hardware and software configuration and management, and security (access control).
- Design and implement basic network services such as DHCP, DNS, network shares and printing, remote access, user accounts and groups, and manage desktop and network security.
- Determine the factors involved in developing a secure information technology strategy.
- Describe and identify common security threats and attacks and describe how to safeguard against them.
- Apply a common ethical hacking methodology to carry out a penetration test and describe how to implement countermeasures for these types of attacks.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1521*	A+ Operating Systems Technologies	3
CIS 1522*	A+ Core Hardware	3
CIS 1946*	CISCO Networking I	3
CIS 1950*	Windows Client Administration	3
CIS 1500*	Computer User Support	3
CIS 1745*	UNIX System Administration	3
CIS 1810*	Security Fundamentals	3
CIS 1947*	CISCO Networking II	3
CIS 1952*	Windows Server Administration	3
CIS 2811*	Intrusion Detection and Prevention Systems Fundamentals	3
CIS 2812*	Network Security	3
CIS 2813*	Forensics and Incident Response	3
CIS 2814*	Ethical Hacking and Systems Defense	3
CIS 2815*	Cloud Computing	3
CIS 2980*	Internship	2
CIS 2987*	CIS Capstone	3
Technical Electives CIS 1415* CIS 2560* CIS 2972* CIS 2973* CIS 2976* CIS 2999*	Choose 7 credits from the following: Introduction to Programming Web Server Administration SQL Server Administration Server Virtualization Emerging Technologies in Information Systems Special Topics in Computer Science (1-3 credits)	7
General Education Electives	Select from at least 3 different goal areas of the Minnesota Transfer Curriculum	15
Total Credits		**72**

*Requires a prerequisite or a concurrent course

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:
- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:
- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

PC Support Technician Certificate - 21 credits

Program Website: (https://degrees.lsc.edu/computer-technician/)

Program Description
This 21-credit certificate program teaches students how to support hardware and operating systems for desktop and laptop computers and printers. Students are prepared for CompTIA A+ certification.

Program Outcomes
Install and troubleshoot hardware components and operating systems successfully.

Pre-program Requirements
Successful entry into this program requires a basic level of keyboarding skills and a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1521*	A+ Operating Systems Technologies	3
CIS 1522*	A+ Core Hardware	3
CIS 1950*	Windows Client Administration	3
CIS 1500*	Computer User Support	3
Technical Electives CIS 1415* CIS 1745* CIS 1810* CIS 1946* CIS 1947* CIS 1952*	Choose 6 credits from tthe following: Intro to Programming UNIX System Administration Security Fundamentals CISCO Networking I CISCO Networking II Windows Server Administration	6
Total Credits		**21**

*Requires a prerequisite or a concurrent course

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Web Developer Certificate – 20 credits

Program Website: (https://www.lsc.edu/degrees/web-developer-certificate/)

Program Description

This program is designed to prepare the student with the knowledge to design, create, and maintain Web pages for use on the World Wide Web.

Web Developer Certificate transfers seamlessly into LSC's Computer and Web Programming Diploma (57 credits), and Computer and Web Programming AAS Degree (72 credits).

Program Outcomes

- Successfully design, implement, and host a web site that incorporates appropriate use of graphics and multimedia.
- Use problem-solving techniques to create a web application to solve business problems.

Required Courses

Course	Course Title	Credits
CIS 1402*	Foundations of CIS	3
CIS 1406*	HTML/CSS	3
CIS 1410*	Web Site Design	3
CIS 1412*	Web Graphics I	3
CIS 1408*	Scripting and Frameworks	4
CIS 1420*	Advanced Web Site Design	4
Total Credits		**20**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a basic level of keyboarding skills and a specific level of skill in the areas of English, mathematics, and reading.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Fire and EMT

Emergency Medical Technician Certificate – 9 credits

Program Website: (https://degrees.lsc.edu/emergency-medical-technician/)

Program Description

This certificate is designed to provide students the requirements to be eligible to test for the National Registry EMT Certificate. Emergency Medical Technicians provide out of hospital emergency medical This 24-credit Certificate seamlessly transfers to the Fire Technology AAS (60 credits). care and transportation for critical and emergent patients who access the emergency medical services (EMS) system. EMTs have the basic knowledge and skills necessary to stabilize and safely transport patients ranging from non-emergency and routine medical transports to life threatening emergencies. Emergency Medical Technicians function as part of a comprehensive EMS response system, under medical oversight. Emergency Medical Technicians perform interventions with the basic equipment typically found on an ambulance. Emergency Medical Technicians are a critical link between the scene of an emergency and the health care system.

Required Courses

Course	Course Title	Credits
FIRE 2486	Emergency Medical Technician	9
Total Credits		**9**

Program Outcomes

- Be job ready based on national accepted performance job standards and behaviors for Emergency Medical Technicians.
- Be prepared with the appropriate background and experiences to serve as an Emergency Medical Technician.
- Be able to integrate into the incident command system and its component parts into daily work assignments and all emergency response settings.
- Be able to function as an emergency medical technician at the appropriate level for the service and interact with all providers to ensure good patient care.
- Be able to use the nationally recognized standards and behaviors for the response to all types of emergencies.
- Be experienced in day-to-day operations, station life and working conditions.

Pre-Program Requirements

Students must be 16 years old to take this course, and 18 years old and have a felony-free record to become nationally certified. Current NetStudy background check is required.

Fire Fighter Certificate – 24 credits

Program Website: (https://degrees.lsc.edu/firefighter-license/)

Program Description

This certificate is designed to supply all of the knowledge and skills to become a licensed firefighter in Minnesota. This certificate is contained in the Fire Technology AAS and is designed for the non-traditional student, those holding a college degree, or for becoming a volunteer firefighter. This certificate program offers the fundamental knowledge and skills required to be a firefighter.

This 24-credit Certificate seamlessly transfers to the Fire Technology AAS (60 credits).

Required Courses

Course	Course Title	Credits
FIRE 1408*	Fire Fighter I & II	7
FIRE 1430	Hazaradous Materials Operations	2
FIRE 1410	Building Construction	3
FIRE 2486	Emergency Medical Technician	9
FIRE 2511*	Company Functions	3
Total Credits		**24**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Fire service professional skills and qualifications for leadership and supervision.
- Using the Incident Command System in both daily operations and emergency operations.
- Career and promotional opportunities both within and outside of the fire service.
- Organizational and professional communications techniques for the workplace.
- Creating a safe working environment in both emergency and non-emergency situations.
- Creating and developing the changes needed for the future of fire service.

Pre-Program Requirements

Students must complete a Medical Physical documenting they are medically cleared to wear a self-contained Breathing Apparatus (respirator) as well as verification of current vaccinations.

Fire Medic Certificate - 20 credits

Program Website: (https://degrees.lsc.edu/fire-paramedic/)

Program Description

This certificate is designed to supply all the knowledge and skills for a Nationally Registered Paramedic to become a licensed firefighter in Minnesota. This certificate program offers the fundamental knowledge and skills required to be a firefighter.

This 20-credit Certificate seamlessly transfers to the Fire Fighter Certificate (24 credits) and to the Fire Technology AAS (60 credits).

Qualifies the student for IFSAC Certification and Minnesota Licensure.

Program Outcomes

- Fire service professional skills and qualifications for leadership and supervision.
- Using the Incident Command System in both daily operations and emergency operations.
- Career and promotional opportunities both within and outside of the fire service.
- Organizational and professional communications techniques for the workplace.
- Creating a safe working environment in both emergency and non-emergency situations.
- Creating and developing the changes needed for the future of fire service.

Pre-Program Requirements

Current registry as an Emergency Medical Technician – Paramedic required.

Required Courses

Course	Course Title	Credits
FIRE 1401	Today's Fire Service	2
FIRE 1408*	Fire Fighter I and II	7
FIRE 1430	Hazardous Materials Operations	2
FIRE 2502*	Rescue Basic	3
FIRE 2511*	Company Functions	3
	Choose 3 credits from the following: (3 credits unless noted)	3
FIRE 1414*	Fire Protection Hydraulics and Water Supply	
FIRE 1470	Wildland Fire Fighting (2 credits)	
FIRE 1472*	Wildland Fire Leadership	
FIRE 1474*	Wildland Portable Pumps and Water Use (2 credits)	
FIRE 1476*	S-212 Wildland Chainsaws	
FIRE 1478*	S-290 Intermediate Wildland Fire (2 credits)	
FIRE 1506*	Occupational Health and Safety for the Fire Service	
FIRE 2420*	Fire Instructor (2 credits)	
FIRE 2445*	Hazardous Materials Chemistry	
FIRE 2450*	Fire Prevention	
FIRE 2460*	Fire Inspection and Prevention Applications	
FIRE 2462*	Introduction to Fire and Emergency Services Administration	
FIRE 2464*	Legal Aspects of the Fire Service	
FIRE 2470*	Fire Investigations I	
FIRE 2472*	Fire Investigations II	
FIRE 2512*	Tactics and Strategies	
FIRE 2610*	Fire Internship 100 (1 credit)	
FIRE 2620*	Fire Internship 200 (2 credits)	
Total Credits		**20**

Requires a prerequisite or a concurrent course

Additional technical electives available, see advisor for details

Fire Science and Administration AS Degree – 60 credits

Program Website: (https://degrees.lsc.edu/fire-officer/)

Program Description

The Associate of Fire Science and Administration degree is designed to build a broad base of knowledge for the Fire Service. This program is intended for the Fire Fighter seeking promotion and/or one who plans to transfer into a related four-year bachelor's degree program. This degree follows the Fire and Emergency Services Higher Education (FESHE) model created by the National Fire Academy (NFA). To facilitate distance learning all courses are offered fully on-line.

Program Outcomes

- Fire service professional skills and qualifications for leadership and supervision.
- Using the Incident Command System in both daily operations and emergency operations.
- Career and promotional opportunities both within and outside of the fire service.
- A strong base of knowledge in both liberal and technical education far beyond the Associate in Science.
- Organizational and professional communications techniques for the workplace.
- Creating a safe working environment in both emergency and non-emergency situations.
- Creating and developing the changes needed for the future of the fire service.
- Fire prevention activities including inspection, preplanning, investigation, and public fire education.

Required Courses

Course	Course Title	Credits
FYE 1000	First Year Experience	1
FIRE 1401	Today's Fire Service	2
FIRE 1404	Fire Behavior and Combustion	3
ENGL 1106*	College Composition	3
FIRE 1410	Building Construction	3
FIRE 2450*	Fire Prevention	3
ENGL 1109*	College Composition II	3
FIRE 1502*	Fire Protection Systems	3
FIRE 1504*	Principles of Fire and Emergency Services Safety and Survival	3
FIRE 1414* FIRE 1470 FIRE 1474* FIRE 1476* FIRE 2420* FIRE 2460* FIRE 2462* FIRE 2464* FIRE 2512* FIRE 2610* FIRE 2620*	Choose 12 credits from the following or any FIRE prefix course not already on the guide: Fire Protection Hydraulics and Water Supply (3 cr) Wildland Firefighting (2 cr) S-211 Wildland Portable Pumps and Water Use (2 cr) S-212 Wildland Fire Chain Saws (3 cr) Fire Instructor (2 cr) Fire Inspection and Prevention Applications (3 cr) Introduction to Fire & Emergency Services Administration (3 cr) Legal Aspects of the Fire Service (3 cr) Fire Fighting Tactics and Strategy (3 cr) Fire Internship 100 (1 credit) Fire Internship 200 (2 credits)	12
General Education Electives	Choose 24 credits from at least two different Goal Areas 2-10 of the MnTC	24
Total Credits		**60**

*Requires a prerequisite or a concurrent course

**For additional technical electives see an advisor for details

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Fire Technology AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/firefighter/)

Program Description

The Fire Technology program provides an opportunity for students to obtain basic and advanced instruction in fire prevention, firefighting techniques, rescue, and management of fire services. Critical decision making is emphasized at the company officer level to ensure improvement in all aspects of fire technology, productivity, and safety. Wildland Firefighting classes are available to enhance the knowledge base of fire suppression technicians. Completion of liberal education courses early in program is recommended to establish an academic foundation for technical courses.

Program Outcomes

- Be job ready based on national accepted performance job standards and behaviors for firefighters.
- Be prepared with the appropriate background and experiences to serve as a fire equipment operator.
- Be able to conduct fire prevention activities.
- Be able to integrate the incident command system and its component parts into daily work assignments and all emergency response settings.
- Be able to function as an emergency medical technician at the appropriate level for the department and interact with all providers to ensure good patient care.
- Be able to use the nationally recognized standards and behaviors for the response to hazardous materials releases and emergencies.
- Be able to apply a broad working knowledge of rescue techniques and theories to include specialized areas not limited to activities like high level/high angle, confined spaces, and water related rescues.
- Be experienced in day-to-day fire department type operations, station life and working conditions.

Required Courses

Course	Course Title	Credits
FIRE 1408*	FireFighter I & II	7
FIRE 1430	Haz Mat Operations	2
ENGL 1106*	College Composition	3
FIRE 1410	Building Construction	3
FIRE 2511*	Company Functions	3
ENGL 1109*	College Composition II	3
FIRE 2486	Emergency Medical Technician	9
FIRE 2502*	Rescue Basic	3
FIRE 1412*	Fire Apparatus Operation	3
FIRE 2440	Fire Chem I	3
FIRE 2450	Fire Prevention	3
FIRE 2512*	Fire Fighting Tactics and Strategies	3
FIRE 2602	Concepts of Fire Service Careers	2
Choose 4 FIRE prefix	credits from the following or any course not already on the guide:	
FIRE 1470	Wildland Fire Fighting (2 cr)	4
FIRE 1474*	S-211 Wildland Portable Pumps and Water Use (2 cr)	
FIRE 1476*	S-212 Wildland Fire Chain Saws (3 cr)	
FIRE 2610*	Fire Internship 100 (1 cr)	
FIRE 2620*	Fire Internship 200 (2 cr)	
FIRE 2999	Special Topics in Fire Service	
General Education Electives	Choose 9 credits from at least two different Goal Areas 2-10 of the MnTC	9
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Wildland Firefighting Certificate - 16 credits

Program Website: (https://degrees.lsc.edu/wildland-firefighter/)

Program Description

This certificate is designed to provide the entry level wildland firefighter the skills necessary to enter and advance in the field of Wildland firefighting. It is comprised of several National Wildfire Coordinating Group courses; S-130 Firefighter Training, S-190 Introduction to Wildland Fire Behavior, I-100 Incident Command System Orientation, I-700 National Incident Management System Introduction, S-211 Wildland Portable Pumps, S-212 Wildland Fire Chain Saws. This certificate also gives the Firefighter the basic understanding of Structural Firefighting which is applied in an Urban Interface wildfire situation. Upon completion of this certificate the graduate will have the necessary background and certifications to gain employment by numerous natural resource agencies as well as the private sector. Annual physical agility tests and background checks will need to be successfully completed prior to employment.

Required Courses

Course	Course Title	Credits
FIRE 1408*	Fire Fighter I and II	7
FIRE 1430	Hazardous Materials Operations	2
FIRE 1470	Wildland Firefighting	2
FIRE 1474*	Wildland Portable Pumps and Water Use	2
FIRE 1476*	S-212 Wildland Fire Chain Saws	3
Total Credits		**16**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Understand nationally accepted performance standards and behaviors for Wildland Firefighters.
- Develop skills required to serve as an Entry Level Wildland Firefighter.
- Integrate the Incident Command System and its component parts into daily work assignments and all emergency response settings.
- Use the nationally recognized standards and behaviors for the response to and mitigation of hazardous materials releases and other natural emergencies.
- Apply a working knowledge of Pumps and water distribution systems used in the Wildland Firefighting field.
- Apply a broad working knowledge of suppression techniques and theories used during fire suppression.
- Understand daily fire department type operations, station life, and working conditions.
- Apply a working knowledge of Fire Weather and Fire Behavior during daily assignments.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A 250 or higher on the Arithmetic portion of the Accuplacer.

Medical approval (doctor's physical)

FIRE 1470 Student must be 16 years old to take these courses and 18 years old to be "NWCG Red Carded." Students must have a felony free record to become "Red Card Certified."

Manufacturing & Trades

Engineering CAD Technician Certificate - 24 credits

Program Website: (https://degrees.lsc.edu/cad-software/)

Program Description

The Engineering CAD Technician program prepares students to translate the ideas, sketches, and specifications of engineers and designers into workable plans which are used in product fabrication. Students learn to use engineering technology in determining exact specifications for new product design or modification, or redesign of present products. The course begins with instruction in basic drafting skills and advances to more complex technological areas. Major emphasis will be on the application and use of computer aided design.

This 24-credit Certificate seamlessly transfers to the Engineering CAD Technology Diploma (60 credits) and the AAS (67 credits).

This certificate is designated to provide a basic working knowledge of CAD and/or enhance the education of a student who may occasionally come in contact with engineering CAD technology through another related technical field of study. This certificate is not intended to take the place of either the two-year AAS degree or the two-year diploma degree from the Integrated Manufacturing – Engineering CAD Technology program.

Required Courses

Course	Course Title	Credits
CADE 1407*	AutoCAD	3
CADE 1450*	Mechanical Details	3
CADE 1468*	SolidWorks I	3
CADE 1490*	Revit Industrial/Structural (BIM) Applications	3
CADE 2472*	AutoCAD Design Project	3
CADE 2492*	Revit Industrial/Mechanical (BIM) Applications	3
INMG 1410*	Mechanical Print Reading	3
Choose 3	credits from the following:	
INMG 1420*	Design Application Concepts I	3
CADE 2407	Engineering Technology Internship (variable credits)	
MTCC 2504*	CAD CAM	
WLDG 1560	Gas Metal Arc Welding I	
Total Credits		**24**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Design products for manufacture using 2D and 3D standards.
- Apply orthographic CAD design procedures to working drawings.
- Perform advanced CAD software applications.
- Create a capstone design project incorporating advanced CAD and industrial/mechanical applications.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Engineering CAD Technology Diploma - 60 credits

Program Website: (https://degrees.lsc.edu/engineering/)

Program Description

The Integrated Manufacturing - Engineering CAD Technology program provides students with an engineering technology which incorporates computer graphics and technical illustrations. The program prepares students for advanced computer applications emerging in the fields of engineering, graphics, and design. Students will learn to use engineering technology in determining exact specifications for new product design, modification, or redesign of present products. This course begins with instruction in basic drafting skills and advances to more complex technological areas. Major emphasis will be on the application and use of computer aided design.

This 60-credit Diploma seamlessly transfers to the Engineering CAD Technology AAS (67 credits).

Program Outcomes

- Illustrate orthographic viewing and dimensioning techniques.
- Demonstrate section and auxiliary detailing.
- Display dimensioning and tolerance techniques.
- Outline an understanding of manufacturing principles and practices.
- Create mechanical component details.
- Illustrate sheet metal development drawings.
- Demonstrate basic through advanced principles of CAD applications.
- Create and engineer electrical/electronic drawings.
- Create and engineer industrial piping layouts.
- Create and engineer fluid power drawings.
- Present technical illustrations using 3-dimensional design.
- Provide a cumulative final design project.
- Create engineering drawings using advanced CAD applications.

Required Courses

Course	Course Title	Credits
CADE 1468*	SolidWorks I	3
FYE 1000	First Year Experience	1
INMG 1400	Introduction to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
WLDG 1560	Gas Metal Arc Welding I	3
CADE 1407*	AutoCAD	3
CADE 1450*	Mechanical Details	3
CADE 1470	SolidWorks II	3
CADE 1480*	Industrial/Mechanical CAD Applications I	3
INMG 1412*	Advanced Mechanical Blueprint Reading	3
CADE 1482*	Industrial/Mechanical CAD Applications II	3
CADE 1490*	Revit Industrial/Structural (BIM) Applications	3
CADE 2434*	3D Process Piping Design	3
CADE 2472*	AutoCAD Design Project	3
CADE 2492*	Revit Industrial/Mechanical (BIM) Applications	3
COMM 1601	Interviewing Procedure and Practice	1
Choose 12 credits from the following:		
INMG 1422* CADE 1474* CADE 2407 CADE 2420* CADE 2430*	Design Application Concepts II Reverse Engineering Engineering Technology Internship (variable credits) Electrical/Electronic Drawings Industrial Piping	12
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:
- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:
- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Engineering CAD Technology AAS Degree - 67 credits

Program Website: (https://degrees.lsc.edu/cad/)

Program Description

This program prepares students to translate the ideas, sketches, and specifications of engineers and designers into workable plans which are used in product fabrication. Students learn to use engineering technology in determining exact specifications for new product design or modification, or redesign of present products. The course begins with instruction in basic drafting skills and advances to more complex technological areas, including the application of computer-aided design.

Program Outcomes

- Illustrate orthographic viewing and dimensioning techniques.
- Demonstrate section and auxiliary detailing.
- Display dimensioning and tolerance techniques.
- Outline an understanding of manufacturing principles and practices.
- Create mechanical component details.
- Illustrate sheet metal development drawings.
- Demonstrate basic through advanced principles of CAD applications.
- Create and engineer electrical/electronic drawings.
- Create and engineer industrial piping layouts.
- Create and engineer fluid power drawings.
- Present technical illustrations using 3-dimensional design.
- Provide a cumulative final design project.
- Create engineering drawings using advanced CAD applications.

Required Courses

Course	Course Title	Credits
CADE 1468*	SolidWorks I	3
INMG 1400	Intro Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
WLDG 1560	Gas Metal Arc Welding I	3
CADE 1407*	AutoCAD	3
CADE 1450*	Mechanical Details	3
CADE 1470	SolidWorks II	3
CADE 1480*	Industrial/Mechanical CAD Applications I	3
INMG 1412*	Advanced Mechanical Blueprint Reading	3
CADE 1482*	Industrial/Mechanical CAD Applications II	3
CADE 1490*	Revit Industrial/Structural (BIM) Applications	3
CADE 2434*	3D Process Piping Design	3
CADE 2472*	AutoCAD Design Project	3
CADE 2492*	Revit Industrial/Mechanical (BIM) Applications	3
COMM 1601	Interviewing Procedure and Practice	1
Choose 6 credits from the following:		
INMG 1422*	Design Application Concepts II	6
CADE 1474*	Reverse Engineering	
CADE 2407	Engineering Technology Internship (variable credits	
CADE 2430*	Industrial Piping	
General Education Electives	Choose from at least 3 different Goal Areas of the MnTC	14
Total Credits		**67**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Engineering Technology AS Degree - 60 credits

Program Website: (https://www.lsc.edu/degrees/engineering-technology-as/)

Program Description

This AS program prepares students for transfer to earn a Bachelor of Science in Engineering Technology.

Students learn through hands-on training, to become specialists dedicated to the development, design, and implementation of engineering and technology related to positions in construction, manufacturing, product design, testing, or technical services including sales.

Program Outcomes

- Demonstrate safe use of machine tools used in manufacturing such as saws, drill press, engine lathes, milling machines and welding machines.
- Demonstrate understanding of mechanical blueprints including orthographic drawings, symbols, and tolerancing.
- Demonstrate teamwork in design and manufacture of a working project.
- Generate and simulate CAD/CAM toolpaths for various CNC machines.
- Utilize computer design programs (CAD) to create three dimensional models, assemblies, animation, and drawings.
- Demonstrate understanding various number systems used in digital logic circuits.
- Demonstrate understanding and programming of microcontrollers.
- Demonstrate understanding of the basic operation and programming of an industrial Programmable Logic Controller.
- Develop an understanding of math and physics concepts related to Engineering Technology.

Required Courses

Course	Course Title	Credits	MnTC Goal
CADE 1407*	AutoCAD	3	
CADE 1468*	SolidWorks I	3	
ELTN 1412	Digital Electronics	2	
ELTN 2442	Automation Controllers	3	
INMG 1111	Introduction to Project Management	3	
INMG 1400	Introduction to Manufacturing Technology	4	
INMG 1410*	Mechanical Print Reading	3	
INMG 1420	Design Application Concepts I	3	
INMG 1450*	Prototyping Processes	3	
MTCC 2504*	CAD-CAM	3	
General Education	A total of 30 MnTC credits must be selected from at least 6 different Goal Areas		
ENGL 1106*	College Compostion 1	3	1
MATH 1150* MATH 1100* MATH 1130*	Pre-Calculus (4 cr) **or** College Algebra (4 cr) **and** Trigonometry (3 cr)	4-7	4
PHYS 1201 *	Introduction to Physics I	5	3
PHYS 1202*	Introduction to Physics II	5	3
	Additional MnTC Goal Electives	10-13	1-10
Total Credits		**60**	

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Completion of MATH 0970 – Intermediate Algebra (or equivalent course or higher). MATH 0970 can be taken concurrently with Semester I coursework.

SolidWorks (CAD) Certificate - 18 credits

Program Website: (https://www.lsc.edu/degrees/solidworks-cad-certificate/)

Program Description

This SolidWorks certificate prepares students for the SolidWorks (CSWA) or (CSWP-Weldments) Exam. This certificate is also intended/recommended for people who are already in a manufacturing related field or who have earned a certificate, diploma, or degree in a manufacturing related program of study. SolidWorks software is the standard in 3D design and mechanical engineering at thousands of companies worldwide. Engineers, designers and CAD technicians create 3D models and 2D drawings ranging from individual parts to assemblies with thousands of parts.

Program Outcomes

- Design products for manufacture using 2D and 3D standards.
- Apply orthographic CAD design procedures to working drawings.
- Perform advanced CAD software applications.
- Create a capstone design project incorporating advanced CAD and industrial/mechanical applications.

Required Courses

Course	Course Title	Credits
CADE 1450*	Mechanical Details	3
CADE 1468*	SolidWorks I	3
CADE 1470*	SolidWorks II	3
INMG 1410*	Mechanical Print Reading	3
Choose one from the following:		
CADE 2476* or MTCC 2504* or WLDG 1500	SolidWorks Design Project or CAD CAM or Blueprint Reading for Welders	3
Choose one from the following:		
CADE 2500* or CADE 2502*	SolidWorks Associate Exam Preparation SolidWorks Weldments Exam Preparation	3
Total Credits		**18**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Carpentry Certificate - 30 credits

Program Website: (https://www.lsc.edu/degrees/carpentry-certificate/)

Program Description

The Carpentry program prepares students to build and repair structures in compliance with existing codes. Students learn skills needed for residential and commercial construction including blueprint reading, material estimating, cabinet building, and framing. Students will work with a variety of hand tools, power tools, and construction equipment, and have learning experiences both on and off-campus.

Program Outcomes

- Frame floors, walls, roofs using wood and steel.
- Install exterior finish components.
- Install interior finish components.
- Coordinate construction activities.
- Perform construction activities safely.

Pre-program Requirements

To begin your carpentry career, you need to be at a specific skill level in English/reading and mathematics.

Required Courses

Course	Course Title	Credits
CARP 1402*	OSHA Training	1
CARP 1404*	Tool and Machine Safety	1
CARP 1406*	Blueprint Reading	2
CARP 1410*	Framing Principles I	2
CARP 1412*	Carpentry Framing Lab I	1
CARP 1413*	Carpentry Framing Lab II	4
CARP 1416*	Roof Covering	1
CARP 1418*	Cabinetmaking I	1
CARP 1420*	Carpentry Leveling and Layout Methods	1
CARP 1422*	Metal Framing	1
CARP 1408*	Foundations and Concrete	1
CARP 1502*	Interior Finish I	1
CARP 1504*	Carpentry Interior Lab I	1
CARP 1505*	Carpentry Interior Lab II	3
CARP 1508*	Exterior Finish I	1
CARP 1510*	Carpentry Exterior Lab I	1
CARP 1511*	Carpentry Exterior Lab II	3
CARP 1518*	Cabinetmaking II	2
CARP 1520*	Estimating for Carpentry	2
Total Credits		**30**

*Requires a prerequisite or a concurrent course

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Carpentry Diploma - 45 credits

Program Website: (https://www.lsc.edu/degrees/carpentry-diploma/)

Program Description

The Carpentry program prepares students to build and repair structures in compliance with existing codes. Students learn skills needed for residential and commercial construction including blueprint reading, material estimating, cabinet building, and framing. Students will work with a variety of hand tools, power tools, and construction equipment, and have learning experiences both on and off-campus. The student will have the opportunity to act as a lead carpenter, experiencing being in charge of other workers and acting as supervisor on a construction project activity.

Program Outcomes

- Install floor, walls, and roofs.
- Install exterior finishes.
- Install interior finishes.
- Estimate building materials.
- Read Construction Blueprints.
- Perform carpenter activities safely.
- Coordinate construction activities.
- Acquire building materials.
- Supervise and act as a lead carpenter.
- Strengthen knowledge in General Education fields.

Pre-program Requirements

To begin your carpentry career, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Required Courses

Course	Course Title	Credits
CARP 1402*	OSHA Training	1
CARP 1404*	Tool and Machine Safety	1
CARP 1406*	Blueprint Reading	2
CARP 1410*	Framing Principles I	2
CARP 1412*	Carpentry Framing Lab I	1
CARP 1413*	Carpentry Framing Lab II	4
CARP 1416*	Roof Covering	1
CARP 1418*	Cabinetmaking I	1
CARP 1420*	Carpentry Leveling and Layout Methods	1
CARP 1422*	Metal Framing	1
CARP 1408*	Foundations and Concrete	1
CARP 1502*	Interior Finish I	1
CARP 1504*	Carpentry Interior Lab I	1
CARP 1505*	Carpentry Interior Lab II	3
CARP 1508*	Exterior Finish I	1
CARP 1510*	Carpentry Exterior Lab I	1
CARP 1511*	Carpentry Exterior Lab II	3
CARP 1518*	Cabinetmaking II	2
CARP 1520*	Estimating for Carpentry	2
COMM 1601	Interviewing Procedure and Practice	1
Choose 14	credits from the following:**	14
ALTH 1430*	First Aid & CPR/AED for Health Care Professionals (1 cr)	
ALTH 1435*	First Aid and Community CPR/AED (1cr)	
CARP 2404*	Lead Carpenter Floor Framer (2 cr)	
CARP 2406*	Lead Carpenter Wall Framer (5 cr)	
CARP 2408*	Lead Carpenter Roof Framer (3 cr)	
CARP 2410*	Lead Carpenter Stair Framer (3 cr)	
CARP 2412*	Lead Roofer (2 cr)	
CARP 2414*	Lead Carpenter Interior Finisher (4 cr)	
CARP 2416*	Lead Carpenter Exterior Finisher (4 cr)	
CARP 2510***	Carpenter Internship (3-5 cr)	
Total Credits		**45**

*Requires a prerequisite or a concurrent course

**Other courses may be allowed as electives with program advisor approval

***CARP2510 is only permitted with the completion of 1st year and GPA of 3.0 or better

Carpentry AAS - 60 credits

Program Website: (https://www.lsc.edu/degrees/carpentry-aas/)

Program Description

The Carpentry program prepares students to build and repair structures in compliance with existing codes. Students learn skills needed for residential and commercial construction including blueprint reading, material estimating, cabinet building, and framing. Students will work with a variety of hand tools, power tools, and construction equipment, and have learning experiences both on and off-campus. The student will have the opportunity to act as a lead carpenter, experiencing being in charge of other workers and acting as supervisor on a construction project activity. The inclusion of a 15-credit General Education component diversifies the student's training and enhances transfer opportunities to other institutions of higher learning.

Program Outcomes

- Install floor, walls, and roofs.
- Install exterior finishes.
- Install interior finishes.
- Estimate building materials.
- Read construction blueprints.
- Perform carpenter activities safely.
- Coordinate construction activities.
- Acquire building materials.
- Supervise and act as a lead carpenter.
- Strengthen knowledge in General Education fields.

Pre-program Requirements

To begin your carpentry career, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Required Courses

Course	Course Title	Credits
CARP 1402*	OSHA Training	1
CARP 1404*	Tool and Machine Safety	1
CARP 1406*	Blueprint Reading	2
CARP 1410*	Framing Principles I	2
CARP 1412*	Carpentry Framing Lab I	1
CARP 1413*	Carpentry Framing Lab II	4
CARP 1416*	Roof Covering	1
CARP 1418*	Cabinetmaking I	1
CARP 1420*	Carpentry Leveling and Layout Methods	1
CARP 1422*	Metal Framing	1
CARP 1408*	Foundations and Concrete	1
CARP 1502*	Interior Finish I	1
CARP 1504*	Carpentry Interior Lab I	1
CARP 1505*	Carpentry Interior Lab II	3
CARP 1508*	Exterior Finish I	1
CARP 1510*	Carpentry Exterior Lab I	1
CARP 1511*	Carpentry Exterior Lab II	3
CARP 1518*	Cabinetmaking II	2
CARP 1520*	Estimating for Carpentry	2
COMM 1601	Interviewing Procedure and Practice	1
Choose 14 credits from the following:**		
ALTH 1430	First Aid & CPR/AED for Health Care Professionals (1 cr)	14
ALTH 1435*	First Aid and Community CPR/AED (1 cr)	
CARP 2404*	Lead Carpenter Floor Framer (2 cr)	
CARP 2406*	Lead Carpenter Wall Framer (5 cr)	
CARP 2408*	Lead Carpenter Roof Framer (3 cr)	
CARP 2410*	Lead Carpenter Stair Framer (3 cr)	
CARP 2412*	Lead Roofer (2 cr)	
CARP 2414*	Lead Carpenter Interior Finisher (4 cr)	
CARP 2416*	Lead Carpenter Exterior Finisher (4 cr)	
CARP 2510***	Carpenter Internship (3-5 cr)	
General Education Electives	Choose from at least three different Goal Areas of the Minnesota Transfer Curriculum	15
Total Credits		**60**

*Requires a prerequisite or a concurrent course. ALTH1435 may be taken after completion of 1st year coursework. **Other courses may be allowed as electives with program advisor approval ***CARP2510 is only permitted with the completion of 1st year and GPA of 3.0 or better

***Civil Engineering Technology Diploma - 51 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

In the Civil Engineering Technology program, students learn skills they can use in a career assisting Civil Engineers and Land Surveyors. The student will find a wide range of opportunities in all phases of construction, design, and surveying. The course of instruction includes route surveying, property descriptions, quantity calculations, material testings and CAD (Computer Aided Design) to design roads, building sites, and property subdivisions.
This 51-credit Diploma seamlessly transfers to the Civil Engineering Technology AAS (60 credits).

Program Outcomes

- Determine accuracy of their surveying level work
- Verify the accuracy of their total station data.
- Perform standard survey calculations.
- Develop Site and Highway plan sets.
- Research related information in both print and electronic formats.
- Set-up and create drawings using CAD.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
CETT 1400*	Introduction to Civil Engineering Technology	3
CETT 1402*	Introduction to Surveying	3
CETT 1410*	Introduction to Material Testing**	3
CETT 1450*	Engineering Graphics	4
CETT 1420*	Route Survey	3
CETT 1430*	Civil CAD Applications	4
CETT 1440*	Engineering Problem Solving	2
CETT 2440*	Civil Estimating	3
CETT 2407*	Engineering Technology Internship	1-3
CETT 2400*	Intermediate Survey	3
CETT 2410*	Stormwater Management	4
CETT 2430*	Site Development	3
CETT 2420	Land Survey Systems	3
CETT 2450*	Highway Design	3
CETT 2460*	Advanced Survey	3
MnTC General	**Education Requirements**	
Goal Area 1	Communication (3 credit minimum)	
Goal Area 3 or Goal Area 4	Natural Sciences or Math (3 credit minimum)	6
Total Credits		**51**

*Requires a prerequisite or a concurrent course
**Taking three of the following four MnDOT certification courses can be substituted for CETT 1410: CETT 2600 Aggregate Production I; CETT 2610 Grading and Base I; CETT 2630 Bituminous Street I; CETT 2650 Concrete Field I.

***Civil Engineering Technology AAS - 60 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

This program prepares students for many career opportunities in the transportation field including: Surveying, Roadway Design, Computer Aided Design, and Construction. Coursework emphasizes practical applications of basic engineering and surveying principles with special attention on math, drafting, surveying, materials, technical engineering science, and computer-aided design. Typical employers include private surveyors, consulting engineers, state, county and municipal engineering departments, utility companies, U.S. Army Corps of Engineers, and other federal agencies.

Program Outcomes

- Determine accuracy of their surveying level work
- Verify the accuracy of their total station data
- Perform standard survey calculations
- Develop Site and Highway plan sets
- Research related information in both print and electronic formats
- Set-up and create drawings using CAD

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
CETT 1400	Introduction to Civil Engineering Technology	3
CETT 1402	Introduction to Surveying	3
CETT 1410*	Introduction to Material Testing**	3
CETT 1450	Engineering Graphics	4
CETT 1420*	Route Survey	3
CETT 1430*	Civil CAD Applications	4
CETT 1440	Engineering Problem Solving	2
CETT 2440*	Civil Estimating	3
CETT 2407	Engineering Technology Internship	1-3
CETT 2400*	Intermediate Survey	3
CETT 2410	Stormwater Management	4
CETT 2430*	Site Development	3
CETT 2420	Land Survey Systems	3
CETT 2450*	Highway Design	3
CETT 2460*	Advanced Survey	3
MnTC General	**Education Requirements**	
Goal Area 1	Communication (3 credit minimum)	15
Goal Area 3 or Goal Area 4	Natural Sciences or Math (3 credit minimum)	
Goal Area 5 or Goa Area 6	Social and Behavior Sciences or Humanities (3 credit minimum)	
Goal Areas 1-10	General Education - Other	
Total Credits		**60**

***Requires a prerequisite or a concurrent course**

**Taking three of the following four MnDOT certification courses can be substituted for CETT 1410: CETT 2600 Aggregate Production I; CETT 2610 Grading and Base I; CETT 2630 Bituminous Street I; CETT 2650 Concrete Field *I*

Commercial and Residential Wiring Diploma - 68 credits

Program Website: (https://degrees.lsc.edu/electrical-wiring/)

Program Description

The Commercial and Residential Wiring diploma program teaches students to install, operate, and repair electrical systems. Students also learn to install wiring in buildings and to make power connections from an outside source. Training in the program includes simulated residential, commercial, and industrial settings. Also covered will be DC and AC motor controls, electrical distribution panels, and testing equipment.

Students become familiar with digital applications, analog solid state, and programmable controllers that are used within industrial settings throughout the nation.

This diploma transfers seamlessly into an AAS degree (82 credits) in Commercial and Residential Wiring.

Program Outcomes

- Have a working knowledge and understanding of the National Electrical Code (NEC).
- Have a working knowledge of safety issues relating to the electrical industry and workplace.
- Understand and be able to perform tasks relating to residential wiring.
- Understand and be able to perform tasks relating to commercial wiring.
- Understand and be able to perform tasks relating to industrial wiring.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework, or
- With instructor permission, concurrent enrollment in MATH 1115.

Pre-Program Courses

Course	Course Title	Credits
ELTN 1406	DC Electricity	4
ELTN 1408	AC Electricity	4
ELTN 1412	Digital Electronics	2
ELTN 1422	Media and Cabling	2
ELTN 1475	Introduction to the National Electrical Code	2
ELTN 1530	Renewable Energy	3
ELTN 1428	Electrical Safety	1
ELTN 1442	Motors and Generators	6
ELTN 1470	Systematic Troubleshooting	1
ELTN 1635	PLT Control Lab	3
ELTN 2442	Automation Controllers	3

Required Courses

Course	Course Title	Credits
ELEC 2403	Residential Wiring	4
ELEC 2405	Electrical Blueprint Reading	2
ELEC 2423	Commercial Wiring I	4
ELEC 2433	Motor Control	3
ELEC 2440	National Electrical Code I	2
ELTN 2430	Introduction to Instrumentation	3
ELEC 2453	Commercial Wiring II	4
ELEC 2461	Electrical Troubleshooting	2
ELEC 2503	Electrical Controls	3
ELEC 2533	Industrial Wiring	4
ELEC 2510	National Electrical Code II	2
ELTN 2440	Motor Speed Controllers	3
	Choose 1 credits from the following (Other courses may be allowed as electives with program advisor approval): -Any ELTN or ELEC courses not listed above -ALTH 1435: American Red Cross Community First Aid and CPR (1 cr) -COMM 1601: Interviewing Procedure and Practice (1 cr)	1
Total Credits		**68**

Commercial and Residential Wiring AAS - 82 credits

Program Website: (https://www.lsc.edu/degrees/commercial-and-residential-wiring-aas/)

Program Description

The Commercial and Residential Wiring A.A.S. Degree program combines technical courses with general education courses, offering graduates an excellent foundation for employment leading to leadership roles, management positions, and potential transfer to institutions with baccalaureate degrees. This program is designed to develop entry-level skills; and to complete the program within two years, the student is advised to follow the program guide.

Approved by the Minnesota Department of Labor and Industry for one-year credit toward the Journeyman exam.

Program Outcomes

The program is designed to provide students with the knowledge and ability to:

- Have a working knowledge and understanding of the National Electrical Code (NEC).
- Have a working knowledge of safety issues relating to the electrical industry and workplace.
- Understand and be able to perform tasks relating to residential wiring.
- Understand and be able to perform tasks relating to commercial wiring.
- Understand and be able to perform tasks relating to industrial wiring.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Pre-Program Courses

Course	Course Title	Credits
ELTN 1406	DC Electricity	4
ELTN 1408	AC Electricity	4
ELTN 1412	Digital Electronics	2
ELTN 1422	Media and Cabling	2
ELTN 1475	Introduction to the National Electrical Code	2
ELTN 1530	Renewable Energy Systems	3
ELTN 1428	Electrical Safety	1
ELTN 1442	Motors and Generators	6
ELTN 1470	Systematic Troubleshooting	1
ELTN 1635	PLT Control Lab	3
ELTN 2442	Automation Controllers	3
MATH 1115	Contemporary Math or Goal Area 4 course	4

Required Courses

Course	Course Title	Credits
ELEC 2403	Residential Wiring	4
ELEC 2405	Electrical Blueprint Reading	2
ELEC 2423	Commercial Wiring I	4
ELEC 2433	Motor Control	3
ELEC 2440	National Electrical Code I	2
ELTN 2430	Introduction to Instrumentation	3
ELEC 2453	Commercial Wiring II	4
ELEC 2461	Electrical Troubleshooting	2
ELEC 2503	Electrical Controls	3
ELEC 2533	Industrial Wiring	4
ELEC 2510	National Electrical Code II	2
ELTN 2440	Motor Speed Controllers	3
General Education Electives	Choose from at least 2 different Goal Areas: 1-3 or 5-10 of the Minnesota Transfer Curriculum	11
Total Credits		**82**

Basic Electronics Certificate - 26 credits

Program Website: (https://degrees.lsc.edu/basic-electronics/)

Program Description

This certificate is designed to give basic knowledge of electronics and computers. The technical knowledge received will prepare students for future training on specific electronic equipment

This certificate transfers seamlessly into the Electronic Technology Diploma (60 credits), and the Electronic Engineering Technology AAS (72 credits)

Required Courses

Course	Course Title	Credits
ELTN 1406*	DC Electricity	4
ELTN 1408*	AC Electricity	4
ELTN 1412	Digital Electronics	2
MATH 1115*	Contemporary Math	4
ELTN 1422	Media and Cabling	2
ELTN 1432*	Solid-State Devices	5
ELTN 1500	Practical PC Maintenance	2
ELTN 2442*	Automation Controllers	3
Total Credits		**26**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Operate common electronic test equipment, oscilloscopes, DMMs, and signal generators.
- Read and understand circuit schematics, i.e. recognize basic circuit configurations and understand their operation.
- Understand basic circuit analysis techniques.
- Troubleshoot and repair common electronic circuits.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL/READ 0955 – Read/Write College Prep: Advance, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework
- With instructor permission, concurrent enrollment in MATH 1115.

Electronic Technology Diploma - 60 credits

Program Website: (https://degrees.lsc.edu/electronic-technician/)

Program Description

This certificate is designed to give basic knowledge of electronics and computers. The technical knowledge received will prepare students for future training on specific electronic equipment

This certificate transfers seamlessly into the Electronic Technology Diploma (60 credits), and the Electronic Engineering Technology AAS (72 credits)

Program Outcomes

- Operate common electronic test equipment, oscilloscopes, DMMs, and signal generators.
- Read and understand circuit schematics, i.e. recognize basic circuit configurations and understand their operation.
- Understand basic circuit analysis techniques.
- Troubleshoot and repair common electronic circuits.
- Install and configure various PC hardware components, e.g. memory, hard drives, modems, and network cards.

Required Courses

Course	Course Title	Credits
ELTN 1406*	DC Electricity	4
ELTN 1408*	AC Electricity	4
ELTN 1412	Digital Electronics	2
MATH 1115*	Contemporary Math	4
ELTN 1422	Media and Cabling	2
ELTN 1432*	Solid-State Devices	5
ELTN 1452*	Microcontrollers	4
ELTN 1500	Practical PC Maintenance	2
ELTN 1470*	Systematic Troubleshooting	1
ELTN 2442*	Automation Controllers	3
ELTN 2400*	CET Exam Preparation	2
	Choose 27 credits from the following (other courses may be allowed as electives with program advisor approval): • Any ELTN or ELEC courses not listed above • COMM 1601 Interviewing Procedure and Practice (1 credit)	27
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework,
- With instructor permission, concurrent enrollment in MATH 1115.

Industrial Controls AAS - 72 credits

Program Website: (https://degrees.lsc.edu/electrical-engineering/)

Program Description

The AAS Electronics Engineering Technology program with Industrial Controls Emphasis educates students in the areas of basic electronic theory and analysis, industrial control principles and practices, and provides students with the skills required to obtain jobs as industrial electronic technicians in a wide variety of industries. Training includes basic theory and extensive hands-on experience with industrial wiring practices, motors and motor controllers, programmable controllers, and a variety of industrial instrumentation.

Program Outcomes

- Operate common electronic test equipment, oscilloscopes, DMM's, and signal generators
- Read and understand circuit schematics, i.e. recognize basic circuit configurations and understand their operation
- Understand basic circuit analysis techniques
- Troubleshoot and repair common electronic circuits
- Install, program, and troubleshoot programmable controllers (PLC's) used in industrial plants
- Install, troubleshoot, and configure AC and DC motors
- Install and configure various PC hardware components, e.g. memory, hard drives, modems, and network cards
- Be proficient at cabling using appropriate standards and media

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics.

Required Courses

Course	Course Title	Credits
ELTN 1406*	DC Electricity	4
ELTN 1408*	AC Electricity	4
ELTN 1412	Digital Electronics	2
ELTN 1422	Media and Cabling	2
ELTN 1428	Electrical Safety	1
MATH 1115*	Contemporary Math	4
ELTN 1432*	Solid-State Devices	5
ELTN 1442*	Motors and Generators	6
ELTN 1500	Practical PC Maintenance	2
ELTN 1470*	Systematic Troubleshooting	1
ELTN 2440*	Motor Speed Controllers	3
ELTN 2442*	Automation Controllers	3
ELTN 2444*	Power Distribution for Industrial Controls	4
ELTN 2400*	CET Exam Preparation	2
ELTN 2430*	Introduction to Instrumentation	3
ELTN 2450*	Automation Controller Applications	5
ELTN 2452*	Process Control Theory	3
	Choose 7 credits from the following (other courses may be allowed as electives with program advisor approval): • Any ELTN or ELEC courses not listed above • COMM 1601: Interviewing Procedure and Practice (1 credit)	7
	MnTC General Education Requirements	
Goal Area 1	Communication (3 credit minimum)	11
Goal Area 5 or Goa Area 6	Social and Behavior Sciences or Humanities (3 credit minimum)	
Goal Areas 1-10	General Education - Other	
Total Credits		**72**

*Requires a prerequisite or a concurrent course

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 – Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Automated Machining Certificate - 16 credits

Program Website: (https://degrees.lsc.edu/cnc-machine/)

Program Description

This 16-credit certificate provides advanced training for people already working as machinists. It gives them a chance to improve their skills with the latest fully-automated machine tools available today. The CNC machines will be set up and programmed keeping lights out machining in mind. CAM will also be used to create programs for these machines.

Program Outcomes

- Manufacture mating parts and assemblies.
- Perform set ups and use milling fixtures to manufacture parts.
- Setup and machine compound angles using various processes.
- Build jigs and fixtures to complete manufacturing processes.
- Manufacture and inspect quality products.

Required Courses

Course	Course Title	Credits
MTCC 2600*	CNC Automation Programming	1
MTCC 2602*	Swiss Automation	3
MTCC 2604*	CNC Mill/Turn Application	4
MTCC 2606*	CNC 4 Axix Horizontal Automation	4
Elective Credits	Choose 4 elective credits from any MTCC course.	4
Total Credits		**16**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Completion of an AAS or Diploma degree in the Machine Technology program and/or instructor's consent.
Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Manual Machinist Certificate - 30 credits

Program Website: (https://degrees.lsc.edu/machinist/)

Program Description

This 30-credit certificate trains students to work in a manual machining environment. Students will learn setups in machining, inspection of parts made on vertical mills, lathes, and grinders. Using jigs and fixtures necessary to these parts will be covered as well as the materials to use in manufacturing.

Program Outcomes

- Manufacture mating parts and assemblies.
- Perform setups and use milling fixtures to manufacture parts.
- Set up and machine compound angles using various processes.
- Build jigs and fixtures to complete manufacturing processes.
- Manufacture and inspect quality product.

Required Courses

Course	Course Title	Credits
INMG 1400	Introduction to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
CADE 1468*	Solidworks I	3
MTCC 1600	Engineering Materials	1
WLDG 1560	Gas Metal Arc Welding I	3
INMG 1412*	Advanced Mechanical Blueprint Reading	3
MTCC 1432*	Quality Methods	2
MTCC 1505*	Surface Grinder I	2
MTCC 1520*	Cylindrical Grinding	1
MTCC 1530*	Waterjet Cutting Processes	2
MTCC 1603*	Turning	2
MTCC 1604*	Milling	2
MTCC 2500*	CNC Mill Conversational	2
Total Credits		**30**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Machine Technology CNC Programmer Diploma - 64 credits

Program Website: (https://degrees.lsc.edu/cnc-programmer/)

Program Description

The CNC Machine Programmer program is designed to prepare the student for employment as a CNC Machinist/-Programmer. Skill development includes performing basic floor programming to produce a part to specifications, setup and operation of CNC machines, instruction in inspection and statistical process control, and program parts designed using a CAD/CAM computer system.

Program Outcomes

- Perform a basic setup and operate different types of manual metal working machines.
- Write basic programs and operate different types of CNC metal working machines.
- Perform mathematical calculation of shop problems.
- Use basic CAD and CAM computer programs to generate CNC programs to be used on machine tools.
- Interpret all basic drawings and blueprints.
- Build basic machine parts and tools.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Required Courses

Course	Course Title	Credits
CADE 1468*	SolidWorks I	3
INMG 1400	Introduction to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
WLDG 1560	Gas Metal Arc Welding I	3
INMG 1412*	Advanced Mechanical Blueprint Reading	3
INMG 1422	Design Application Concepts II	3
MTCC 1432*	Quality Methods	2
MTCC 1505*	Surface Grinder	2
MTCC 1620	CNC Basic Programming	2
MTCC 2500*	CNC Mill Conversational	2
MTCC 2504*	CAD CAM	3
MTCC 1600	Engineering Materials	1
MTCC 1603*	Turning	2
MTCC 1604*	Milling	2
MTCC 2502*	CNC Turning	3
MTCC 2506*	Advanced CAM	2
MTCC 2540*	CNC Machine Center 3 Axis	3
MTCC 2564*	CNC Horizontal 4 Axis	3
COMM 1601	Interviewing Procedure and Practice	1
MTCC 1520*	Cylindrical Grinding	1
MTCC 1530*	Water Jet Cutting Processes	2
MTCC 2560*	Advanced CNC Mill 4 Axis	3
MTCC 2562*	CNC Mill/Turn Live Tooling	3
MTCC 2570	Wire EDM	2
MTCC 2572*	Swiss Automatic	3
Total Credits		**64**

*Requires a prerequisite or a concurrent course

Machine Technology CNC Programmer AAS Degree - 71 credits

Program Website: (https://degrees.lsc.edu/cnc/)

Program Description

The CNC Machine Programmer program is designed to prepare the student for employment as a CNC Machinist/-Programmer. Skill development includes performing basic floor programming to produce a part to specifications, setup and operation of CNC machines, instruction in inspection and statistical process control, and program parts designed using a CAD/CAM computer system.

Program Outcomes

- Perform a basic setup and operate different types of manual metal working machines.
- Write basic programs and operate different types of CNC metal working machines.
- Perform mathematical calculation of shop problems.
- Use basic CAD and CAM computer programs to generate CNC programs to be used on machine tools.
- Interpret all basic drawings and blueprints.
- Build basic machine parts and tools.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

Required Courses

Course	Course Title	Credits
CADE 1468*	SolidWorks I	3
INMG 1400	Introduction to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
WLDG 1560	Gas Metal Arc Welding I	3
INMG 1412*	Advanced Mechanical Blueprint Reading	3
INMG 1422*	Design Application Concepts II	3
MTCC 1432*	Quality Methods	2
MTCC 1505*	Surface Grinder	2
MTCC 1620	CNC Basic Programming	2
MTCC 2504*	CAD CAM	3
MTCC 1600	Engineering Materials	1
MTCC 1603*	Turning	2
MTCC 1604*	Milling	2
MTCC 2502*	CNC Turning	3
MTCC 2540*	CNC Machine Center 3 Axis	3
MTCC 2564*	CNC Horizontal 4 Axis	3
MTCC 2560*	Advanced CNC Mill 4 Axis	3
MTCC 2562*	CNC Mill/Turn Live Tooling	3
MTCC 2570	Wire EDM	2
MTCC 2572*	Swiss Automatic	3
General Education Electives	Choose from at least 3 of the goals areas of the Minnesota Transfer Curriculum Goal Areas 1-10	15
Total Credits		**71**

*Requires a prerequisite or a concurrent course

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Rapid Prototyping and Design Certificate - 14 credits

Program Website: (https://degrees.lsc.edu/3d-printing/)

Program Description

Rapid Prototyping and Reverse Engineering is an emerging field that uses high tech tools, software, equipment, and processes to build a 3D working model of an idea or much needed part in a short period of time. This offers many versatile advantages compared to traditional methods of manufacturing. This certificate will complement skills learned and developed in the Integrated Manufacturing programs (Machine Tool, Engineering CAD, and Welding Diploma). Students will have the skills necessary to take a concept through the design, manufacture, and testing phases of the product upon completion of this certificate.

Required Courses

Course	Course Title	Credits
CADE 1468*	Solidworks I	3
CADE 1474*	Reverse Engineering	3
INMG 1450*	Prototyping Processes	3
MTCC 1432*	Quality Methods	2
MTCC 2504*	CAD CAM	3
Total Credits		**14**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Analyze product specifications.
- Inspect, measure, and test existing mechanical component.
- Produce computer-aided drawing and assembly as needed.
- Create prototype of product.
- Set up and operate various prototyping equipment.
- Make simple changes in models to achieve a working product.
- Select proper processes used for the prototype.
- Test product and make any revisions.
- Present working finished product.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score 250 or higher on the Arithmetic portion of the Accuplacer.

***Production Technologist Certificate - 8 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

This certificate aligns with the Manufacturing Skill Standards Council's (MSSC) assessment and certification system for Safety, Manufacturing Processes and Production, Quality Practices and Measurement, and Maintenance Awareness. The core curriculum is based upon federally endorsed national standards for production workers. Students who complete these courses have the skills and knowledge to pass the credentialing exam and gain a nationally recognized credential.

Required Courses

Course	Course Title	Credits
CMAE 1514	Safety	2
CMAE 1518	Manufacturing Processes and Production	2
CMAE 1522	Quality Practices and Measurement	2
CMAE 1526	Maintenance Awareness	2
Total Credits		**8**

This 8-credit Certificate seamlessly transfers to the Machine Production Technologist Diploma (34 credits), the Advanced Machine Production Technologist AAS (60 credits), the Welding Technologist Diploma (32 credits) and the Advanced Welding Technologist AAS (60 credits).

Program Outcomes

- Explain performance of preventative maintenance
- Discuss the concepts of routine repair
- Discuss monitoring indicators to ensure correct operations
- Explain periodic or statistically based internal quality audit activities
- Explain continuous improvement
- Explain communication regarding quality problems
- Discuss how to determine resources available for the production process
- Identify set-up and verification of equipment for the production process
- Describe the process of setting team production goals
- Explain characteristics of working in a safe and productive manufacturing workplace
- Identify procedures related to performing emergency drills and participating on emergency teams
- Explain proper safe use of equipment

Pre-program Requirements

There are no specific program prerequisites for this certificate.

***Production Technologies Certificate - 16 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

This certificate aligns with the Manufacturing Skill Standards Council's (MSSC) assessment and certification system for Safety, Manufacturing Processes and Production, Quality Practices and Measurement, and Maintenance Awareness. The core curriculum is based upon federally endorsed national standards for production workers. Students who complete these courses have the skills and knowledge to pass the credentialing exam and gain a nationally recognized credential.

Required Courses

Course	Course Title	Credits
CMAE 1502	Technical Math	3
CMAE 1506	Introduction to Computers	2
CMAE 1510	Print Reading	2
CMAE 1514	Safety	2
CMAE 1518	Manufacturing Processes and Production	2
CMAE 1522	Quality Practices and Measurement	2
CMAE 1526	Maintenance Awareness	2
CMAE 1528	Career Success Skills	1
Total Credits		**16**

Program Outcomes

- Identify and apply appropriate safety procedures
- Use technical mathematics to solve problems
- Demonstrate use of common computer software
- Analyze and apply specific manufacturing process procedures
- Identify and apply specific quality procedures
- Interpret symbols and blueprints accurately for a variety of projects
- Identify appropriate and inappropriate professional behavior.

Pre-program Requirements

There are no specific program prerequisites for this certificate.

Gas Tungsten Arc Welding Production Certificate - 18 credits

Program Website: (https://degrees.lsc.edu/gtaw/)

Program Description

This certificate will provide the student with entry level skills and knowledge to perform as a gas tungsten arc welder (GTAW) with minimal supervision in all positions on ferrous and nonferrous metals.

This 18-credit Certificate seamlessly transfers to the Welding Diploma (65 credits).

Program Outcomes

- Utilize safe working techniques and practices.
- Read prints and interpret welding symbols.
- Use measuring and layout tools properly.
- Operate welding tools and equipment.
- Apply principles to welding and metal fabrication processes.
- Determine the quality of welds.
- Utilize computerized equipment for welding and cutting.

Required Courses

Course	Course Title	Credits
WLDG 1500*	Blueprint Reading for Welders	3
WLDG 1520	Gas Tungsten Arc Welding I	3
WLDG 1522*	Gas Tungsten Arc Welding II	3
WLDG 1524*	Gas Tungsten Arc Welding III	3
WLDG 1582*	GTAW Fabrication Methods	3
Technical Electives	Choose any from CADE, INMG, MTCC or WLDG	3
Total Credits		**18**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL/READ 0955 – Read/Write College Prep: Advanced, or
- Completion of ENGL/READ 0950 or 0955 (or equivalent course or higher). ENGL/READ 0950 may be taken concurrently with Semester I coursework.

Welding Certificate - 24 credits

Program Website: (https://degrees.lsc.edu/welding-certificate/)

Program Description

The certificate is designed to provide a basic working knowledge of Integrated Manufacturing, and/or enhance the education of a student who may come in contact with Welding, Machine Tool, and Engineering CAD Technology through another related technical field of study.

This certificate is designed to provide a basic working knowledge of Integrated Manufacturing, and/or enhance the education of a student who may come in contact with Welding, Machine Tool, and Engineering CAD Technology through another related technical field of study. This certificate is not intended to take the place of either the two-year AAS degree or the two-year diplomas from any of the Integrated Manufacturing Programs.

Required Courses

Course	Course Title	Credits
CADE 1468*	Solidworks I	3
INMG 1400	Introduction to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
MTCC 1600	Engineering Materials	1
WLDG 1560	Gas Metal Arc Welding	3
WLDG 1520	Gas Tungsten Arc Welding I	3
WLDG 1540	Shielded Metal Arc Welding	3
MTCC 1603*	Turning	2
MTCC 2500*	CNC Mill Conversational	2
Total Credits		**24**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Demonstrate the proper use of various saws.
- Use basic safety skills.
- Calculate and set RPMs.
- Use four-jaw chuck, turn between centers, and cut tapers.
- Drill and bore holes.
- Use edge finder.
- Square work piece.
- Cut pipe threads.
- Cut acme threads.
- Program using conversational language.
- Set up and run parts.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL/READ 0955 – Read/Write College Prep: Advanced, or
- Completion of ENGL/READ 0950 or 0955 (or equivalent course or higher). ENGL/READ 0950 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

***Welding Technology Certificate - 30 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

The Welding Technology Certificate offers seven production technologies courses that provide core skills and six courses with advanced welding skill topics, including: Welding print reading & interpreting symbols, OxyFuel Welding, SMAW (shielded metal arc welding), GMAW (gas metal arc welding), FWAW (flux cored arc welding), GTAW (gas tungsten arc welding), Metallurgy, and hands-on experience through on-site labs.

Program Outcomes

- Demonstrate proper welder use and safety.
- Interpret welding blueprints and drawings.
- Interpret weld symbols.
- Demonstrate proper welding processes.
- Demonstrate cutting process.
- Demonstrate various weld transfers.
- Select base metals with weld-ability.
- Demonstrate weld and setup using GTAW.
- Demonstrate weld and setup using GMAW.
- Demonstrate proper GMAW wire selection.
- Demonstrate proper fabrication layout.
- Prepare student for welding certification.

Required Courses

Course	Course Title	Credits
CMAE 1502	Technical Math	3
CMAE 1506	Introduction to Computers	2
CMAE 1510	Print Reading	2
CMAE 1514	Safety	2
CMAE 1518	Manufacturing Processes and Production	2
CMAE 1522	Quality Practices and Measurement	2
CMAE 1526	Maintenance Awareness	2
CMAE 1560	Interpreting Symbols	2
CMAE 1562	Oxyfuel Welding	3
CMAE 1564	Shielded Metal Arc Welding	3
CMAE 1566	Gas Metal Arc Welding/Flux Cored Arc Welding	3
CMAE 1568	Gas Tungsten Arc Welding	3
CMAE 1570	Metallurgy	1
Total Credits		**30**

Pre-program Requirements

There are no specific program prerequisites for this certificate.

Welding Technologist Diploma - 32 credits

Program Website: (https://www.lsc.edu/degrees/welding-technologist-diploma/)

Program Description

The Welding Technologist Diploma is a one-year program designed to provide an intermediate career pathway in manufacturing, specific to the field of Welding Technology. This 32-credit diploma is designed to prepare the student for employment as an entry to intermediate level welding or fabrication technologist. This program allows students to gain the information needed to develop skills used in the welding industry. This program covers introductory GMAW, GTAW, FCAW, SMAW, and OXY/Fuel welding processes. Instruction includes classroom lectures and demonstrations, as well as hands-on projects in a lab setting.

This 32-credit Diploma seamlessly transfers to the Welding Diploma (65 credits).

Most of the courses in the INMG Welding Technologist Diploma are offered on-site in a lab setting with some of the courses offered online.

Required Courses

Course	Course Title	Credits
CADE 1468*	Solidworks I	3
WLDG 1560	Gas Metal Arc Welding	3
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
INMG 1400	Intro to Manufacturing Technology	4
WLDG 1500 *	Blueprint Reading for Welders	3
WLDG 1520	Gas Tungsten Arc Welding I	3
WLDG 1540	Shielded Metal Arc Welding I	3
INMG 1422* or WLDG 1550*	Design Application Concepts II or CNC Plasma and Cutting Processes	3
WLDG 1570*	Flux Cored Arc Welding I	3
COMM 1601	Interviewing Processes and Procedures	1
Total Credits		**32**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Demonstrate proper welder use and safety.
- Interpret welding blueprints and drawings.
- Interpret weld symbols.
- Demonstrate proper welding processes.
- Demonstrate cutting process.
- Demonstrate various weld transfers.
- Select base metals with weld-ability.
- Demonstrate weld and setup using GTAW.
- Demonstrate weld and setup using GMAW.
- Demonstrate proper GMAW wire selection.
- Demonstrate proper fabrication layout.
- Prepare student for welding certification.

Pre-program Requirements

To begin your career in Welding Technology, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL/READ 0955 – Read/Write College Prep: Advanced, or
- Completion of ENGL/READ 0950 or 0955 (or equivalent course or higher). ENGL/READ 0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Welding Diploma - 65 credits

Program Website: (https://degrees.lsc.edu/welding-diploma/)

Program Description

The Welding Diploma is a two-year program designed to provide an advanced career pathway in manufacturing, specific to the field of Welding. This 65-credit diploma is designed to prepare the student for employment as an intermediate to advanced welder or fabricator. This program allows students to gain the information and to develop skills used in the welding industry. This program covers GMAW, GTAW, FCAW, SMAW. Instruction includes classroom lectures and demonstrations, as well as hands-on projects in a lab setting. Students will have the opportunity to achieve industry level credentials.

Program Outcomes

- Demonstrate an understanding of welding equipment and proper safety.
- Demonstrate an understanding of blueprints and blueprint reading.
- Demonstrate an understanding of proper welding processes.
- Demonstrate an understanding of cutting processes.
- Demonstrate an understanding of different weld transfers.
- Select metals based upon weldability.
- Demonstrate an understanding of TIG welding and setup.
- Demonstrate an understanding of MIG welding and setup.
- Understand MIG wire selection.
- Demonstrate an understanding of proper layout.
- Understand weld symbols.
- Prepare student for welding certification.

Required Courses

Course	Course Title	Credits
CADE 1468*	Solidworks I	3
INMG 1400	Intro to Manufacturing Technology	4
INMG 1410*	Mechanical Print Reading	3
INMG 1420	Design Application Concepts I	3
WLDG 1560	Gas Metal Arc Welding I	3
INMG 1422*	Design Application Concepts II	3
WLDG 1500*	Blueprint Reading for Welders	3
WLDG 1520	Gas Tungsten Arc Welding I	3
WLDG 1540	Shielded Metal Arc Welding I	3
WLDG 1570*	Flux Cored Arc Welding I	3
WLDG 1522*	Gas Tungsten Arc Welding II	3
WLDG 1542*	Shielded Metal Arc Welding II	3
WLDG 1562*	Gas Metal Arc Welding II	3
WLDG 2402*	Introduction to Metallurgy	2
WLDG 1572*	Flux Cored Arc Welding II	3
WLDG 1550*	CNC Plasma and Cutting Processes	3
COMM 1601	Interviewing Procedure and Practice	1
WLDG 1524*	Gas Tungsten Arc Welding III	3
WLDG 1544*	Shielded Metal Arc Welding III	3
WLDG 1564*	Gas Metal Arc Welding III	3
WLDG 1580*	GMAW Fabrication Methods	3
WLDG 1590*	Introduction to Robotic Training	2
WLDG 2502*	Weld Qualification	1
Total Credits		**65**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English/reading and mathematics. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL/READ 0955 – Read/Write College Prep: Advanced, or
- Completion of ENGL/READ 0950 or 0955 (or equivalent course or higher). ENGL/READ 0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Welding AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/advanced-welding-technologist/)

Program Description

The Welding AAS Degree is a two-year program designed to provide an advanced career pathway in manufacturing, specific to the field of Welding Technology. This 60 credit AAS is designed to prepare the student for employment as an intermediate welding or fabrication technologist. It is also a pathway for manufacturing related 4-year degrees. This program allows students to gain the information and to develop skills used in the welding industry. This program covers GMAW, GTAW, FCAW, SMAW and OXY/Fuel process. Instruction includes classroom lectures and demonstrations, as well as hands-on projects in a lab setting.

Program Outcomes

- Demonstrate proper welder use and safety.
- Interpret welding blueprints and drawings.
- Interpret weld symbols.
- Demonstrate proper welding processes.
- Demonstrate cutting process.
- Demonstrate various weld transfers.
- Select base metals with weld-ability.
- Demonstrate weld and setup using GTAW.
- Demonstrate weld and setup using GMAW.
- Demonstrate proper GMAW wire selection.
- Demonstrate proper fabrication layout.
- Prepare student for welding certification.

Required Courses

Course	Course Title	Credits
CADE 1468*	Solidworks I	3
INMG 1400	Intro to Manufacturing Technology	4
WLDG 1560	Gas Metal Arc Welding I	3
WLDG 1500*	Blueprint Reading for Welders	3
WLDG 1520	Gas Tungsten Arc Welding I	3
WLDG 1540	Shielded Metal Arc Welding I	3
WLDG 1570*	Flux Cored Arc Welding I	3
WLDG 1522*	Gas Tungsten Arc Welding II	3
WLDG 1542*	Shielded Metal Arc Welding II	3
WLDG 1562*	Gas Metal Arc Welding II	3
WLDG 1564	Gas Metal Arc Welding III	3
WLDG 1572*	Flux Cored Arc Welding II	3
WLDG 1524*	Gas Tungsten Arc Welding	3
WLDG 1544*	Shielded Metal Arc Welding III	3
WLDG 1590* or MTCC 1530*	Introduction to Robotic Welding or Water Jet Cutting Processes	2
General Education Electives	Choose from at least 3 goals areas of the Minnesota Transfer Curriculum Goal Areas 1-10	15
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Pre-program Requirements

To begin your career in Welding, you need to be at a specific skill level in English/reading and mathematics.

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Transportation

***Auto Body Technology Diploma - 33 credits – PROGRAM UNDER REDESIGN

Program Website: (https://www.lsc.edu/degrees/)

Program Description

This program prepares individuals for employment in the automotive collision repair industry. Instruction includes collision-related damage assessment and repair, substrate preparation, and refinishing.

Program Outcomes

- Refinish automotive parts and assemblies.
- Straighten automotive panels and structural assemblies.
- Perform welding techniques.
- Repair composite substrates.
- Diagnose and repair automotive mechanical and electrical systems.
- Perform auto glass service procedures.
- Perform collision-related damage assessment and estimating procedures.

Pre-Program Requirements

Successful entry into this program requires a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 – College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
ABTE 1402*	Introduction to Auto Body Industry & Safety	2
ABTE 1412*	Automotive Interiors, Glass, and Bolt-on Panels	4
ABTE 1425*	Panel Straightening & Refinish Procedures	4
ABTE 1428*	Auto Body Welding & Adhesives	3
ABTE 1445*	Auto Body Mechanical, Electrical and Diagnostic Systems	3
ABTE 1455*	Advanced Refinish Techniques	3
ABTE 1464	Collision Damage Analysis and Estimating	2
ABTE 1475*	Collision Damage Replacement and Composite Repair	3
ABTE 1480*	Production Lab	4
ABTE 1485*	Unibody and Frame Repair	2
ABTE 1490*	Custom Refinish, Fabrication Tools, and Techniques	3
Total Credits		**33**

Auto Maintenance and Light Repair Diploma - 36 credits

Program Website: (https://degrees.lsc.edu/)

Program Description

In the Auto Maintenance and Light Repair program, students will have the opportunity to learn skills to prepare for entry-level positions as automotive and light truck maintenance technicians. These skills will also be helpful in preparing for Automotive Service Excellence (ASE) certification. Program courses cover fundamental parts identification, operation, and maintenance of vehicle components and systems specified by the ASE Education Foundation. Courses align with the ASE G1 industry requirements.

Program Outcomes

- Utilize service literature.
- Perform maintenance following environmental and ethical guidelines.
- Exhibit the safety procedures and practices necessary to work efficiently and professionally in the automotive industry.
- Operate, maintain and repair tools and equipment in the automotive shop.
- Provide basic maintenance and light repair of the following automotive systems: engines, transmission, drive trains, suspension and steering, brakes, electrical, heating, air conditioning, and fuel injection.
- Safely perform maintenance on light duty diesel, stop start, and hybrid vehicles.

Required Courses

Course	Course Title	Credits
ASTE 1310	Applied Safety and Environmental Stewardship	2
ASTE 1320**	Information Systems and Shop Management	3
ASTE 1330*	Automotive Fundamentals and Maintenance	5
ASTE 1340**	Electrical and Electronics Principles	6
ASTE 1350*	Electronic Control Units and Scan Tools	2
ASTE 1510**	Braking Systems	4
ASTE 1520*	Supplemental Restraint Systems	2
ASTE 1530**	Steering, Suspension, and Alignment	8
ASTE 1540*	Climate Control System Operation, Diagnosis, and Repair	4
Total Credits		**64**

*Requires a prerequisite or a concurrent course
** Meets NC3 Certification requirements

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Auto Service Technology Diploma - 72 credits

Program Website: (https://www.lsc.edu/degrees/auto-service-technology-diploma/)

Program Description

In the Auto Service Technology program, students learn the skills for entry-level positions as automotive maintenance, repair and light duty truck technicians. The program also prepares students for professional certification through Automotive Service Excellence (ASE). Courses of instruction cover parts identification and all systems of the automobile, including basic operation, diagnosis, and repair with the objective of developing the diagnostic and problem-solving skills required of an automotive service technician.

Program Outcomes

- Meet all ASE G1 industry requirements for MLR.
- Diagnose and repair automotive systems and related components: engine, transmission, drive train, suspension and steering, brakes, electrical, heating and air conditioning, fuel injection, light duty diesel fuel systems, and hybrid electric vehicle systems.
- Access, utilize, and manage electronic service information and shop management systems.
- Perform repairs following environmental and ethical guidelines.
- Exhibit the safety procedures and practices necessary to work efficiently and professionally in the automotive industry.
- Maintain and repair tools and equipment in the automotive shop.
- Perform automotive and light duty truck vehicle maintenance and repair tasks in accordance with ASE G1 Education Foundation requirements.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
ASTE 1310	Applied Safety and Environmental Stewardship	2
ASTE 1320**	Information Systems and Shop Management	3
ASTE 1330*	Automotive Fundamentals and Maintenance	5
ASTE 1340**	Electrical and Electronics Principles	6
ASTE 1350*	Electronic Control Units and Scan Tools	2
ASTE 1510**	Braking Systems	4
ASTE 1520*	Supplemental Restraint Systems	2
ASTE 1530**	Steering, Suspension, and Alignment	8
ASTE 1540*	Climate Control System Operation, Diagnosis and Repair	4
ASTE 2310*	Gas and Diesel Engine Service and Repair	5
ASTE 2320*	Mass Airflow, Speed Density and GDI Fuel Systems	5
ASTE 2330*	OBD II Operation, Diagnosis, and Repair	4
ASTE 2630*	Light Duty Diesel Fuel & Emission Systems	4
ASTE 2520*	Manual Drivetrains, Differentials, Transfer Cases, and NVH	4
ASTE 2530*	ECU Communication and Body Electrical Systems	6
ASTE 2540*	Electronic Automatic Transmissions	5
ASTE 2550*	Hybrid Electric Vehicle Operation and Safety	3
Total Credits		**72**

*Requires a prerequisite or a concurrent course
**Meets NC3 Certification requirements

***Truck Driving Certificate - 10 credits – PROGRAM UNDER REDESIGN

Program website: (https://degrees.lsc.edu/truck-driver/)

Program Description

Training will consist of tractor-trailer basic and advanced operation techniques, safety, log books, and weight distribution.

Upon completion of this program, the student will have obtained a Class A Commercial Driver's License and gained the skills and knowledge to become a professional truck driver.

Required Courses

Course	Course Title	Credits
TDT 1820	Truck Driving – Class A CDL Theory	3
TDT 1822	Truck Driving – Class A CDL Range	4
TDT 1824	Truck Driving – Class A On-Road Training	3
Total Credits		**10**

Program Outcomes

- Obtain a Class A commercial driver's license (CDL)
- To become Federal Motor Carrier Safety Regulation qualified

Aviation Management AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/aviation-management/)

Program Description

The Aviation Management AAS degree provides a comprehensive background in aviation studies, management, and business, and prepares students for careers in airline operation, air transportation, airport management, airport consulting, aircraft manufacturing, sales, and aviation insurance.

Program Outcomes

- Apply government regulations, security and safety standards, and safety, and environmental concerns to support implementation of appropriate strategic and tactical business methodologies.
- Utilize technology to enhance airport and airline efficiency and competitiveness.
- Speak and write effectively for professional business communication in the airline industry.

Pre-program Requirements

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Required Courses

Course	Course Title	Credits
AVIA 1100	Introduction to Professional Aviation	2
AVIA 1201*	Private Pilot Ground	4
ENGL 1106*	College Composition I	3
MATH 1115*	Contemporary Math	4
AVIA 2310*	Airline Operations	3
AVIA 2340*	Aviation Law	3
BUS 2400*	Principles of Marketing	3
ECON 1150*	Principles of Economics: Macroeconomics	3
LGST 1420*	Business Law	3
AVIA 2312*	Aviation Dispatch	3
ACCT 1410	Financial Accounting Principles I	3
BUS 2402*	Principles of Management	3
CIS 1402* or BUS 1448	Foundations of CIS or Leadership Development	3
COMM 1105*	Interpersonal Communications	3
AVIA 1360*	Aviation Safety	3
AVIA 1390*	Aviation Meteorology	3
AVIA 2361*	Human Factors	2
AVIA 2370*	Management of Aviation Services	2
COMM 1601	Interview Procedure and Practice	1
ECON 1160*	Principles of Economics: Microeconomics	3
PHIL 1130* or PHIL 1140*	Ethics or Critical Thinking	3
Total Credits		**60**

*Courses may require a prerequisite or a concurrent course

Aviation Maintenance Technology Diploma - 88 credits

Program Website: (https://degrees.lsc.edu/aircraft-maintenance/)

Program Description

The Airframe and Powerplant maintenance technician diploma program trains students in the repair and scheduled maintenance of aircraft. This fully approved Federal Aviation Administration (FAA) program prepares graduates to repair and maintain commercial and general technically advanced aircraft found in today's market. Training will include study and hands-on experiences in reading and comprehending aircraft manuals, troubleshooting and repairing electrical malfunctions using electrical schematics, analyzing and repairing powerplant malfunctions, repair airframe structures and return aircraft to service, maintaining aircraft powerplant subsystems and determine their airworthiness in accordance with applicable FAA and manufacturer specifications.

This 88-credit Diploma seamlessly transfers to the Aviation Maintenance Technology AAS (103 credits).

Required Courses

Course	Course Title	Credits
AMT 1450*	Fundamentals I	6
AMT 1452*	Fundamentals II	6
AMT 1454*	Aircraft Electrical	7
AMT 1460*	Flight Controls and Avionics Systems	6
AMT 1462*	Metallic Structures	7
AMT 1464*	Non-Metallic Structures	6
AMT 1470*	Aircraft Fuel and Landing Gear Systems	6
AMT 1472*	Cabin Control and Inspection	6
AMT 2410*	Reciprocating Engines I	7
AMT 2412*	Propellers and Reciprocating Engine Repair	6
AMT 2414*	Reciprocating Engine Inspection	6
AMT 2420*	Turbine Engines I	7
AMT 2422*	Turbine Engines II	6
AMT 2430*	AMT Capstone	6
Total Credits		**88**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Students will successfully pass the required FAA written testing of an Airframe and Power Plant Mechanic.
- Students will utilize appropriate technology as it pertains to the aviation industry.
- Students will interpret various FAA Regulations that apply to maintenance in the aviation industry.
- Students will apply appropriate safety work habits and procedures.
- Students will apply principles of troubleshooting for various aircraft maintenance tasks.
- Students will demonstrate the proper use of hand tools appropriate to the industry.
- Students will use technical information provided by various aircraft manufacturers to perform aircraft maintenance.
- Students will document various maintenance tasks according to FAA Regulations.
- Students will read and interpret technical information found in the aircraft records.
- Students will demonstrate the necessary skills to properly maintain an aircraft in an airworthy condition.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher).

Mathematics:

- Completion of MATH 0955 (or equivalent or higher).

Aviation Maintenance Technology AAS Degree - 103 credits

Program Website: (https://degrees.lsc.edu/aircraft-mechanic/)

Program Description

The Airframe and Powerplant maintenance technician program trains students in the repair and scheduled maintenance of aircraft. This fully approved Federal Aviation Administration (FAA) program prepares graduates to repair and maintain commercial and general technically advanced aircraft found in today's market. Training will include study and hands-on experiences in reading and comprehending aircraft manuals, troubleshooting and repairing electrical malfunctions using electrical schematics, analyzing and repairing powerplant malfunctions, repair airframe structures and return aircraft to service, maintaining aircraft powerplant subsystems and determine their airworthiness in accordance with applicable FAA and manufacturer specifications.

Required Courses

Course	Course Title	Credits
AMT 1450*	Fundamentals I	6
AMT 1452*	Fundamentals II	6
AMT 1454*	Aircraft Electrical	7
AMT 1460*	Flight Controls and Avionics Systems	6
AMT 1462*	Metallic Structures	7
AMT 1464*	Non-Metallic Structures	6
AMT 1470*	Aircraft Fuel and Landing Gear Systems	6
AMT 1472*	Cabin Control and Inspection	6
AMT 2410*	Reciprocating Engines I	7
AMT 2412*	Propellers and Reciprocating Engine Repair	6
AMT 2414*	Reciprocating Engine Inspection	6
AMT 2420*	Turbine Engines I	7
AMT 2422*	Turbine Engines II	6
AMT 2430*	AMT Capstone	6
General Education Electives	Choose from at least 3 different Goal Areas of the Minnesota Transfer Curriculum	15
Total Credits		**103**

*Requires a prerequisite or a concurrent course

Program Outcomes

- Students will successfully pass the required FAA written testing required of an Airframe and Power Plant Mechanic.
- Students will utilize appropriate technology as it pertains to the aviation industry.
- Students will interpret various FAA Regulations that apply to maintenance in the aviation industry.
- Students will apply appropriate safety work habits and procedures.
- Students will apply principles of troubleshooting for various aircraft maintenance tasks.
- Students will demonstrate the proper use of hand tools appropriate to the industry.
- Students will use technical information provided by various aircraft manufacturers to perform aircraft maintenance.
- Students will document various maintenance tasks according to FAA Regulations.
- Students will read and interpret technical information found in the aircraft records.
- Students will demonstrate the necessary skills to properly maintain an aircraft in an airworthy condition.

Pre-program Requirements

Successful entry into this program requires a specific level of skill in the areas of English, mathematics, and reading. Program entry will depend, in part, on meeting the prerequisites listed below:

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher).

Mathematics:

- Completion of MATH 0955 (or equivalent or higher).

Professional Pilot Diploma - 45 credits

Program Website: (https://www.lsc.edu/degrees/professional-pilot-diploma/)

Program Description

The Professional Pilot Diploma is designed to meet the needs of students who plan a career as a pilot in commercial aviation. The program leads to FAA certification as a commercial pilot with an instrument rating.

This 45-credit Diploma seamlessly transfers to the Professional Pilot AAS (60 credits).

Students choose from one of two tracks: Airplane or Helicopter.

Program Outcomes

- The Federal Aviation Administration Knowledge and Flight tests for a particular FAA Pilot Certificate or Rating.
- Understand the historical developments of the aviation industry.
- Be familiar with the various mechanical systems found on typical light aircraft that graduates will likely be operating.
- Conduct safe flight operations as it pertains to human factors, aircraft design, environmental factors, industry practices and procedures, evolving technologies, accident investigations and conclusions.
- Understand and define the elements of airport operations and their importance to the success, stability, and future of the business community and the aviation industry.

Pre-program Requirements

Requires FAA 1st or 2nd class medical certificate. Requires security clearance from TSA.

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English, reading, and math. Program entry will depend, in part, on meeting the prerequisites listed below:

Required Course

Course	Course Title	Credits
AVIA 1100	Introduction to Professional Aviation	2
AVIA 1201*	Private Pilot Ground	4
AVIA 1240* or AVIA 1245*	Private Pilot: Airplane or Private Pilot: Helicopter	2
AVIA 1250* or AVIA 1255*	Private Pilot Flight Lab: Airplane or Private Pilot Flight Lab: Helicopter	1
AVIA 1351*	Aircraft Systems	2
AVIA 1352* or AVIA 1354*	Aircraft Systems: Airplane or Aircraft Systems: Helicopter	1
AVIA 1390*	Aviation Meteorology	3
AVIA 1501*	Instrument Pilot Ground	4
AVIA 1540* or AVIA 1545*	Instrument Pilot: Airplane or Instrument Pilot: Helicopter	1
AVIA 1550* or AVIA 1555*	Instrument Pilot Flight Lab: Airplane or Instrument Pilot Flight Lab: Helicopter	1
AVIA 2102*	Commercial Pilot Ground	2
AVIA 2140* or AVIA 2325*	Commercial Pilot: Airplane or Turbine Transition/External Load: Helicopter	2
AVIA 2150* or AVIA 2335*	Commercial Pilot Flight Lab: Airplane or Turbine Transition/External Load Flight Lab: Helicopter	1
AVIA 2165* or AVIA 2145*	Commercial/Multi-Engine: Airplane or Commercial Pilot: Helicopter	2
AVIA 2175* or AVIA 2155*	Commercial/Multi-Engine Flight Lab: Airplane or Commercial Pilot Flight Lab: Helicopter	1
AVIA 2201*	Certified Flight Instructor Ground	2

Continued on next page

English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- A score of 250 or higher on the Arithmetic portion of the Accuplacer.

Course	Course Title	Credits
AVIA 2380	Crew Resource Management	2
AVIA 2240* or AVIA 2245*	Certified Flight Instructor: Airplane or Certified Flight Instruction: Helicopter	2
AVIA 2250* or AVIA 2255*	Certified Flight Instructor Flight Lab: Airplane or Certified Flight Instruction Flight Lab: Helicopter	1
AVIA 2300	Intro to Air Traffic Control	2
AVIA 2340*	Aviation Law	3
AVIA 2361*	Human Factors	2
AVIA 2370*	Management of Aviation Services	2
Total Credits		**45**

*Requires a prerequisite or a concurrent course

Professional Pilot AAS Degree - 60 credits

Program Website: (https://degrees.lsc.edu/pilot/)

Program Description

The Professional Pilot AAS Degree is designed to meet the needs of students who plan a career as a pilot in commercial aviation. The program leads to FAA certification as a commercial pilot with an instrument rating.

Graduates may transfer to a four-year school to complete a Bachelor's Degree.

Students choose from one of two tracks: Airplane or Helicopter.

Program Outcomes

- The Federal Aviation Administration Knowledge and Flight tests for a particular FAA Pilot Certificate or Rating
- Understand the historical developments of the aviation industry
- Be familiar with the various mechanical systems found on typical light aircraft that graduates will likely be operating
- Conduct safe flight operations as it pertains to human factors, aircraft design, environmental factors, industry practices and procedures, evolving technologies, accident investigations and conclusions
- Understand and define the elements of airport operations and their importance to the success, stability, and future of the business community and the aviation industry

Pre-program Requirements

Requires FAA 1st or 2nd class medical certificate.
Requires security clearance from TSA.

Successful entry into this program requires basic computer skills and a specific level of skill in the areas of English, reading, and mathematics. Program entry will depend, in part, on meeting the prerequisites listed below:

Required Courses

Course	Course Title	Credits
AVIA 1100	Introduction to Professional Aviation	2
AVIA 1201*	Private Pilot Ground	4
AVIA 1240* or AVIA 1245*	Private Pilot: Airplane or Private Pilot: Helicopter	2
AVIA 1250* or AVIA 1255*	Private Pilot Flight Lab: Airplane or Private Pilot Flight Lab: Helicopter	1
MATH 1115*	Contemporary Math	4
AVIA 1351*	Aircraft Systems	2
AVIA 1352* or AVIA 1354*	Aircraft Systems: Airplane or Aircraft Systems: Helicopter	1
AVIA 1501*	Instrument Pilot Ground	4
AVIA 1540* or AVIA 1545*	Instrument Pilot: Airplane or Instrument Pilot: Helicopter	1
AVIA 1550* or AVIA 1555*	Instrument Pilot Flight Lab: Airplane or Instrument Pilot Flight Lab: Helicopter	1
PHYS 1001*	Fundamental Concepts of Physics	4
AVIA 2102*	Commercial Pilot Ground	2
AVIA 2140* or AVIA 2325*	Commercial Pilot: Airplane or Turbine Transition/External Load: Helicopter	2
AVIA 2150* or AVIA 2335*	Commercial Pilot Flight Lab: Airplane or Turbine Transition/External Load Flight Lab: Helicopter	1
ENGL 1106*	College Composition I	3
AVIA 1390*	Aviation Meteorology	3
AVIA 2165* or AVIA 2145*	Commercial/Multi-Engine: Airplane or Commercial Pilot: Helicopter	2

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English/Reading:

- Eligible for ENGL 1106 - College Composition I, or
- Completion of ENGL/READ 0950/0955 (or equivalent or higher). ENGL/READ 0950/0955 may be taken concurrently with Semester I coursework.

Mathematics:

- Eligible for MATH 0970 - Intermediate Algebra, or
- Completion of MATH 0950/0955 (or equivalent or higher). MATH 0950/0955 may be taken concurrently with Semester I coursework.

Number	Name	Credits
AVIA 2175* or AVIA 2155*	Commercial/Multi-Engine Flight Lab: Airplane orCommercial Pilot Flight Lab: Helicopter	1
AVIA 2201*	Certified Flight Instructor Ground	2
AVIA 2380	Crew Resource Management	2
COMM 1105*	Interpersonal Communication	3
AVIA 2240* or AVIA 2245*	Certified Flight Instructor: Airplane or Certified Flight Instruction: Helicopter	2
AVIA 2250* or AVIA 2255*	Certified Flight Instructor Flight Lab: Airplane or Certified Flight Instruction Flight Lab: Helicopter	1
AVIA 2300	Intro to Air Traffic Control	2
AVIA 2340*	Aviation Law	3
AVIA 2361*	Human Factors	2
AVIA 2370*	Management of Aviation Services	2
COMM 1601	Interviewing Procedure and Practice	1
Total Credits		**60**

*Requires a prerequisite or a concurrent course

Course Descriptions

Adult Basic Education

ABE 0301 0 credits
Pathways to College Success: Math Essentials II
This course covers whole numbers, integers, fractions, decimals, ratio/proportions, percents, basic algebra expressions and measurements. An Accuplacer Arithmetic score of 31-69 is needed for placement. PLEASE NOTE: This course does not count towards financial aid.

ABE 0310 0 credits
Pathways to College Success: Math Essentials I
Pathways Math is designed to help students improve their math skills. This course helps students develop the skills, habits, and attitudes that will result in accurate math analysis, attack and solution. Topics include basic arithmetic through pre-algebra. Students will work independently and in small group on the math skills in their assessed area of need. The goal of Pathways Math is to assist in transitioning students who want to refresh and/or build college level math skills. For students with an Accuplacer Arithmetic score of 0-30. PLEASE NOTE: This course does not count towards financial aid.

ABE 0312 0 credits
Pathways to College Success: Read/Write
Pathways Read/Write is designed to help students improve their vocabulary and reading comprehension. This course helps students develop the skills, habits and attitudes that will result in more effective reading strategies, writing techniques and study skills. Topics include word analysis, vocabulary development, comprehension strategies and good college academic study habits. The goal of read/write is to assist in transitioning students effectively to college by refreshing and/or building college level academic skills in reading and writing. PLEASE NOTE: This course does not count towards financial aid.

Auto Body Technology

ABTE 1402 2 credits
Introduction to Auto Body Industry & Safety
This course provides an introduction to the collision repair industry along with the tools, equipment, and processes involved. The retrieval of repair information using on-line, book, and computer-based resources will be discussed. This course meets the requirements set forth by the ASE Education Foundation regarding the fundamentals of shop safety and environmental hazards. Students will learn to perform tasks related to the sustainment of a safe work environment. The student will understand and apply environmental and personal safety standards. (Prerequisites: NG Reading score of 235 or higher) (1.5 hrs lec/1 hr lab/0 hrs OJT)

ABTE 1405 1 credits
Basic Welding
This course will provide the student with an understanding of basic welding fundamentals and the ability to properly and safely use gas and electric welding equipment to perform welding and cutting procedures in the flat position. (Prerequisites: None)(0 hrs lec/2 hrs lab/0 hrs OJT)

ABTE 1412 4 credits
Automotive Interiors, Glass, and Bolt-on Panels
This course will look at the steps necessary to complete a variety of installation repair and removal procedures as applicable to automotive trim, glass, and bolt-on panels. Students will be introduced to the tools and processes used in the disassembly of automotive interiors and exteriors. The materials and manufacturing process will be discussed along with the safety requirements for working on active and passive occupant safety systems. An introduction to automotive interior fabrication will also be discussed.. (Prerequisites: ABTE 1402, or instructor approval) (1 hrs lec/6 hrs lab/0 hrs OJT)

ABTE 1425 4 credits
Panel Straightening & Refinish Procedures
This course meets the requirements set forth by the ASE Education Foundation regarding the fundamentals of metal finishing, body filling, paint preparation and application. Students will begin by learning proper shop safety and processes to repair damage in automotive related metals. These processes include repair by hand and with repair equipment. Students will then prepare automotive related panels for the refinish process, apply proper coatings, and learn to properly spray refinish products

to an array of substrate coatings and base materials. (Prerequisites: ABTE 1402, or instructor approval) (1 hrs lec/6 hrs lab/0 hrs OJT)

ABTE 1428 3 credits
Auto Body Welding and Adhesives
This course covers safety procedures, basic welding of steel and galvanized metals, introduction to aluminum and silicon-bronze welding, plasma cutting, and adhesive bonding processes. Major emphasis is placed on collision facility Metal Inert Gas (MIG) welding and welding according to Inter-Industry Conference on Auto Collision Repair (I-CAR) welding standards. (Prerequisites: ABTE 1402) (1 hr lec/4 hrs lab/0 hrs OJT)

ABTE 1435 3 credits
Introduction to Refinishing
This course provides the student with an understanding of automobile refinishing fundamentals and the ability to properly and safely use refinishing materials and equipment to perform basic surface preparation and material application procedures. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ABTE 1440 3 credits
Auto Trim and Glass Service
This course provides the student with an understanding of automobile trim and glass service techniques and the ability to properly and safely perform trim and glass removal and replacement procedures. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ABTE 1445 3 credits
Auto Body Mechanical, Electrical and Diagnostic Systems
This course meets the requirements set forth by the ASE Education Foundation regarding the fundamentals of mechanical, electrical, and diagnostic systems. Students learn proper shop safety, part identification, inspection concepts, and the operation and repair of these systems in automobiles. Students learn the use of scan tools, diagnostic equipment, and repair processes of mechanical systems related to collision repair. (Prerequisites: ABTE 1402, or instructor approval) (1 hrs lec/4 hrs lab/0 hrs OJT)

ABTE 1455 3 credits
Advanced Refinish Techniques
This course meets the requirements set forth by the ASE Education Foundation regarding advanced refinish and composite repair processes. The student will be introduced to two-tone, multilayer, color and clear blending techniques along with application theories and concepts of solvent-based and waterborne refinish materials. The student will perform multi panel blending of color and clear along with multi stage refinish procedures applied to a variety of substrates. (Prerequisites: ABTE 1402 and ABTE 1425, or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ABTE 1464 2 credits
Collision Damage Analysis and Estimating
This course meets the requirements set forth by the ASE Education Foundation regarding structural, non-structural, and damage analysis. Upon completion, the student will be able to compare pre-accident condition and post-accident repairs in accordance with the best practices of collision estimating and damage analysis. (Prerequisites: None) (1 hrs lec/2 hrs lab/0 hrs OJT)

ABTE 1465 3 credits
Collision Damage Repair
This course provides the student with an understanding of collision damage repair techniques and the ability to properly and safely perform pounding, pulling, and pushing procedures to repair collision damaged body panels. (Prerequisites: ABTE1425 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ABTE 1475 3 credits
Collision Damage Replacement and Composite Repair
This course provides the student with an understanding of automobile body panel replacement techniques and the ability to properly and safely perform cosmetic and structural panel replacement procedures. (Prerequisites: ABTE 1402 and ABTE 1425, or instructor approval) (1 hr lec/4 hrs lab/0 hrs OJT)

ABTE 1480 **4 credits**
Production Lab
Production lab provides students with the opportunity to apply their knowledge and refine their skills learned in related auto body courses. Students will have the ability to direct their efforts, with instructor approval, in curriculum activities that meet their needs. (Prerequisites: ABTE 1402 and ABTE 1425) (0 hrs lec/8 hrs lab/0 hrs OJT)

ABTE 1485 **2 credits**
Unibody and Frame Repair
This course meets the requirements set forth by the ASE Education Foundation regarding structural analysis. Focus is placed on the critical industry equipment and measuring devices used in straightening auto body structures. Students will learn concepts and terminology used in alignment and repair of auto body structures and will analyze uni-body and frame damage. (Prerequisites: ABTE 1402, or instructor approval) (1.5 hr lec/1 hrs lab/0 hrs OJT)

ABTE 1490 **3 credits**
Custom Refinish, Fabrication Tools, and Techniques
This course allows the student to advance their skills into non-traditional fabrication and refinish techniques. This course provides additional applications in metal forming, welding, upholstery, and custom refinish concepts. Upon completion the student will be able to identify and use multiple pieces of equipment beyond that of typical collision repair. Custom painting, graphics, metal working, and hydro dipping will be discussed. Students expand their ability to work with metal and create custom components. (Prerequisites: ABTE 1402 and ABTE 1455, or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

ABTE 1495 **2 credits**
Auto Body Plastic Repairs
This course provides the student with an understanding of automotive plastic repair techniques and the ability to properly and safely perform automobile plastic repairs. (Prerequisites: ABTE1435 or instructor's consent) (1 hr lec/2 hrs lab/0 hrs OJT)

ABTE 1999 **1-3 credits**
Special Topics in Auto Body Technology
Study of special topics in auto body technology. Special course topics will be announced in the class schedule.

ABTE 2480 **1-8 credits**
Advanced Production Lab
Students will apply the knowledge and skills learned in previous completed auto body courses to make repairs as specified by automotive manufacturers. Students will concentrate on time of completion and quality as stated in manufacturer's specifications. (Prerequisites: Completion of Auto Body program and instructor's consent) (0 hrs lec/2-16 hrs lab/0 hrs OJT)

ABTE 2999 **1-3 credits**
Special Topics in Auto Body Technology
Study of special topics in auto body technology. Special course topics will be announced in the class schedule.

Accounting

ACCT 1400 **2 credits**
Business Math
This course is a basic study of the essential mathematical concepts and practical business applications of pricing, discounts, basic payroll calculations, simple interest, compound interest, lump sum and annuity calculations, time value of money, credit card and revolving credit agreements, depreciation methods, and inventory costing methods. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 1410 **3 credits**
Financial Accounting Principles I
This course is an introduction to the fundamental concepts and principles which are used in the business environment to analyze and record transactions incorporating the accrual method of accounting. The focus will be on the analysis of the fundamental accounting equation using a systematic process to record, classify, measure, and report economic data. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 1500 3 credits
Personal Finance
This course is an introduction to personal financial management and planning designed to help the student plan for a successful financial future. Topics covered in this course include key factors that affect personal income, budgeting, cash-flow management, use of credit and credit cards, planned borrowing, managing taxes, and major expenditures including housing, automobiles, insurance and investments. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 1510 3 credits
Financial Accounting Principles II
This course is the second course in a series of two courses. This course continues the study of fundamental concepts and principles which are used in the business environment to analyze and record transactions incorporating the accrual method of accounting. This course focuses on the basic accounting equation as it is applied to both service and merchandising businesses. More detailed analysis is focused on the individual financial statements: income statement, balance sheet, statement of shareholders' equity, and statement of cash flow. (Prerequisites: ACCT1410 or concurrent or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 1530 2 credits
Payroll Accounting
This course covers various federal and state laws pertaining to the computation of salaries, wages, and related taxes. Topics include the preparation of employment records, payroll registers, time cards, employee earnings records, and state and federal reports. A comprehensive payroll project will be completed. (Prerequisites: ACCT1410, or concurrent, or instructor consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 1540 4 credits
Fundamentals of Taxation
This course is an explanation and interpretation of the Internal Revenue Code as it relates to the preparation and filing sole proprietorships and individual federal income tax returns. (Prerequisites: ACCT 1410, or concurrent, or instructor consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2410 3 credits
Spreadsheet Concepts and Applications for Accounting
This course covers the use of electronic spreadsheets for accounting and other business applications. Various spreadsheet models will be constructed for the purpose of illustrating the different features of the electronic spreadsheets and to provide useful tools for the solving of selected accounting problems. (Prerequisites: ACCT1510, or concurrent, or instructor consent; and ADSC 1430) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2420 4 credits
Intermediate Accounting I
First of the two Intermediated Accounting course series: This course is a comprehensive, in-depth study of financial accounting theories, concepts and practices with an analysis of the influence on financial accounting by various boards, associations, and governmental agencies. Topics that will be covered in detail include the conceptual framework and its impact on the measurement and communication of economic data, revenue recognition criteria, income measurement, profitability analysis, cash, receivables, inventories, property, plant and equipment, intangible assets, and the utilization and impairment of plant assets. The impact of these topics will also be incorporated into the study of the four basic financial statements and required disclosures. (Prerequisites: ACCT1510, or concurrent, or instructor consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2430 3 credits
Managerial Accounting
This course covers decision-making accounting; analysis and use of accounting information from the internal manager's perspective; and manufacturing operations, cost control, and pricing decisions. (Prerequisites: ACCT1410 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2460 2 credits
Computerized Applications in Accounting
This course is an introduction to computerized accounting applications. Topics include computerized general ledger and payroll accounting, accounting applications for accounts receivable and accounts payable, fixed assets accounting, inventory

procedures, and a computerized accounting simulation. (Prerequisites: ACCT1410 or instructor consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2465 1 credits
Volunteer Income Tax Assistance
Introduction and training for the preparation of Federal and Minnesota State tax returns for students and for low-income individuals. There will be preparation of actual tax returns as a volunteer, supervised by faculty or staff. (Prerequisites: ACCT1540 or instructor's consent) (1 hr lec/0 hrs lab/0 hrs OJT)

ACCT 2470 3 credits
Governmental Tax Assistance
This course is designed to introduce students to the application of fund accounting principles and procedures that are incorporated by governmental units and not-for-profit organizations. The focus will be on the standards promulgated by the Governmental Accounting Standards Board (governmental entities) and on the Financial Accounting Standards Board (not-for-profit entities). The implementation of fund accounting and budgetary considerations will be examined in conjunction with financial reporting for the four governmental fund types as well as proprietary and fiduciary funds. (Prerequisites: ACCT1510 (or instructor consent); ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 56 or higher on the reading comprehension portion of the CPT; and MATH0470) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2480 3 credits
Fraud Prevention
This course is designed to introduce students to the responsibilities that management, internal auditors, and external auditors have for maintaining appropriate internal controls within the framework of the Sarbanes-Oxley Act of 2002. The implementation of appropriate internal controls to prevent fraud, to ensure accurate financial records, and to protect the organizations resources will be identified and discussed. (Prerequisites: ACCT1510 (or instructor consent); ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 56 or higher on the reading comprehension portion of the CPT; and MATH0470) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2520 4 credits
Intermediate Accounting II
Second of the two Intermediate Accounting course series: this course is a continuation of the comprehensive, in-depth study of financial accounting theories, concepts and practices with an analysis of the influence on financial accounting by various boards, associations, and governmental agencies. Topics that will be covered in detail include the conceptual framework and its impact on the measurement and reporting of investments, current liabilities, contingencies, long-term debt, leases, deferred and accrued income taxes, shareholders' equity, earnings per share, impact and treatment of accounting changes, and error corrections. The impact of these topics will also be incorporated into the study of the four basic financial statements and required disclosures. (Prerequisites: ACCT2420 or concurrent, or instructor consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2570 4 credits
Comprehensive Review for Accreditation in Accounting
This course is designed to prepare the student for the Comprehensive Examination for Accreditation in Accountancy, as offered by the Accreditation Council for Accountancy and Taxation, an affiliate of the National Society of Public Accountants. For students not planning to take the comprehensive exam, this course serves as a capstone course for review and integration of the common body of knowledge in the accounting field. (Prerequisites: LGST1420, ACCT1540, and ACCT2420; or instructor's consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2695 1-3 credits
Accounting Internship
This course is designed to provide the student with practical work experience in the accounting field. The internship should provide the student with the opportunity to apply the variety of skills and knowledge that they have been introduced to in the A.A.S. Accountant program through work assignments designed to accomplish the accounting tasks and responsibilities that are consistent with an individually prepared learning objectives plan. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 56 or higher on the reading

comprehension portion of the CPT; and MATH0470) (0 hrs lec/0 hrs lab/3-9 hrs OJT)

ACCT 2697 3 credits
Accounting Capstone
This course is designed to help students to synthesize the variety of skills and knowledge that they have been introduced to in the AAS Accounting program to solve complex problem. Students will be required to analyze and resolve accounting problems by integrating and applying skills and techniques acquired from previous courses. (Prerequisites: ACCT1530 and ACCT1540, or concurrent or instructor consent; and ACCT2420 and ACCT2430, or concurrent, or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ACCT 2999 1-3 credits
Special Topics in Accounting
Study of special topics in accounting. Special course topics will be announced in the class schedule.

Professional Nursing

ADN 1415 3 credits
Nursing Care of the Adult I
This course introduces the fundamental nursing care and management of common disease processes of the adult. Concepts of medical surgical nursing will be integrated throughout the content. Pharmacological and non-pharmacological therapies will be introduced. Lab experience will allow the student the opportunity to apply theoretical concepts. (Prerequisites: successful completion of all previous courses on program planner and concurrent enrollment in current semester courses; 78 or higher on the Reading Comprehension portion of the CPT, or READ/ENGL0955 or its equivalent transfer course or higher with a grade of "C" or better; and 71 or higher on the Elementary Algebra Skills portion of the CPT, or MATH 0460 or its equivalent transfer course or higher with a grade of "C" or better) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADN 1417 4 credits
Fundamentals of Nursing Care
This course introduces fundamental nursing principles foundational to clinical practice and aligns with ADN1415, expanding on the assessment and application of nursing care. Students will begin to apply evidence-based nursing, the nursing process, and develop clinical judgment. Principles such as diversity, equity, inclusion, comfort, sleep, oxygenation, infection control, wounds, health assessment, health promotion, patient teaching, documentation and informatics are discussed in the classroom setting and then demonstrated in the nursing lab. (Prerequisites: Acceptance into AS Nursing program) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

ADN 1422 1 credits
Introduction to Pharmacology
This course introduces principles of pharmacology, pharmacokinetics, pharmacodynamics, safety, client teaching, and developmental considerations with emphasis on the nursing process. In the lab setting, students will demonstrate competency in administering introductory medication skills and routes, use medication reference materials and apply basic medication math skills, terminology, and abbreviations to interpret medication orders. (0.5/1/0))

ADN 1450 1 credits
AD Clinical I
This course covers the clinical application of fundamental nursing care principles for the beginning professional nursing student. The course focuses on communication, documentation, theory application, data collection, patient care and safety, medication administration and professionalism. The nursing process will be used in caring for patients in stable situations in lab and clinical settings. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses; 78 or higher on the Reading Comprehension portion of the CPT, or READ/ENGL0955 or its equivalent transfer course or higher with a grade of C or better; and 71 or higher on the Elementary Algebra Skills portion of the CPT, or MATH 0460 or its equivalent transfer course or higher with a grade of C or better) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADN 1460 2 credits
AD Clinical II
This course covers the clinical application of fundamental nursing care principles for the professional nursing student at an increased level of

complexity. The course focuses on communication, documentation, theory application, data collection, patient care and safety, medication administration and professionalism. The nursing process will be used in caring for patients in clinical settings. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses.) (0 hrs lec/4 hrs lab/0 hrs OJT)

ADN 1510 1.5 credits
Professional Nursing Concepts
This course explores different professional concepts and expectations in nursing in relation to the following: scope of practice, advocacy, health promotion and teaching, principles of therapeutic communication, clinical decision-making, evidence-based practice, legal and ethical principles, and informatics. Students will analyze and adapt the provision of nursing care in relation to equitable healthcare, inclusive practices, and culture. (Prerequisites: successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (1.5 hrs lec/0 hrs lab/0 hrs OJT)

ADN 1515 2 credits
Nursing Care of the Adult II
This course explores more extensively the nursing care and management of common disease processes of the adult. It integrates and expands concepts covered in semester I nursing courses. Pharmacological and non-pharmacological therapies will be applied to increasingly complex disease processes. Lab experience will allow the student the opportunity to apply theoretical concepts. (Prerequisites: successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (1 hr lec/2 hrs lab/0 hrs OJT)

ADN 1520 2.5 credits
Pharmacological Interventions
This course integrates principles of pharmacology, pharmacokinetics, pharmacodynamics, drug classification, safety, client teaching and developmental considerations for the most commonly prescribed drug classifications. Throughout the lecture and lab, students will work on increasing their clinical judgment and application of the nursing process. In the lab setting, students will demonstrate competency with administration of more advanced medication routes, advanced medication math, interpretation of medication orders, and the use of medication reference materials. Simulated medication administration scenarios will assist the learner in integrating clinical judgment and nursing process related to a broad client population. (Prerequisites: None) (2 hrs lec/1 hrs lab/0 hrs OJT)

ADN 1524 1 credits
LPN/LVN to RN Role Transition
This course assists students to transition from the role of the Licensed Practical Nurse or Licensed Vocational Nurse to the Associate Degree Nurse. Learning opportunities will occur in the laboratory setting. Transitional topics include discussion and application of scope of practice differences between the LPN/LVN and the registered nurse as well as demonstration of the comprehensive assessment and basic medication skills. (Prerequisite: Acceptance into the AST Professional Nursing program) (0/2/0)

ADN 1525 2 credits
AST Nursing Clinical
This course expands upon concepts and skills introduced at the practical nurse level for the student transitioning to the RN role. The focus is centered upon management of care for patients with acute and chronic health conditions. The concepts of team leading, delegation, intravenous therapy and nursing skills at the RN level will be expanded upon. (Prerequisites: successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

ADN 2415 2 credits
Nursing Care of the Adult III
This is a simulation course. It incorporates psychomotor demonstration of nursing skills with application of interdisciplinary, case management principles, integrated pharmacological and non-pharmacological interventions as they relate to medical and/or surgical health needs of a variety of patient populations. The student will apply principles of delegation, prioritization, case management, patient teaching, nursing process, and evidence-based

practice to a variety of patients with diverse health needs. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

ADN 2431 **2 credits**
Behavioral Health Nursing
This course introduces students to relevant concepts in the field of psychiatric nursing. Emphasis is placed on the use of the nursing process in understanding nursing care for clients with psychiatric disorders. The impact of culture and elements of legal/ethical issues in behavioral health nursing are included. Therapeutic communication and critical thinking are primary tools of the nurse. Lab experience will allow the student the opportunity to apply theoretical concepts. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (1 hr lec/2 hrs lab/0 hrs OJT)

ADN 2432 **1 credits**
Behavioral Health Clinical
This course introduces students to the care of client with psychiatric disorders. Clinical experience is provided in outpatient adolescent and adult behavioral health settings. Emphasis is placed on the use of the nursing process and the development of nursing care plans. Utilize therapeutic relationships, interpersonal communication and critical thinking skills. (Prerequisites: Successful completion of all previous courses and concurrent enrollment in all current semester courses.) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADN 2471 **2 credits**
Family Nursing
This course introduces the complex nursing care management of maternal-newborn and pediatric patients. The role of nursing is taught based on the principles of growth and development, health promotion/prevention, utilizing critical elements of evidence-based practice and professional standards of care. Lab experience will allow the student the opportunity to apply theoretical concepts. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (1 hr lec/2 hrs lab/0 hrs OJT)

ADN 2472 **1 credits**
Family Nursing Clinical
This course is designed to build upon the knowledge and skills gained in Family Nursing course. The student will provide care for obstetric patients in the hospital setting and pediatric patients in a well-child clinic and pediatric hospital simulation. The clinical experience involves the student in the practice of health promotion and disease prevention as well as managing care during recovery, disease, or illness. (Prerequisites: successful completion of all previous courses and concurrent enrollment in all current semester courses) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADN 2481 **3 credits**
Advanced Nursing Care
This course integrates a collaborative approach to managing patients with complex health issues. Concepts of advanced nursing care are applied in clinical problem solving situations for acute, chronic and complex illnesses. Utilizing elements of evidence-based practice and nursing process, the student participates in integrated lab simulations to synthesize theoretical concepts and apply clinical reasoning skills. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADN 2483 **2 credits**
Advanced Nursing Care Clinical
This course synthesizes all previous and concurrent clinical and academic courses, while managing complex multi-patient assignments in the acute care setting. Focus will be placed on nursing care in complex situations utilizing leadership, delegation, clinical judgment, and prioritization. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

ADN 2491 **1 credits**
Leadership and Management
This course emphasizes the synthesis and application of professional nursing leadership and management

concepts. The role of the professional nurse working with individuals, families, and communities is examined. Principles of community assessment are examined and applied. (Prerequisites: Successful completion of all previous courses on program planner and concurrent enrollment in current semester courses) (.5 hr lec/1 hr lab/0 hrs OJT)

ADN 2500 **3 credits**
Intensive Care Preceptorship
This nursing course is an elective for the Associate of Science nursing student in the final semester of the nursing program. This course is designed to build on skills previously introduced and expose the student to the critical care environment. In the Intensive Care Internship, emphasis is on the use of the nursing process within the critical care unit. Clinical experience may be provided in a variety of Critical Care settings and/or simulation. (Prerequisites: AS Nursing degree student in the last semester of the program. Current CPR) (.5 hrs lec/5 hrs lab/0 hrs OJT)

ADN 2505 **3 credits**
Nursing Preceptorship
This nursing course is an elective for the Associate of Science nursing student in the final year of the nursing program. This course is designed to build on skills previously introduced and expose the student to an alternate clinical setting. In the Nursing Preceptorship, emphasis is on the use of the nursing process within that clinical setting. Clinical experience may be provided in a variety of settings and/or simulation. (Prerequisites: AS Advanced Standing Track (AST) student in the 2nd or 3rd semester of the program. Current CPR) (.5 hrs lec/5 hrs lab/0 hrs OJT)

ADN 2600 **1 credits**
Clinical Capstone Experience
This course will provide students the opportunity to synthesize knowledge and team leading skills through a concentrated case management approach. The capstone experience allows the student to apply/analyze nursing management skills and improve patient outcomes as a member of a multidisciplinary team. (Prerequisites: successful completion of all nursing courses) (0 hrs lec/2 hrs lab/0 hrs OJT)

Administrative Support

ADSC 1414 **2 credits**
Keyboarding
This course is designed for the beginning keyboarding student who wishes to increase their knowledge and speed in keying. This course teaches proper typing techniques to build speed and accuracy by utilizing Microsoft Word to create, edit, and correctly format business documents. (Prerequisites: None) (1 hrs lec/ 2 hrs lab/0 hrs OJT)

ADSC 1419 **3 credits**
Business English
This course covers the study of the fundamentals of language skills and aids in their application with a goal toward mastery of written business communications. (Prerequisites: Keyboarding/word processing ability or concurrent enrollment in a keyboarding or word processing course; completion of ENGL/READ 0950 or 78 or higher on the reading comprehension portion of the CPT or concurrent enrollment in ENGL/READ 0955) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1420 **3 credits**
Business Communications
This course covers the development and application of business writing skills in creating business documents such as letters, memos, and informal reports, and electronic communications. (Prerequisites: keyboarding/word processing ability or concurrent enrollment in a keyboarding or word processing course; ADSC 1419; completion of ENGL/READ 0950, or 78 or higher on the reading comprehension portion of the CPT, or concurrent enrollment in ENGL/READ 0955) (3 hrs lec/0 hrs lab/ 0 hrs OJT)

ADSC 1421 **3 credits**
Business Presentations
This course covers development of business communication skills in the following areas: one-to-one communications, small- and large-group presentations, business telephone usage, voice-mail techniques, conducting business meetings, listening skills, and the use of presentation software for enhancing business presentations. (Prerequisites: ADSC1420, ADSC1430, or ADSC1719; concurrent enrollment in either of these courses or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1425 **1 credits**
Calculators/Ten-key
This course covers development and competence using the ten-key numeric touch method. Students will develop speed and accuracy using the touch system. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1430 **3 credits**
Business Computers/Microsoft Office
This course introduces computer terminology, hardware, and software related to the business environment. The focus of this course is on business productivity, software applications, and professional behavior in computing, including word processing, spreadsheets, databases, presentation graphics, security protocols, and business-oriented utilization of the Internet. (Prerequisites: College-level reading) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1432 **3 credits**
Office Capstone
This is a capstone course designed to integrate and reinforce skills and knowledge learned in previous courses. Through the use of simulations, students will experience daily routines, make decisions, set priorities, deal with work pressure, develop interpersonal relationships, and become aware of work quality and quantity requirements while utilizing a variety of software. Project emphasis should develop an awareness of workflow. Students will prepare a program portfolio reflecting their personal and academic development throughout their college experience. (Prerequisites: ADSC1430, College-level reading and writing) (0 hrs lec/6 hrs lab/0 hrs OJT)

ADSC 1433 **2 credits**
Advanced Microsoft Office Suite
An advanced course in the use and integration of Microsoft Office Word, Excel, Outlook, and PowerPoint. Students will learn additional advanced concepts of word processing, spreadsheets, database, and presentation graphics and how they integrate.. (Prerequisites: ADSC1430) (1 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1440 **3 credits**
Office Protocol
This course develops the skills to perform required office tasks. Procedures include research and ordering of office equipment and supplies, telephone techniques, telecommunications, mailing, and calendaring. Topics of the productive work environment are also covered: teamwork skills, time and stress management, ethical behaviors, positive self-image, and professional conduct in the office. Students learn to apply critical thinking skills along with professional resume writing and interview techniques. (Prerequisites: none) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1441 **2 credits**
Office Accounting
This course covers the basic accounting cycle for service and merchandising businesses. Topics include the analysis of business transactions, recording transactions in a variety of journals, and the preparation of financial reports with manual and computerized applications. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ADSC 1442 **2 credits**
Records Management
This course is an introduction to the procedures for managing document/records storage systems. Applications include manual and/or electronic storage and retrieval. Topics include records control and retention, storage and retrieval devices, and records management issues and trends. (Prerequisites: none) (1 hr lec/2 hrs lab/0 hrs OJT)

ADSC 1452 **3 credits**
Transcription & Editing
This course covers skill development in transcribing machine-dictated material into mailable business documents. Emphasis is placed on building transcription speed and accuracy; applying punctuation, grammar, and spelling rules; using reference materials; proofreading and correcting errors; and efficiently utilizing word processing software and transcription equipment. (Prerequisites: ADSC1420 or concurrent enrollment and ADSC1415 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1515 **3 credits**
Law Office Applications

This course covers legal procedures, documents, and terminology relating to estate planning and estate administration proceedings, real estate law, and corporate law in Minnesota. Documents are prepared using word processing and/or transcription. (Prerequisites: Keyboarding and word processing ability) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1517 3 credits
Computers in the Law Office
This course covers practical computer applications in legal organizations and how the computer can be used to make the legal support staff more productive. Various types of software and legal-specific applications are covered. (Prerequisites: College-level reading and basic computer skills.) (1 hr lec/4 hrs lab/0 hrs OJT)

ADSC 1525 3 credits
Legal Transcription/Word Processing Applications
This course covers transcription of dictated and rough-draft legal material into a variety of usable legal documents using word processing software. Emphasis will be on authentic forms and material, editing and proofreading, and correcting errors. (Prerequisites: Keyboarding and word processing ability) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1610 3 credits
Medical Office Terminology
This course introduces word analysis by study of word roots, prefixes, suffixes, and abbreviations common to the medical office/profession. This class has a business focus with emphasis on the written aspect of medical office terminology following medical transcription rules developed by the American Association of Medical Transcriptionists. A heavy focus is placed on vocabulary building techniques to teach the meaning, spelling, correct usage and pronunciation of medical terms for accuracy in transcription, coding, and completion of insurance forms. (Prerequisites: College level reading & writing)(3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1611 3 credits
Medical Office Procedures I
This introductory course to medical office procedures covers medical office career opportunities, medical ethics and laws, meetings, telephone techniques, appointment scheduling, filing, patient records, mail, fee collection, and medical office pharmacology. (Prerequisites: College-level reading & writing)(3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1612 3 credits
Medical Office Procedures II
This course is a continuation of MOPI. Medical topics covered include integration of medical office tasks: bookkeeping, payroll procedures, billing, health insurance, appointment scheduling, patient data input, and CPT and ICD diagnostic coding. (Prerequisites: ADSC1611) (2 hrs lec/2 hrs lab 0 hrs OJT)

ADSC 1614 3 credits
Health Insurance and Billing
This course will provide an introduction to the various types of insurance plans, legal considerations involved in claim processing, basic steps in ICD-9-CM and CPT coding, HCPCS, and ADA coding, insurance terminology, and causes for claim rejections. (Prerequisites: ADSC1610 or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1618 3 credits
CPT Coding
This course provides basic knowledge of CPT coding and the purpose it serves. Basic coding facts, structure of code numbers, abbreviations, symbols, terms, book content, and coding guidelines are covered. This course introduces various types of insurance plans, legal considerations involving coding, insurance terminology, causes for claim rejection, and completion of the CPT coding portion of medical reports and insurance forms. (Prerequisites: ADSC1621) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1621 3 credits
Medical Office Anatomy and Physiology I
This business course covers human body anatomy and physiology with emphasis on spelling accuracy, terminology, abbreviations, and diagnostic and laboratory tests. A heavy focus is placed on the proper pronunciation of medical terms, diagnostic and operative terms for accuracy in medical machine transcription, coding, and insurance form completion. (Prerequisites: ADSC1610 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1622 3 credits
Medical Office Anatomy and Physiology II
This business course is a continuation of Medical Office Anatomy & Physiology I. Students continue learning the body systems by studying and analyzing body structure and function with emphasis on spelling accuracy, terminology, abbreviations, and diagnostic and laboratory tests. A heavy focus is placed on proper pronunciation of medical terms, diseases, diagnostic and operative terms for accuracy in medical machine transcription, coding, medical assisting, and insurance courses. Study of diseases, organs, and structures by various anatomical systems will be covered. (Prerequisites: Completion of or concurrent enrollment in ADSC1621) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1630 3 credits
Medical Transcription
This course introduces medical machine transcription and covers transcription of dictated medical material into a variety of usable medical documents. Emphasis is on authentic forms and material, building speed and accuracy, proofreading, advanced editing, and correcting errors. (Prerequisites: ADSC1621 and ADSC1415) (2 hrs lec/2 hrs lab/0 hrs)

ADSC 1636 3 credits
International Classification of Disease-10th Revision Clinical Modification
This course provides basic knowledge of ICD-10-CM coding and delineates the purpose it serves. Basic coding facts, structure of code numbers, abbreviations, symbols, terms, book content, and coding guidelines are covered. This course introduces various types of insurance plans, legal considerations involving coding, insurance terminology, causes for claim rejection, completion of the coding portion of medical reports and insurance forms. (Prerequisites: ADSC1610, ADSC1621, ADSC1622 and ADSC1614) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1638 3 credits
International Classification of Diseases - 10th Revision PCS
This course provides basic knowledge of ICD-10-PCS coding system and delineates the purpose it serves. Basic coding facts, structure of code numbers, abbreviations, symbols, terms, book content, and coding guidelines are covered. Students will be introduced to the professional standards for coding and reporting of inpatient and outpatient services. Students will practice identifying and accurately assigning codes to procedures. (Prerequisites: ADSC1610, ADSC 1621, ADSC1622 and ADSC1614) (3 hrs lec/0 hrs lab/0 hrs OJT)

ADSC 1711 1 credits
Computer Essentials
A beginning level course in computer literacy. Teaches skills needed to function in a work environment to include: keyboarding, windows, Internet access, and word processing. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1715 3 credits
Document Production/Microsoft Word
This course provides students with the opportunity to learn word processing for employment or home use and to utilize a microcomputer as a word processor. Students will learn to create, edit, format, save, print manage, and enhance documents. (Prerequisites: basic computer skills) (1 hr lec/4 hrs lab/0 hrs OJT)

ADSC 1718 **1 credits**
Keyboarding Drills
This course is designed to increase keyboarding speed and improve accuracy through personal goal setting, error analysis, and intensive corrective practice work. (Prerequisites: ADSC1415 or equivalent; 35 wpm) (0 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 1720 **3 credits**
Advanced Document Production/MS Word
This course is designed for students as a continuation of skill development started in Keyboarding. Students will continue the development of advanced formatting skills while utilizing Microsoft Word software to increase keyboarding speed, accuracy, and proofreading skills. This course also covers skill development in transcribing machine-dictated material into mailable business documents. Students will successfully transcribe documents while applying punctuation, grammar, spelling, and proofreading rules using reference materials. (Prerequisites: ADSC 1414 and ADSC 1430) (1 hr lec/4 hrs lab/0 hrs OJT)

ADSC 2440 **2 credits**
Advanced Office Protocol
This course covers topics that develop advanced skills for the office. Office safety and OSHA standards are addressed along with HIPAA compliance requirements. Students will learn hands-on how to set up new technology that may be required for business meetings. Students will create their personal mission statement, develop their leadership philosophy, and demonstrate related performance. Advanced time management, stress management, and teamwork skills are applied. Strategies utilized for the hiring and firing of an employee are covered and Quickbooks payroll software will be introduced. (Prerequisites: ADSC 1440 or instructor concent) (1 hr lec/2 hrs lab/0 hrs OJT)

ADSC 2450 **2 credits**
Digital Content Management
In this course students learn to create various graphic design business publications using Adobe Photoshop. Students will learn the basics of web-page design and development, and web-based social networking for the business world. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ADSC 2498 **1 credits**
Administrative Secretary Internship
This course is designed to provide the student with purposeful occupational experience in the Administrative Secretary careers field. Each internship is an individualized experience. A training plan is created for each student in conjunction with the training site to provide experience related to the skills and knowledge acquired in the program. One credit is equal to 48 hours of internship. (Prerequisites: Advisor's consent) (0 hrs lec/0 hrs lab/3 hrs OJT)

ADSC 2520 **3 credits**
Legal Document Processing
This course covers advanced legal procedures, use of terminology, and document production relating to various specialty areas of law in Minnesota, with an emphasis on advanced transcription and word processing skills. (Prerequisites: Keyboarding and word processing ability; college-level reading and writing) (2 hrs lec/2 hrs lab/0 hrs OJT)

ADSC 2597 **3 credits**
Law Office Internship
This course is designed to provide the student with purposeful occupational experience in the law office. Each internship is an individualized experience. A training plan is created for each student in conjunction with the training site to provide experience related to the skills and knowledge acquired in the program. One credit is equal to 48 hours of internship. (Prerequisites: College level reading and writing; Advisor approval) (0 hrs lec/0 hrs lab/9 hrs OJT)

ADSC 2697 **3 credits**
Medical Secretary Internship
This course is designed to provide the student with purposeful occupational experience in the Medical Secretary field. Each internship is an individualized experience set up by the program leader in conjunction with the training site to provide experience related to the skills and knowledge acquired in the program. One credit is equal to 48 hours of internship. (Prerequisites: Instructor's consent) (0 hrs lec/0 hrs lab/9 hrs OJT)

ADSC 2999 **1-3 credits**
Special Topics in Administrative Support
Study of special topics in administrative support. Special course topics will be announced in the class schedule.

Health

ALTH 1400 **2 credits**
Introduction to Allied Health
This course prepares students for rapidly changing healthcare careers. This course includes basic knowledge healthcare workers utilize contributing to the safe and effective delivery of healthcare. Course content focuses on behaviors for success in healthcare, communications in the healthcare setting, awareness and sensitivity to patient needs, legal issues in healthcare, ethical issues in healthcare, respecting patient and staff diversity and healthcare safety and Standard Precautions. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

ALTH 1410 **1 credits**
Medical Terminology
This course focuses on the component parts of medical terms: prefixes, suffixes and word roots. Students practice formation, analysis and reconstruction of terms with an emphasis on spelling, definition and pronunciation. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

ALTH 1430 **1 credit**
First Aid and CPR/AED for Health Care Professionals
This course is designed for those pursuing a health care occupation. It covers the basic steps of recognizing and caring for cardiac arrest with one and two rescuer CPR, automatic external defibrillation, bag mask ventilation, and obstructed airway techniques on adults, children and infants. The basics of first aid, medical emergencies, injury emergencies and environmental emergencies will be covered. After successful completion of all skills and written exams, the student will receive certification in CPR/AED (health care professional level) and First Aid. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

ALTH 1436 **2 credits**
Medication Administration for Non-licensed Personnel
This course is designed to be an introduction to medication administration for non-licensed personnel working in long term or residential care settings, under the supervision of a registered nurse. This course includes the study of legal requirements, safety measures, terminology, body systems, and the use of references related to the administration of medications. Students will study actions, dosages, toxic symptoms, and special considerations of commonly prescribed medications. Students will practice the administration of oral, topical, otic, ophthalmic, and rectal forms of medication in a lab setting. This course meets the requirements of the Minnesota Department of Health. (Prerequisites: Nursing Assistant or instructor approval) (1 hr lec/2 hrs lab/0 hrs OJT)

ALTH 1440 **1 credits**
Medical Ethics and Law
This course will introduce health occupation students to basic ethical principles, codes of ethics, bioethics, and laws that govern the behaviors of health care workers today. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

ALTH 2999 **1-3 credits**
Special Topics in Allied Health
Study of special topics in allied health. Special course topics will be announced in the class schedule.

Aviation Maintenance Technician

AMT 1410 **4 credits**
Aviation Maintenance Fundamentals I
Students will fulfill 80 hours of FAA General AMT area requirements including: aircraft drawings (levels 2 and 3), cleaning and corrosion control (level 3), maintenance forms and records (level 3), maintenance publications (level 3), materials and processes (level 3), and mechanic privileges and limitations (level 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/2 hrs lab/0 hrs OJT)

AMT 1412 **6 credits**
Aviation Maintenance Fundamentals II
Students will fulfill 144 hours of FAA General AMT area requirements including: fluid lines and fittings (level 3), ground operation and servicing (level 2), materials and processes (levels 1, 2, and 3), and weight and balance (levels 2 and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1414 **3 credits**
Aviation Physics and Math
Students will fulfill 64 hours of FAA General AMT area requirements including: basic physics (level 2) and mathematics (level 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (2 hrs lec/2 hrs lab/0 hrs OJT)

AMT 1416 **5 credits**
Aviation Electricity and Electronics
Students will fulfill 128 hours of FAA General AMT area requirements including: basic electricity (level 2 and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (2 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1418 **2 credits**
Aviation Finishing and Covering
Students will fulfill 48 hours of FAA Airframe I AMT area requirements including: aircraft covering (level 1) and aircraft finishes (levels 1 and 2). (Prerequisites: ENGL0460, MATH0450 and READ0465) (1 hr lec/2 hrs lab/0 hrs OJT)

AMT 1420 **6 credits**
Aircraft Rigging
Students will fulfill 144 hours of FAA Airframe I AMT area requirements including: airframe inspection (level 3) and assembly and rigging (levels 1, 2, and 3) (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1422 **5 credits**
Structures (Non-metallic)
Students will fulfill 128 hours of FAA Airframe I AMT area requirements including: Sheet metal and non-metallic structures (level 2) and wood structures (level 1). (Prerequisites: ENGL0460, MATH0450 and READ0465) (2 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1424 **5 credits**
Structures (Sheet Metal)
Students will fulfill 128 hours of FAA Airframe I AMT area requirements including: sheet metal and non-metallic structures (levels 2 and 3) (Prerequisites: ENGL0460, MATH0450 and READ0465) (2 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1426 **2 credits**
Aviation Welding
Students will fulfill 48 hours of FAA Airframe I AMT area requirements including: welding (levels 1 and 2). (Prerequisites: ENGL0460, MATH0450 and READ0465) (1 hr lec/2 hrs lab/0 hrs OJT)

AMT 1428 **2 credits**
Cabin Atmosphere Control Systems
Students will fulfill 48 hours of FAA Airframe II AMT area requirements including: cabin and atmosphere control systems (levels 1 and 2) and ice and rain control systems (level 2). (Prerequisites: ENGL0460, MATH0450 and READ0465) (1 hr lec/2 hrs lab/0 hrs OJT)

AMT 1430 **6 credits**
Electrical Systems
Students will fulfill 96 hours of FAA Airframe II AMT area requirements including aircraft electrical systems (level 1, 2, and 3), and fire protection systems (levels 1 and 3), and 48 hours of FAA Power Plant II AMT area requirements including engine electrical systems (level 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1432 **2 credits**
Fuel Systems
Students will fulfill 24 hours of FAA Airframe II AMT area requirements including aircraft fuel systems (levels 1, 2 and 3); and 24 hours of Power II AMT area requirements including fuel metering systems (levels 1, 2, and 3) (Prerequisites: ENGL0460, MATH0450 and READ0465) (1 hr lec/2 hrs lab/0 hrs OJT)

AMT 1450 **6 credits**
Fundamentals I
Students will fulfill 144 hours of FAA General AMT area requirements including: aircraft drawings (levels 2 and 3), cleaning and corrosion control (level 3), maintenance forms and records (level 3),

maintenance publications (level 3), materials and processes (level 3), mechanic privileges and limitations (level 3), basic physics (level 2) and mathematics (level 3). (Prerequisites: READ/ENGL 0955) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1452 **6 credits**
Fundamentals II
Students will fulfill 152 hours of FAA General AMT area requirements including: fluid lines and fittings (level 3), ground operation and servicing (level 2), materials and processes (levels 1, 2, and 3), and weight and balance (levels 2 and 3). (Prerequisites: AMT 1450 with a C or better) (2.5 hrs lec/7 hrs lab/0 hrs OJT)

AMT 1454 **7 credits**
Aircraft Electrical
Students will fulfill 104 hours of FAA General AMT area requirements including: basic electricity (level 2 and 3). Students will fulfill 46 hours of FAA Airframe II AMT area requirements including aircraft electrical systems (level 1, 2, and 3), and fire protection systems (levels 1 and 3), and 26 hours of FAA Power Plant II AMT area requirements including engine electrical systems (level 3). (Prerequisites: AMT 1452 with a C or better) (3 hrs lec/8 hrs lab/0 hrs OJT)

AMT 1460 **6 credits**
Flight Controls and Avionics Systems
Students will fulfill 144 hours of FAA Airframe I AMT area requirements including: assembly and rigging (levels 1, 2, and 3), and Airframe II AMT area requirements including aircraft instrument systems (levels 1 and 2), communication and navigation systems (levels 1 and 2). (Prerequisites: AMT 1454 with a C or better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1462 **7 credits**
Metallic Structures
Students will fulfill 160 hours of FAA Airframe I AMT area requirements including: sheet metal and non-metallic structures (levels 2 and 3), and welding (levels 1 and 2). (Prerequisites: AMT 1454 with a C or better) (4 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1464 **6 credits**
Non-Metallic Structures
Students will fulfill 144 hours of FAA Airframe I AMT area requirements including: Sheet metal and non-metallic structures (level 2), wood structures (level 1), aircraft covering (level 1) and aircraft finishes (levels 1 and 2). (Prerequisites: AMT 1454 with a C or Better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1470 **6 credits**
Aircraft Fuel and Landing Gear Systems
Students will fulfill 144 hours of FAA Airframe II AMT area requirements including aircraft fuel systems (levels 1, 2 and 3), aircraft landing gear systems (level 3), hydraulic and pneumatic power systems (levels 2 and 3), position and warning systems (levels 2 and 3). (Prerequisites: AMT 1454 with a C or Better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1472 **6 credits**
Cabin Control and Inspection
Students will fulfill 128 hours of FAA Airframe II AMT area requirements including: cabin and atmosphere control systems (levels 1 and 2), ice and rain control systems (level 2), and Airframe I AMT area requirements including: airframe inspection (level 3). (Prerequisites: AMT 1454 with a C or better) (4 hrs lec/4 hrs lab/0 hrs OJT)

AMT 1510 **6 credits**
Hydraulic and Pneumatic Systems
Students will fulfill 144 hours of FAA Airframe II AMT area requirements including aircraft landing gear systems (level 3), hydraulic and pneumatic power systems (levels 2 and 3), position and warning systems (levels 2 and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1512 **5 credits**
Navigation, Communication,and Instrument Troubleshooting
Students will fulfill 75 hours of FAA Airframe II AMT area requirements including aircraft instrument systems (levels 1 and 2), communication and navigation systems (levels 1 and 2); and 37 hours of Power II AMT area requirements including engine instrument systems (levels 2 and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/4 hrs lab/0 hrs OJT)

AMT 1514 **7 credits**
Power Plant
Students will fulfill 160 hours of FAA Power Plant II AMT area requirements including engine cooling systems (levels 2 and 3), engine exhaust and reverser systems (levels 1, 2 and 3), ignition and starting systems (levels 1, 2, and 3), induction and engine airflow systems (levels 1, 2, and 3), lubrication systems (levels 2 and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (4 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1516 **5 credits**
Power Plant Inspection
Students will fulfill 112 hours of FAA Power Plant I AMT area requirements including engine inspection (level 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/4 hrs lab/0 hrs OJT)

AMT 1518 **5 credits**
Propeller Systems
Students will fulfill 112 hours of FAA Power Plant II AMT area requirements including propellers (levels 1, 2, and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/4 hrs lab/0 hrs OJT)

AMT 1520 **6 credits**
Reciprocating Engines
Students will fulfill 144 hours of FAA Power I AMT area requirements including reciprocating engines (levels 1, 2, and 3). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 1522 **6 credits**
Turbine Engines
Students will fulfill 140 hours of FAA Power I AMT area requirements including Turbine engines (levels 2 and 3); and hours of FAA Power II AMT area requirements including auxillary power units (level 1) and unducted fans (level 1). (Prerequisites: ENGL0460, MATH0450 and READ0465) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2410 **7 credits**
Reciprocating Engines I
Students will fulfill 160 hours of FAA Power Plant II AMT area requirements including engine cooling systems (levels 2 and 3), engine exhaust systems (levels 2 and 3), ignition and starting systems (level 2), induction and engine airflow systems (levels 1, 2, and 3), lubrication systems (levels 2 and 3), fuel metering systems (levels 1, 2, and 3), and engine instrument systems (levels 2 and 3). (Prerequisites: AMT 1454 with a C or Better) (4 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2412 **6 credits**
Propellers and Reciprocating Engine Repair
Students will fulfill 144 hours of FAA Power Plant II AMT area requirements including propellers (levels 1, 2, and 3) and Power I AMT area requirements including reciprocating engines (levels 1 and 3). (Prerequisites: AMT 2410 with a C or better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2414 **6 credits**
Reciprocating Engine Inspection
Students will fulfill 144 hours of FAA Power Plant I AMT area requirements including engine inspection (level 3) and reciprocating engines (level 2). (Prerequisites: AMT 2410 with a C or better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2420 **7 credits**
Turbine Engines I
Students will fulfill 160 hours of FAA Power Plant II AMT area requirements including engine cooling systems (levels 2 and 3), engine exhaust and reverser systems (levels 1, 2 and 3), ignition and starting systems (levels 1, 2, and 3), induction and engine airflow systems (levels 1 and 2), lubrication systems (levels 2 and 3), fuel metering systems (levels 1, 2, and 3), and engine instrument systems (levels 2 and 3). (Prerequisites: AMT 1454 with a C or better) (4 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2422 **6 credits**
Turbine Engines II
Students will fulfill 144 hours of FAA Power Plant I AMT area requirements including engine inspection (level 3), turbine engines (levels 2 and 3); and Power II AMT area requirements including auxiliary power units (level 1) and unducted fans (level 1). (Prerequisites: AMT 2420 with a C or better) (3 hrs lec/6 hrs lab/0 hrs OJT)

AMT 2430 **6 credits**
AMT Capstone
Students will fulfill 128 hours of General, Airframe, and Power Plant review to successfully pass FAA General, Airframe, and Power Plant written tests. (Prerequisites: Completion or test-out of all AMT courses) (4 hrs lec/4 hrs lab/0 hrs OJT)

Anthropology

ANTH 1110 **3 credits**
Cultural Anthropology
An introduction to the concepts, methods, and theories of cultural anthropology, focusing on the range of variation and degree of uniformity in human behavior. This course will examine elements of socio-cultural systems: religion/magic, politics, social organization/kinship, economics, technology and environment. For anthropology, sociology, nursing, criminal justice, and social work majors as well as for students interested in broadening their world view. MTC goal areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: College-level reading and writing, ENGL1106 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

ANTH 2999 **1-3 credits**
Special Topics in Anthropology
Study of special topics in anthropology. Special course topics will be announced in the class schedule.

Architectural Technology

ARCH 1400 **3 credits**
Introduction to Architecture
This course covers the basic principles and applications of architecture. Concepts of planning and space utilization are explored in conjunction with regulatory requirements. An exposure to architectural history is given, along with an overview of architecture's current role in the construction industry. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ARCH 1402 **3 credits**
Tiny House in the Built Environment
This course introduces the elements of building design viewed through the lens of the Tiny House movement. Demands of the built environment are explored, resulting in the creation of an architectural program statement. Design and construction solutions are developed while investigating the concepts of condensed living. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0520) (2 hrs lec/2 hrs lab/0 hrs OJT)

ARCH 1411 **2 credits**
Materials and Methods I
This course covers the technical aspects and proper application of building materials as used in the systems of light frame construction. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

ARCH 1415 **6 credits**
Project Lab I
This course covers an introduction to print reading, the use of drafting tools, and the production of drawings for light frame construction. Three-dimensional visualization skills are developed through technical drawing exercises. It is intended that ARCH1425 be taken concurrently. Students will apply both manual and CAD drafting methods for the project drawings of this course. (Prerequisites: None) (2 hrs lec/8 hrs lab/0 hrs OJT)

ARCH 1418 **2 credits**
Principles of Building Performance
This course studies the interaction between occupants, building components/systems, and the surrounding environment in creating safe, healthy, and comfortable buildings. Emphasis is placed on understanding and controlling flows of heat, air, and moisture as governed by the laws of physics. (Prerequisites: College-level reading, writing and MATH0520 or concurrent enrollment) (2 hrs lec/0 hrs lab/0 hrs OJT)

ARCH 1425 **3 credits**
Architectural CAD I
In this course students are introduced to industry standard CAD software using the MS Windows environment and file management. A combination of lecture and hands-on lab is used to develop a solid foundation for two-dimensional architectural CAD drafting. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ARCH 1430 **3 credits**
Architectural Design-Criteria/Constraints
This course outlines criteria for preliminary design and establishes practical guidelines for the development and implementation of a building's architectural program. Specific attention is given to identifying and applying the various regulatory requirements of current code publications. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ARCH 1435 **2 credits**
Site Design
This course covers the concepts of contouring, site planning, and the development of plot plans. Consideration is given to the topographic, climatic, and geological aspects of site development. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ARCH 1440 **5 credits**
Principles of Commercial Construction
This course covers the technical aspects of materials used in commercial building construction and develops the characteristic architectural drawings and details involved in their proper application. (Prerequisites: ARCH1410) (2 hrs lec/6 hrs lab/0 hrs OJT)

ARCH 1441 **3 credits**
Materials and Methods II
This course covers the technical aspects and proper application of building materials as primarily used in the systems of commercial construction. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

ARCH 1445 **4 credits**
Project Lab II
This course covers commercial print reading and the production of working drawings for commercial construction. It is intended that ARCH1455 be taken concurrently. Focus is placed on application of CAD drafting. (Prerequisites: ARCH1415) (1 hr lec/6 hrs lab/0 hrs OJT)

ARCH 1448 3 credits
Principles of Structural Design
This course covers basic structural theory, the calculation of loads on a system of structural members, and the use of published load tables to select structural members. (Prerequisites: College-level reading, writing and MATH0520) (3 hrs lec/0 hrs lab/0 hrs OJT)

ARCH 1450 2 credits
Architectural CAD Project
This course covers the specific architectural application of computer aided drafting through the utilization of software integrating pre programmed macro command menus. Outlined is the development of two and three dimensional design, presentation, and production drawings.

ARCH 1455 3 credits
Architectural CAD II
This course develops efficiency in two-dimensional techniques and applies office standards for CAD such as the use of line weights and layer guidelines. Students are introduced to three-dimensional modeling and rendered presentation drawings. The lab focuses on applying architectural criteria to CAD drawing production. (Prerequisites: ARCH1425 or CADE1407) (1 hr lec/4 hrs lab/0 hrs OJT)

ARCH 1999 1-3 credits
Special Topics
Special topics in architectural technology. Special course topics will be announced in the class schedule.

ARCH 2400 3 credits
Mechanical and Electrical Systems
This course covers the principles of heating, ventilation, air conditioning, plumbing, and electrical systems. Lab exercises include the reading, layout, and development of mechanical and electrical plans. (Prerequisites: ARCH1445) (2 hrs lec/2 hrs lab/0 hrs OJT)

ARCH 2405 2 credits
Architectural CAD III-Intro to BIM
This course provides a thorough introduction to Building Information Modeling (BIM) including documentation, scheduling, and rendering. Emphasis is given to project development utilizing Autodesk Revit Architecture software. Revit Structure and MEP are also introduced. (Prerequisites: ARCH1455, or instructor approval) (1 hr lec/2 hrs lab/0 hrs OJT

ARCH 2410 2 credits
Estimating
This course outlines various procedures for quantity/cost calculation used in architectural estimating including comparative analysis of construction costs. (1 hr lec/2 hrs lab/0 hrs OJT)

ARCH 2420 3 credits
Construction Detailing-Criteria/Constraints
This course identifies the myriad of concerns facing the architectural detailer and describes how solutions can be approached by applying the criteria which is essential for the successful performance of a building. (2 hrs lec/2 hrs lab/0 hrs OJT)

ARCH 2435 6 credits
Project Lab III
This course identifies the myriad of concerns facing the architectural detailer and describes how solutions can be approached by applying criteria which is essential for the successful performance of a building. Projects include team design activities with a focus placed on the detail development of various building systems covered in previous coursework. (Prerequisites: ARCH1441 and ARCH1445) (2 hrs lec/8 hrs lab/0 hrs OJT)

ARCH 2450 3 credits
Specifications and Construction Administration
This course covers the legal aspects of a project's construction phase and develops the relationship between specifications and drawings. Project manual format, principles of use and administration procedures are outlined including the preparation of standard documentation. (Prerequisites: ARCH1441 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ARCH 2460 6 credits
Commercial Project
This course synthesizes an architectural program with environmental and regulatory requirements in the development of a coherent building concept. Design/construction drawings are developed for a commercial building based on an interdisciplinary

approach to building systems. (Prerequisites: ARCH2435) (1 hr lec/10 hrs lab/0 hrs OJT)

ARCH 2465 2 credits
Architectural CAD IV-BIM Intermediate
This course covers intermediate concepts of Building Information Modeling (BIM). Students interact in small groups to develop project solutions within a multi-discipline, multi-user database environment. (Prerequisites: ARCH 2405, or instructor approval) (1 hr lec/2 hrs lab/0 hrs OJT)

ARCH 2500 1-6 credits
Architectural Internship
This course provides the student with work site experience in which technical skills and knowledge learned in previous courses may be applied. In addition, students will learn about company organization, personnel procedures, and other employer expectations as appropriate to the internship site. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/3-18 hrs OJT)

ARCH 2999 1-4 credits
Special Topics in Architectural Technology
Special topics in architectural technology. Special course topics will be announced in the class schedule.

Art

ART 1110 3 credits
Introduction to Art & Design
This is an introduction to the elements and principles of two-dimensional design. Design is the process of selection of visual elements used by artists to express themselves. An understanding of two-dimensional design underlies all 2-D art such as drawing, painting, photography, printmaking, illustration, and graphic design. Students will work with a variety of different materials, techniques, and concepts. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1111 3 credits
Introduction to Digital Art
This course is an introduction to creating art on the computer. Through a combination of demonstrations, presentations, and hands-on experience students learn about a variety of digital technologies and software applications currently being used by contemporary artists. Major areas covered include digital drawing/painting, design, photo manipulation, and 3-D applications. Basic concepts of design are also covered. Students examine the aesthetic, theoretical, and historical aspects of digital art as an expressive medium. This course is intended for students with a working knowledge of Windows or Macintosh platform. MTC goal area: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1112 3 credits
Introduction to Sculpture Design
This is an introduction to the elements and principles of three-dimensional design. Students will be introduced to vocabulary and critical analysis of sculptural artworks. Assignments make use of a variety of materials, tools, and processes. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1113 3 credits
Drawing I
An introduction to traditional and contemporary drawing methods, concepts, and techniques through structured experiences in drawing and perceiving. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1118 3 credits
Art Appreciation
An introduction to human creativity and expression in the visual arts from a global perspective. Students will view and discuss works from a wide spectrum of human history and world cultures with an emphasis on expression, style, and artistic meaning. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ART 1120 3 credits
Art History: Prehistoric to 1400 A.D.
An introduction to the history of art emphasizing the social context and historical fabric out of which art has developed. The time-period covered by this class is from prehistoric to approximately 1400 A.D. The course explores western and non-western architecture, sculpture, painting, and craft through

lecture, discussion, and written assignments. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ART 1122 3 credits
Art History: Renaissance to the Present
An introduction to the history of art emphasizing the social context and historical fabric out of which art has developed. The time-period covered by this class is from the Renaissance to the present. The course explores western and non-western architecture, sculpture, painting, and craft through lecture, discussion, and written assignments. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ART 1125 3 credits
Watercolor
An introductory course presenting practical and creative knowledge for students at any level who want to develop, explore, and experiment with the exciting possibilities of the watercolor medium. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ART 1110 or ART 1151 recommended) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1138 3 credits
Ceramics I
In this course students work with ceramic techniques emphasizing slab, pinch, coil, sculpture and wheel methods of clay construction. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1162 3 credits
Introduction to Fused Glass
An introduction to creating art using glass. This course will focus on learning the concepts, materials, and methods involved in glass fusing, kiln casting, glass enameling, and glass mosaic work. Students will create decorative, functional, and sculptural pieces. Students will also learn about the aesthetic, theoretical, and historical aspects of glass as an expressive art medium. (Prerequisite: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1165 3 credits
Metal Art/Jewelry I
An introduction to basic hand-fabrication techniques and processes using non-ferrous metals as small sculptural forms or jewelry. Avenues of study include layout, shaping and fitting mating parts, finishing and hand-soldering of projects. Students are required to purchase hand tools and pay a personal property fee. MTC goal area: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1168 3 credits
Painting I
Introduction to traditional and contemporary painting techniques and concepts. Focus is on building skills in depicting images and spaces, and on applying the art elements and design principles to painted compositions. Students are introduced to the technical vocabulary of painting and to the critical analysis of contemporary and historical paintings. Representational, abstract and non-objective modes of painting are explored. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1300 1 credits
Sculpture Workshop
This course will explore basic sculpture construction, clay modeling, and modern sculpture. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

ART 1305 1 credits
Ceramics Workshop
This course will explore traditional methods used to construct ceramic form. The potter's wheel will be the primary focus. The slab, coil and pinch techniques will be demonstrated based on request. Decorative techniques using studio slips, earthenware glazes and the Raku process will be introduced. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

ART 1500 3 credits
Digital Photography I
This introductory course covers how to use a digital camera, how to edit photographs using computer software, and how to create successful photographic compositions. In addition, students will examine the aesthetic, theoretical, and historical aspects of photography as an expressive medium. Students will

need to supply their own digital camera. Information on selecting a digital camera will be covered during the first week of the course. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: Working knowledge of Windows or Macintosh platform) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1510 3 credits
Digital Painting I
This introductory course covers the basic concepts and techniques of digital painting using the computer and raster-based software programs. Material covered includes both the creation of original work as well as the manipulation of existing images. In addition, students examine the aesthetic, theoretical, and historical aspects of digital art as an expressive medium. This course is intended for students with a working knowledge of Windows or Macintosh platform. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1520 3 credits
Digital Graphic Design I
This course is an introduction to the basic design concepts and techniques created using the computer and design editing software. Students will learn to create and alter designs used in the business and art world. In addition, students will examine the historical, theoretical, and aesthetic aspects of graphic design as an expressive and persuasive artistic medium. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: College-level reading and writing; working knowledge of Windows or Macintosh platform) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 1999 1-3 credits
Special Topics in Art:
Special topics in art. Special course topics will be announced in the class schedule.

ART 2100 3 credits
Sculpture I
This is an introduction to the language and concepts of creating sculpture. The course concentrates on the development of ideas through exploration of various materials, tools, techniques, and processes. Students will also be introduced to oral and written critical analysis of sculptural artwork. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2102 3 credits
Sculpture II
Intermediate level construction techniques using found objects, clay, plaster, adhesives, fasteners and other common materials in conjunction with the development of a personal aesthetic and understanding of concepts used to create contemporary sculpture. A lab fee will be assessed. (Prerequisites: ART 2100) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2112 3 credits
Watercolor II
Experience in advanced watercolor techniques and concepts. (Prerequisites: ART 1125) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2113 3 credits
Drawing II
This course builds on the concepts, techniques, and materials covered in Drawing I. Major areas include the human figure, composition, color, personal expression, and the role drawing has played throughout human history. Students will use a variety of different drawing mediums. (Prerequisites: ART1113 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2139 3 credits
Ceramics II
Intermediate-level ceramic hand-building, wheel throwing, decorating, glazing, and firing methods. A personal property fee will be charged in addition to tuition. (Prerequisites: ART1138 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2140 3 credits
Ceramics III
Advanced level ceramic methods in hand-building, wheel throwing, glazing, and kiln firing. A personal property fee will be charged in addition to tuition. (Prerequisites: ART2139 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2165 **3 credits**
Metal Art/Jewelry II
A concentrated study in small metals, refinement of techniques and concepts, geared to meet the needs of individual students and to help them develop personal direction. This course will also introduce and familiarize students with the lost wax casting process. (Prerequisite: ART1165) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2168 **3 credits**
Painting II
Advanced painting concepts and strategies exploring alternative avenues to expression, technique, and methods of painting. (Prerequisites: ART1115 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2199 **1 credits**
Independent Study
Research in selected areas. This course offers the student an opportunity to investigate advanced, creative, and technical problems in art. May be repeated for six credits. MTC goal areas:(2) Critical Thinking, (6) Humanities and Fine Arts.

ART 2200 **1 credits**
Art Portfolio Preparation
This course will concentrate on creating a portfolio/resume for a career in art. Students will develop the artists' statement and will gain understanding of the preparation of a professional portfolio. Students will plan/prepare/present an exhibition of their artwork under guidance of faculty. During the exhibition students will digitally document their art work. (Prerequisites: College level reading and writing. Successful completion of a college art course or permission.) (1 hr lec/0 hrs lab/0 hrs OJT)

ART 2500 **3 credits**
Digital Photography II
This intermediate course covers advanced techniques of digital photography including camera features, digital-editing techniques, and aesthetic concerns. Special emphasis is given to projects involving the development of camera vision and conceptual ideas. Students need to supply their own digital camera. (Prerequisites: ART1500 and working knowledge of Windows or Macintosh platform) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2510 **3 credits**
Digital Painting II
This is an intermediate-level course that builds on the concepts and techniques taught in Digital Painting I. Students use raster-based computer software programs and graphic tablets to create original digital paintings. Emphasis is placed on the cognitive and technical skills necessary to translate an idea into visual communication. (Prerequisites: ART1510) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2521 **3 credits**
Digital Graphic Design II
This course is an indepth examination of the design concepts and techniques created by using the computer and design editing software. Students will learn to create detailed and elaborate designs commonly used in the business and art world. In addition, students will continue to explore the intricate historical, theoretical, and conceptual aspects of digital graphic design as an expressive and persuasive artistic movement. (Prerequisites: College-level reading and writing, working knowledge of Windows or Macintosh platform, and ART1520) (1 hr lec/4 hrs lab/0 hrs OJT)

ART 2999 **1-3 credits**
Special Topics in Art
Special topics in art. Special course topics will be announced in the class schedule.

American Sign Language

ASL 1200 **3 credits**
American Sign Language I
In this introductory course you will engage in receptive and expressive language readiness activities as well as learn vocabulary, basic use of American Sign Language grammatical structure and signing space, conversational regulators, fingerspelling and introductory aspects. Students must be able to process visual information. MTC goal area: (8) Global Perspective. (Prerequisites: none) (3 hr lec/0 hr lab/0 hr OJT)

ASL 1210 **3 credits**
American Sign Language II
This course is a continuation of ASL 1200. Students will continue to study American Sign Language

grammatical structure, vocabulary, fingerspelling, use of signing space, conversational regulators, and introductory aspects of Deaf culture. Students must be able to process visual information. MTC goal area: (8) Global Perspective. (Prerequisites: ASL 1200 with a "C" or better or skill-based evaluation of ASL competency) (3 hr lec/0 hr lab/0 hr OJT)

Automotive Service Technology

ASTE 1200 3 credits
Automotive Maintenance
Basic course in automotive car care designed for students with little or no knowledge of automobiles. This class will cover a basic overview of automotive systems and their operation. We will cover routine maintenance such as oil changes, basic engine performance maintenance, an overview of computer systems and check engine lights, fluid changes with determination of fluid conditions, changing tires, tire pressure monitor system operation, and meaning of dashboard indicators. Automotive shop safety emphasized. Safety glasses required. Tools will be provided. Daily lecture followed by demonstration with open lab time in the automotive shop. (Prerequisites: none) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 1310 2 credits
Applied Safety and Environmental Stewardship
This course is a combination of theory and applied hands-on activities that meets the requirements set forth by the ASE Education Foundation pertaining to personal, industrial, and environmental safety awareness and practices. Applicable components of OSHA 1910, MNOSHA, and the MN DOL are covered along with an introduction to consensus standards organizations and governing bodies. Federal EPA (Minnesota Pollution Control Agency MPCA) regulations as they apply to the automotive repair industry will be discussed and verified. Completion of the American Heart Association (AHA) First Aid/CPR/ and AED is also included. Safety Data Sheets (SDS) retrieval, interpretation, and storage will be covered. Automotive lift safety as addressed by the Automotive Lift Institute (ALI) will be provided. Job Hazard Analysis (JHA) and automotive asbestos abatement requirements will also be covered and developed. (Prerequisites: a score of 236 or higher on the QAS portion and a score of 236 or higher on the Arithmetic portion of the Accuplacer; and a score of 250 or higher on the reading portion of the Accuplacer, or completion of ENGL/READ 0950 or 0955 (or equivalent course or higher). ENGL/READ 0955 may be taken concurrently with Semester I coursework) (1 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1320 3 credits
Information Systems and Shop Management
This foundational course utilizes industry standard computer-based automotive information management and shop operational management software to prepare the Automotive Service Technician for entry-level employment. The course will also include computer network design and configuration to support shop operations. Shop management software will be used for vehicle write-up, estimation, and repair order management. Regulatory agencies and laws governing the automotive service repair industry will be introduced. This course will also emphasize professionalism, ethics, and interpersonal communication in an automotive industry work environment and will explore automotive career opportunities. (Prerequisites: ASTE 1310 or instructor approval) (1 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 1330 5 credits
Automotive Fundamentals and Maintenance
This course is designed for both individuals wanting to become professional automotive and light duty truck technicians and those looking to see how modern vehicles are engineered, classified, and built. The course allows for the disassembly and reassembly of the modern vehicle and requires the extensive use of hand tools. The identification and repair of various fastener types will be covered. Fundamental vehicle systems and their operation will be addressed. Students will perform vehicle inspections and maintenance. Gas Metal Arc Welding along with Oxy-acytelyne torch use is covered. Maintenance and repair related to engines, transmissions, and drivetrains will be performed in accordance with ASE G1 requirements. (Prerequisites: ASTE 1310) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 1340 **6 credits**
Electrical and Electronics Principles
This course meets the requirements set forth by the ASE Education Foundation regarding the fundamentals of electrical theory and for starting and charging systems. Specifically, this course covers the fundamentals of electricity and electronics including circuits, magnetism, resistance, coils, capacitance, diodes, and solid state devices as related to automobiles. Extensive use of digital multi-meters and other test equipment and techniques will be employed. Battery theory and diagnosis for all automotive types including Hybrid (Li-ion) and Stop-Start . Starting and charging system theory, operation, diagnosis, and repair including Stop-Start will be covered. Wiring diagram use and wiring repair practices are included. (Prerequisites: ASTE 1320 or instructor approval) (3 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 1350 **2 credits**
Electronic Control Unites and Scan Tools
This course establishes the foundational automotive Electronic Control Unit (ECU) and scan tool competencies required to function as a professional automotive technician. Students are introduced to the fundamental architecture and operation of ECUs including inputs, outputs, actuator tests, system tests, and component/system resets. Stand-alone scan tool and laptop-based architecture and operation are explained. Students operate at the level of a professional vehicle maintenance and light repair technician (ASE G1) to train and program Tire Pressure Monitoring System (TPMS), Reset Maintenance Monitors and Reset Battery Charging System Monitors, and check and clear Diagnostic Trouble Codes (DTC). (Prerequisites: ASTE 1330 and ASTE 1340 or instructor approval) (1 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1400 **3 credits**
Introduction to Transportation
This course provides the student with a basic understanding of automobile design and the ability to properly and safely perform basic service and repair procedures in the automotive industry. Use of service manuals, flat rate manuals, bulletins, trouble shooting charts, compact disc information retrieval systems, and Internet resources will be introduced. Emphasis will be placed on developing diagnostic skills and interpreting specifications. Minor automotive service and introduction to automotive systems will be covered in lab. Basic MIG welding and oxy-acetylene cutting and welding safety and techniques will be introduced. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1410 **3 credits**
Air Conditioning
This course covers the principles of air conditioning. The various types, diagnosis of malfunctions, testing, and repair are included. Emphasis will be placed on environmentally friendly repair procedures. Practical experience is gained on live systems; diagnosis, recovery, charging, and performance testing of systems. (Prerequisites: ASTE1400, concurrent enrollment, or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1430 **3 credits**
Auto Electrical Fundamentals
This course covers the fundamentals of electricity and electronics, sources of electricity, circuits, magnetism, resistance, coils, capacitance, diodes, and solid state devices as they are related to the automobile. Use of meters will be emphasized. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1440 **3 credits**
Body Electrical & Electronics
This course covers the operation, servicing techniques of chassis wiring, lights, instruments, headlight aiming, and how to read and interpret wiring diagrams. (Prerequisites: ASTE1430) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 1450 **5 credits**
Engine Service
This course covers the fundamentals of engine operation, repair, and maintenance. The procedures for rebuilding, precision measurement, parts and failure identification will be presented. Cylinder block and head disassembly and repair will be performed. (Prerequisites: ASTE1400 or instructor's consent) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 1460 **2 credits**
Basic Fuel System Service
This course covers the theory and principles of automotive fuel systems including carburetors, fuel pumps, fuel tanks, filters, and emission control systems associated with fuel systems on the automobile. Diagnosis, adjustments, and repair of components will be emphasized. (Prerequisites: ASTE1400 or instructor's consent) (1 hr lec/2 hrs lab/0 hrs OJT)

ASTE 1470 **3 credits**
Basic Engine Driveability
This course covers the theory and principles of automobile ignition systems, subsystems, and related emission components. Engine mechanical troubleshooting and diagnosis will be emphasized. Engine analyzers and diagnostic equipment will be introduced. (Prerequisites: ASTE1400, ASTE1430, or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 1490 **3 credits**
Automotive Shop Management I
This introductory course utilizes computer based automotive management software to prepare the Automotive Service Technician for entry-level employment. This course will also emphasize professionalism, ethics, and interpersonal communication in an automotive industry work environment and explore Automotive Career opportunities. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT, or concurrent) (2 hr lec/2 hrs lab/0 hrs OJT)

ASTE 1500 **3 credits**
Charging and Starting Systems
This course covers the theory of starting motors and charging systems. Testing procedures, parts identification, and circuit testing will be included. Emphasis will be placed on diagnosis and troubleshooting procedures. (Prerequisites: ASTE1400, ASTE1430, or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1510 **4 credits**
Braking Systems
This course covers the principles of the vehicle's foundation hydraulic brakes as well as electronic braking systems, including hybrid electric. Course highlights include hydraulic system fundamentals, disc and drum brakes, mechanical & electronic parking brakes, power assist units, anti-lock braking systems (ABS), electronic brake distribution (EBD), traction control (TCS), and trailer sway control. Emphasis will be placed on the proper operation, diagnosis and repair of the various braking systems. This course meets the requirements established by the ASE Education Foundation for Skill Area 5 Brakes (Prerequisites: ASTE1350 or instructor's consent) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 1520 **2 credits**
Supplemental Restraint Systems (SRS)
This course meets the requirements set forth by the ASE Education Foundation regarding supplemental restraint systems (SRS). The course covers the various passive restraint system designs including front, side, door, seat and pyrotechnic seat belts. System operation, diagnosis, and repair is covered. The use of scan tools and the respective service and diagnostic procedures will be performed. Safe system service practices as applied to service, diagnosis, and repair are emphasized. (Prerequisites: ASTE1340 and ASTE1350 or instructor's consent) (1 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 1530 **8 credits**
Steering, Suspension, and Alignment
This course includes instruction on contemporary vehicle chassis design, types of suspensions, and alignment theory and practices. Information covered includes suspension designs, link coil, leaf spring, torsion bar, McPherson strut, and trailing arm. Asian and European design, operation, diagnosis, and repair will be covered. Other instruction includes operation, diagnosis, and repair of steering columns and the hydraulic and the electric steering systems they operate. Tire pressure monitoring systems (TPMS) and their service will be discussed. Extensive time is spent in the shop performing live work to develop the skills required to be successful in the diagnosis and repair of these vehicle components and systems. This course meets the requirements as listed for the ASE

Education Foundation Skill Area 4 Suspension and Steering. (Prerequisites: ASTE1520 or instructor's consent) (3 hrs lec/10 hrs lab/0 hrs OJT)

ASTE 1540 4 credits
Climate Control System Operation, Diagnosis, and Repair
This course introduces the systematic operational aspects of modern vehicle climate control systems to include the hydraulic refrigeration cycle as it applies to modern refrigerants. The components and systems that control compressor operation are identified and explained. The operation, diagnosis, and repair of typical electrical components and systems that operate the air distribution systems within the vehicle, along with the HVAC distribution housing assemblies are covered. Multiple heating system designs are addressed. The use of industry compliant refrigerant recovery, recycling, and recharging equipment are taught along with the requirements of EPA 609 certification and environmental stewardship. Live work is performed in the shop on the various systems while utilizing specific tools and equipment that are unique to climate control service. This course meets the requirements established by the ASE Education Foundation for Skill Area 6- Heating, Ventilation, and Air Conditioning. (Prerequisites: ASTE1340 and ASTE1350 or instructor's consent) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2310 5 credits
Gas and Diesel Engine Service and Repair
This course meets the requirements set forth by the ASE Education Foundation. Students will perform the complete disassembly, inspection, and reassembly of late model engines. The engines are required to be operational after this process. Live work is performed in the shop that meets program accreditation requirements. Removal and installation of a complete engine assembly is required. Engine operational theory for both gas (spark ignition) and diesel (compression ignition) engines is covered. The use of precision measuring tools, along with special engine and engine system tools, is addressed.
Engine mechanical diagnosis and testing such as cylinder leakage, cylinder balance, and various types of compression testing are performed. This course provides the fundamental operational and relational theory of modern four cycle engines that is required for the theory of fuel injection and emission systems operation. . (Prerequisites: ASTE1350 or instructor's consent) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2320 5 credits
Mass Airflow, Speed Density and GDI Fuel Systems
The operational theory, diagnosis, and repair for both mass airflow and speed density fuel systems is covered. The course begins with instruction on first moving fuel from the tank to the fuel rail. This is followed by learning the inputs and outputs that are required to maintain engine operation in the following modes of operation: starting, idle, acceleration, cruise, wide open throttle, and deceleration. When this is complete, the course then looks at the operational theory pertaining to gasoline direct injection (GDI). The inputs and outputs that are unique to GDI are tested and serviced. Live work in the shop where appropriate will be performed. There is extensive use of digital multi-meters (DMM), scan-tools, lab scopes, fuel system tools, and service literature throughout the course. This course meets the requirements set forth by the ASE Education Foundation. (Prerequisites: ASTE1350 and ASTE 2310 or instructor's consent) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2330 4 credits
OBD II Operation, Diagnosis, and Repair
The course covers the applied theory of operation as it relates to on-board diagnostics II (OBD II). Students will learn the operation, diagnosis, repair, and verification of repairs as related to comprehensive fuel and emission system components as well as once-per-trip and continuous monitors. Operation and diagnosis of the various J-1962, 16-way data link connector (DLC) is covered. Multiple evaporative emission system integrity monitor designs will be discussed. The various monitors will be run on a variety of vehicle types including American, Asian, and European. Specialized emissions testing equipment will be used. Electronic control unit (ECU) re-programming commonly referred to as "Flash re-programming" will be performed. This course meets the requirements of the ASE Education Foundation. (Prerequisites: ASTE 2320 or instructor's consent) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2400 **3 credits**
Suspension and Steering Repair
This course covers the theory, history, and repairs of various steering and suspension systems using coil springs, leaf springs, torsion bars, McPherson struts, and modified struts. It also covers operation and repairs to various steering systems. (Prerequisites: ASTE1400) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 2410 **3 credits**
Basic Wheel Alignment
This course covers suspension systems using leaf springs, coil springs, McPherson struts, and torsion bars along with the various procedures required to check and adjust wheel alignment angles such as caster, camber, and toe. (Prerequisites: ASTE1400 or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 2420 **2 credits**
Advanced Wheel Alignment
This course covers the method of four-wheel alignment checks and correction procedures and any changes in front or rear suspension systems. (Prerequisites: ASTE1400 and ASTE2410) (0 hr lec/4 hrs lab/0 hrs OJT)

ASTE 2430 **3 credits**
Clutch and Differential
This course covers automotive and light truck clutches. Content includes design, adjustment, diagnosis, and repair. Mechanical and hydraulic systems are presented. Drive line phasing, alignment, balance, and universal joint replacement are included. Repair procedures and theory of differential operation are also covered. (Prerequisites: ASTE1400 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 2450 **2 credits**
Transmission Theory
This course covers basic theory of torque converters, planetary gears, clutches, bands, and hydraulics. The class stresses how manual and automatic transmissions work, their basic parts, and function. (Prerequisites: ASTE1400 and ASTE1430) (2 hrs lec/0 hrs lab/0 hrs OJT)

ASTE 2460 **3 credits**
Transmission Lab
This course covers hands-on lab experience in which various transmissions and transaxles are overhauled, adjusted and bench tested. Basic overhaul techniques, special tool, and gauge usage are taught. (Prerequisites: ASTE1400, ASTE1430 and ASTE2450) (0 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2470 **3 credits**
Introduction to Automotive Computers
This course covers theory and operating principles of automotive computers, sensors, and control devices. (Prerequisites: ASTE1400, ASTE1430, and ASTE1470) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 2480 **2 credits**
Advanced Air Conditioning
This course expands on the principles of air conditioning covered in ASTE1410. Emphasis will be on becoming more proficient in diagnosis, recovery, charging, and performance testing. Emphasis will be placed on major and minor component replacement procedures. All repairs will be accomplished using environmentally safe procedures. (Prerequisites: ASTE1400 and ASTE1410) (0 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2490 **2 credits**
Automotive Shop Management II
This advanced course is designed to enhance the computer based skills developed in ASTE1490 (Automotive Service Management I) to broaden career opportunities. Students will develop management knowledge and skill through internal management in the Automotive Shop at Lake Superior College. (Prerequisites: ASTE1490) (1 hr lec/2 hrs lab/0 hrs OJT)

ASTE 2500 **3 credits**
Fuel Systems II
This course will cover computer controlled carburetors and throttle body or multiple injection systems. (Prerequisites: ASTE1400, ASTE1430, ASTE1460, and ASTE2470) (1 hr lec/4 hrs lab/0 hrs OJT)

ASTE 2510 **4 credits**
Advanced Engine Driveability
This course covers skills in diagnosing, testing, and correcting problems related to engine performance. The course concentrates on computer controlled systems. (Prerequisites: ASTE1400, ASTE1430, ASTE1460, ASTE1470, and ASTE 2500) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2520 **4 credits**
Manual Drivetrains, Differentials, Transfer Cases, and NVH
This course introduces students to manual drivetrains, differentials, and transfer cases to describe how power (torque) is transferred to the wheels. The principle of torque multiplication through gears and levers is explained. This course covers the operation, diagnosis, and repair of clutch assemblies, manual transmissions and transaxles, along with differentials, drive shafts (both rear and front wheel drive), and transfer cases as applied to all wheel drive (AWD) and four wheel drive (4WD). Noise vibration and harshness (NVH) is covered as it applies to drivetrain components, including prop shaft angularity, phasing, and balancing. This course meets the requirements of the ASE Education Foundation. (Prerequisites: ASTE2540 or instructor's consent) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2530
ECU Communication and Body Electrical Systems
This course introduces the student to multiple vehicle communication protocols and architectures. These include SCI, LIN, J-1850, CAN BUS (J-2284 and J-1939) UART, FlexRay and more. Students will then use service literature, scan tools, digital multi-meters, and lab scopes to diagnose, repair, and verify the operation of the following vehicle body electrical systems and accessories: lighting, wipers, power locks, mirrors, pedals, sliding door and window systems, heated and cooled seats, sunroofs, gauges and warning indicators, Bluetooth and voice command operated systems, audio and navigation systems, as well as vehicle security and anti-theft systems. Live work is performed on a combination of vehicles and simulators. This course meets the requirements established by the ASE Education Foundation. (Prerequisites: ASTE1320 and ASTE1340 or instructor's consent) (3 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2540 **5 credits**
Electronic Automatic Transmissions
The primary focus of this course is automatic transmissions and transaxles that are planetary gear based, multi-speed, electronic shift, and hydraulically operated. This includes torque converter, planetary gears, clutches, bands, hydraulic system, component operation, diagnosis, and repair. Power flow through the transmission will be discussed. Electronic transmission operation and control will be a focus. Scan tool, lab scope, and hydraulic circuit testing will be performed. Disassembly and reassembly of automatic transmissions will occur along with cooler flushing requirements and the required transmission software and hardware re-learn and reset procedures. Continuously variable transmission (CVT) operation, diagnosis, and repair will also be included. The multiple types of transmission hydraulic transmission fluid and filtration will be addressed. Transmission/Transaxle maintenance will be performed. This course meets the requirements of the ASE Education Foundation. (Prerequisites: ASTE1350 or instructor's consent) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2550 **3 credits**
Hybrid Electric Vehicle Operation and Safety
This course introduces the student to the following hybrid electric vehicle types: mild hybrids, Type-1, Type-2, and Type-3 as defined by ASE, and battery electric vehicles, also known as full electric vehicles. Time is spent both explaining the safety requirements for working on these types of vehicles and then these behaviors will be demonstrated in the shop when working on the vehicles while performing maintenance, diagnosis, and repair. Battery types and systems such as Nickel Metal Hydride (NiMH)and Lithium Ion (Li-ion) will be explained. Time will be spent discussing major system components such as the system contactor, DC/DC converters, AC/DC inverters, battery packs. Hybrid auxiliary systems relating in part to braking, steering, air-conditioning will be covered. Select hybrid vehicle systems and components will be tested, serviced, removed, and installed. (Prerequisites: ASTE2540 or instructor's consent) (1 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2600 **3 credits**
Intro to Light Duty Diesel
This course covers the theory and operation of light duty diesel engines. Safety Procedures, maintenance, diagnosis and repair are presented. (Prerequisites: score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, may be taken concurrently, or equivalent transfer course or higher) (2 hrs lec/2 hrs lab/0 hrs OJT)

ASTE 2610 **5 credits**
Light Duty Diesel Engine Repair
This course covers the theory and fundamentals of the light duty diesel engine. Precision measurement of parts and failure identification will be discussed. Lubrication and cooling system function and diagnosis will be presented. Cylinder block and cylinder head disassembly/assembly will be performed with emphasis on failure analysis. (Prerequisites: score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, may be taken concurrently, or equivalent transfer course or higher) (2 hrs lec/6 hrs lab/0 hrs OJT)

ASTE 2620 **4 credits**
Light Duty Diesel Air, Exhaust and Emissions
This course covers the theory and operation of air induction and boost components. Diagnosis and repair of induction systems, turbochargers, exhaust catalyst and particulate filtration along with emission controls and DEF systems are emphasized. (Prerequisites: score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, may be taken concurrently, or equivalent transfer course or higher) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2630 **4 credits**
Light Duty Diesel Fuel Systems
This course covers light duty diesel fuel delivery system components including electronic and mechanical system theory and operation. Fuel types and fuel compositions are discussed. Diagnostic techniques of computerized controls are presented. (Prerequisites: score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, may be taken concurrently, or equivalent transfer course or higher) (2 hrs lec/4 hrs lab/0 hrs OJT)

ASTE 2999 **1-3 credits**
Special Topics in Auto Service Technology
Study of special topics in automotive service technology. Special course topics will be announced in the class schedule.

Astronomy

ASTR 1101 **4 credits**
Introduction to Astronomy
Students in astronomy will be introduced to several aspects of the universe. Students will see how astronomical ideas have developed through history and how our ideas about the universe (and our place in it) have changed. They will investigate the motions of the sun, moon, stars, and visible planets. They will learn to identify the major constellations in the night sky and will become aware of changes that occur in the sky with the passage of the seasons. Student will discover what has been learned through exploration of the planets, moons, and other bodies in our solar system. They will learn how the sun produces energy, and how stars form, evolve, and die. Students will discover how galaxies are organized and what their motions teach us about the origin and evolution of the universe. MTC goal area: (3) Natural Sciences. (Prerequisites: College-level reading and MATH0450) (3 hrs lec/2 hrs lab/0 hrs OJT)

Aviation

AVIA 1000 **1 credits**
Heritage and Values
A two-part survey course of the United States Air Force as a public-service organization and as an introductory course to the Air Force ROTC program. Air Force heritage, core values, human relations, the oath of office and interpersonal communication skills are also examined. Open to all university students interested in military topics. Enrollment in course does not designate students as an ROTC cadets. Students who want to enroll in the ROTC program and become cadets must also enroll in AFROTC GMC Lead Lab.

AVIA 1005 **1 credits**
Foundations of the US Air Force II
Second half of a two-part survey course of U.S. Air Force as a public-service organization covering the role of the military in U.S. society; military history; officership; professionalism; core values; career opportunities; customs/courtesies; communication skills. Leadership Laboratory is mandatory for AFROTC cadets and complements this course by providing followership experiences. (Must register though UMD AFROTC program for the Leadership Laboratory.)

AVIA 1100 **2 credits**
Introduction to Professional Aviation
This course provides a broad presentation of the historical development of aviation in the U.S. and its influence on our current society. Examination of past, present, and future aviation careers will also be presented. (Prerequisites: none) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1201 **4 credits**
Private Pilot Ground
This course, combined with either the airplane or helicopter specific track, serves as a preparation for the FAA Private Pilot knowledge and practical tests, which shall be taken upon successful completion of the course. Course content includes, but is not limited to: FAA regulations, aerodynamics, weather, radio communications and navigation, aviation safety, airspace, emergency procedures and aeronautical decision making. (Prerequisites: A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (4 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1240 **2 credits**
Private Pilot: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Private Pilot Certificate with Airplane Single-Engine category and class ratings. Instruction includes the specialized material specific to airplane operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA 1201, concurrent enrollment or instructor approval) (2 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1245 **2 credits**
Private Pilot: Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Private Pilot Certificate with Rotorcraft-Helicopter category and class ratings. Instruction includes the specialized material specific to helicopter operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, concurrent enrollment or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1250 **1 credits**
Private Pilot Flight Lab:Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Private Pilot Certificate with Airplane Single-Engine category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in an airplane or flight training device with an FAA Certified Flight Instructor or solo in order to gain the level of proficiency required to pass the FAA Private Pilot practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, concurrent enrollment or instructor approval; A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 1255 **1 credits**
Private Pilot Flight Lab:Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Private Pilot Certificate with Rotorcraft-Helicopter category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in a

helicopter with an FAA Certified Flight Instructor or solo in order to gain the level of proficiency required to pass the FAA Private Pilot practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, concurrent enrollment or instructor approval, A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 1351 **2 credits**
Aircraft Systems
This course is an introduction to common aircraft systems such as: aircraft structure and design, electrical, hydraulic, powerplant, lubrication, cooling, fuel, ignition, pressurization, ice protection, and forced induction. This course is designed to be taken with AVIA1550 or AVIA1555 to meet the requirements of the respective track. (Prerequisites: A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1352 **1 credits**
Aircraft Systems: Airplane
This course is an introduction to common airplane systems and serves as the track specific companion to AVIA 1351. Airplane specific systems will be covered such as: design characteristics, flight surfaces, and propeller systems. (Prerequisites: AVIA1351 or concurrent enrollment or instructor approval; A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1354 **1 credits**
Aircraft Systems: Helicopter
This course is an introduction to common helicopter systems and serves as the track specific companion to AVIA 1351. Helicopter specific systems will be covered such as: design characteristics, flight surfaces, and rotor systems. (Prerequisites: AVIA1351, or concurrent enrollment or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher.) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1360 **3 credits**
Aviation Safety
This course provides students with an overview of factors related to the safe and efficient operation of aircraft. Pilot performance, aircraft design, environmental factors, and the operating environment will be examined as they relate to accident cause and prevention. The student will learn how to analyze and mitigate risk through the use of a safety management system. (Prerequisites: A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1390 **3 credits**
Aviation Meteorology
Weather elements are studied in detail to determine how they produce our weather and how that weather affects aviation. A climatological approach is used to develop an understanding of the weather elements and their distribution over the Earth. Aviation specific hazards including convective weather, icing, visibility, and wind are also studied in great detail. (Prerequisites: A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of

MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1501 4 credits
Instrument Pilot Ground
This course, combined with either the Airplane or Helicopter specific track, serves as a preparation for the FAA Instrument Rating knowledge and practical tests, which shall be taken upon successful completion of the course. Course content includes, but is not limited to: FAA regulations, flight by reference to instruments, radio navigation and communication, instrument flight procedures, instrument approach procedures, abnormal and emergency procedures, and aeronautical decision making. (Prerequisites: AVIA1201 and AVIA1250 or AVIA1255, or instructor approval; score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (4 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 1540 1 credits
Instrument Pilot: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Instrument-Airplane Rating. Instruction includes the specialized material specific to airplane operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (AVIA1201, AVIA1250 and AVIA1501, concurrent enrollment or instructor approval) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1545 1 credits
Instrument Pilot: Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Instrument-Helicopter Rating. Instruction includes the specialized material specific to helicopter operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, AVIA1255 and AVIA1501, or concurrent enrollment or instructor approval) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 1550 1 credits
Instrument Pilot Flight Lab:Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Instrument Airplane Rating. This lab includes one-on-one ground instruction, along with actual flight training in an airplane or flight training device with an FAA Certified Flight Instructor in order to gain the level of proficiency required to pass the FAA Instrument-Airplane Rating practical test. Additional flight time is included to complete Stage 1 commercial 141 TCO. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, AVIA1250 and AVIA1501, concurrent enrollment or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher.) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 1555 1 credits
Instrument Pilot Flight Lab:Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Instrument-Helicopter Rating. This lab includes one-on-one ground instruction, along with actual flight training in a helicopter with an FAA Certified Flight Instructor or solo in order to gain the level of proficiency required to pass the FAA Instrument-Helicopter Rating practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1201, AVIA1255 and AVIA1501, or concurrent enrollment or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or

completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 1999 1-3 credits
Special Topics in Aviation
Special topics in aviation. Special course topics will be announced in the class schedule.

AVIA 2000 1 credits
Team and Leadership Fundamentals
A two part course that examines Air Force leadership, ethics and values. Students will develop leadership skills based on student participation, group problem solving and oral/written communication. Students will apply these leadership perspectives when completing team building activities and discussing leadership challenges within group dynamics. Students will also demonstrate basic verbal and written communication skills. Open to all university students interested in military topics. Enrollment in course does not designate students as an ROTC cadets. Students who want to enroll in the ROTC program and become cadets must also enroll in AFROTC GMC Lead Lab. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 2005 1 credits
The Evolution of the U.S. Air Force and Space Power II
The second half of a two-part survey course covering Air Force heritage; development/deployment of air power, a primary element of US national security; leadership and quality principles; ethics and values. Emphasis on leadership development based on student participation in group problem solving. Oral/written communication development emphasized. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

AVIA 2101 0-1 credits
Air Force Leadership Lab
Practical environment giving leadership training while being instructed on military customs and courtesies, physical fitness, military drill and the general Air Force environment. Two physical fitness attendances each week; a physical fitness diagnostics test and a physical fitness test are all required. Taken concurrently with 1xxx and 2xxx level academic classes. Pass-Fail only.

AVIA 2102 2 credits
Commercial Pilot Ground
This course, combined with either the Airplane or Helicopter specific track, serves as a preparation for the FAA Commercial Pilot knowledge and practical tests, which shall be taken upon successful completion of the course. Course content includes, but is not limited to: FAA commercial regulations, advanced weather theory, radio communications and navigation, safety, airspace, emergency procedures, and aeronautical decision making. (Prerequisites: AVIA1501 and AVIA1550 or AVIA1555 or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2140 2 credits
Commercial Pilot: Airplane
This course provides the student with the knowledge and skills necessary to earn an FAA Commercial Pilot Certificate with Airplane Single-Engine Land category and class ratings. Instruction includes the specialized material specific to airplane operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. Note: the student will receive his/her pilot certificate or rating upon completion of the entire FAR Part 141 Commercial/Instrument Pilot curriculum. (Prerequisites: AVIA1501, AVIA1550 and AVIA2102, or concurrent enrollment or instructor approval) (2 hrs lec/ 0 hrs lab/0 hrs OJT)

AVIA 2145 2 credits
Commercial Pilot: Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Commercial Pilot Certificate with Rotorcraft-Helicopter category and class ratings. Instruction includes the specialized material specific to helicopter operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1501, AVIA1555, AVIA 2335 and

AVIA2102 or concurrent enrollment or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2150 1 credits
Commercial Pilot Flight Lab:Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Commercial Pilot Certificate with Airplane Single-Engine Land category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in an airplane or flight training device with an FAA Certified Flight Instructor or solo in order to gain the level of proficiency required to pass the FAA Commercial Pilot ASEL practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. Note: the student will receive his/her pilot certificate or rating upon completion of the entire FAR Part 141 Commercial/ Instrument Pilot curriculum. (Prerequisites: AVIA1501, AVIA1550 and AVIA2102, or concurrent enrollment or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher.) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2155 1 credits
Commercial Pilot Flight Lab:Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Commercial Pilot Certificate with Rotorcraft-Helicopter category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in a helicopter with an FAA Certified Flight Instructor or solo in order to gain the level of proficiency required to pass the FAA Commercial Pilot Rotorcraft-Helicopter practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA1501, AVIA1555 and AVIA2102 or concurrent enrollment or instructor approval; A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2165 2 credits
Commercial/Multi-Engine:Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Commercial Pilot Certificate with Airplane Multi-Engine Land category and class ratings. Instruction includes the specialized material specific to airplane operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. Note: the student will receive his/her pilot certificate or rating upon completion of the entire FAR Part 141 Commercial/Instrument Pilot curriculum. (Prerequisites: AVIA1501, AVIA1555, AVIA2102, and AVIA 2175 or concurrent enrollment or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2175 1 credits
Commercial/Multi-Engine Flight Lab: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Commercial Pilot Certificate with Airplane Multi-Engine Land category and class ratings. This lab includes one-on-one ground instruction, along with single-engine flight training with an FAA Certified Flight Instructor or solo and multi-engine flight training with an FAA Certified Flight Instructor in order to gain the level of proficiency required to pass the FAA Commercial Pilot Certificate with Airplane Single-Engine and Multi-Engine category and class ratings. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. Note: the student will receive his/her pilot certificate or rating upon completion of the entire FAR Part 141 Commercial/Instrument Pilot curriculum. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2201 2 credits
Certified Flight Instructor Ground
This course, combined with either the Airplane or Helicopter specific track, serves as a preparation for the FAA Flight Instructor knowledge and practical tests, which shall be taken upon successful completion of the courses. Course content includes, but is not limited to: the learning process, teaching techniques, evaluations and critiques, flight instructor responsibilities, and flight operations relevant to private, commercial, and flight instructor certification. (Prerequisites: AVIA2102 and AVIA2150 or AVIA2155, or instructor approval; A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2240 2 credits
Certified Flight Instructor:Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Flight Instructor Certificate with Airplane-SEL category and class ratings. Instruction includes the specialized material specific to airplane operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2102, AVIA2150, AVIA2175 and AVIA2201 or concurrent enrollment, or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2244 2 credits
Certified Flight Instructor:Helicopter
This course provides the student with the knowledge and skills necessary to earn an FAA Flight Instructor Certificate with Rotorcraft-Helicopter and Instrument category and class ratings. Instruction includes the specialized material specific to helicopter operations. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2102, AVIA 2155, AVIA2335 and AVIA2201 or concurrent enrollment, or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2250 1 credits
Certified Flight Instructor Flight Lab: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Flight Instructor Certificate with Airplane Single-Engine category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in an airplane or flight training device with an FAA Certified Flight Instructor in order to gain the level of proficiency required to pass the FAA Flight Instructor practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2102, AVIA2150, AVIA2175 and AVIA2201 or concurrent enrollment, or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hr lec/2 hrs lab/0 hrs OJT)

AVIA 2255 1 credits
Certified Flight Instructor Flight Lab: Helicopter
This course provides the student with the knowledge and skill necessary to earn an FAA Flight Instructor Certificate with Rotorcraft-Helicopter and Instrument category and class ratings. This lab includes one-on-one ground instruction, along with actual flight training in a helicopter with an FAA Certified Flight Instructor in order to gain the level of proficiency required to pass the FAA Flight (Prerequisites: AVIA2102, AVIA 2155, AVIA2335 and AVIA2201 or concurrent enrollment, or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hr lec/2 hrs lab/0 hrs OJT)

AVIA 2275 1 credits
Certified Flight Instructor Instrument Flight Lab: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Flight Instructor

Instrument Certificate with Airplane Single-Engine category and class ratings. This lab includes 50 hours of one-on-one ground instruction, along with 15 hours of actual flight training in an airplane or flight training device with an FAA Certified Instrument Instructor or solo in order to gain the level of proficiency required to pass the FAA Flight Instructor Instrument practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2201 and AVIA2250 or instructor approval; and A score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2285 **1 credits**
Certified Flight Instructor-Multi-Engine Flight Lab: Airplane
This course provides the student with the knowledge and skill necessary to earn an FAA Flight Instructor Certificate with Airplane Multi-Engine category and class ratings. This lab includes 50 hours of one-on-one ground instruction, along with 15 hours of actual flight training in an airplane or flight training device with an FAA Certified Multi-Engine Instructor in order to gain the level of proficiency required to pass the FAA Flight Instructor Multi-Engine practical test. Instruction includes requirements as listed in the Federal Aviation Regulations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2201 and AVIA2250 or instructor approval; and a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher.) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2300 **2 credits**
Intro to Air Traffic Control
This course provides students with an overview of Air Traffic Control procedures. Students will learn Air Traffic Controller roles and responsibilities, certification requirements, and the technology and tools they use. In addition, students will be introduced to the various Air Traffic Control jobs, and they will have the opportunity to observe real Air Traffic Controllers at work. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2310 **3 credits**
Airline Operations
This course covers the scope and function of a major air carrier's organizational structure and the specific departmental relationships with special attention to corporate issues including: the airline industry, market structure, certification, FAR Part 121 regulations, economic issues, mergers, corporate culture, and international topics. The student will also study airline management and organization, airline economic forecasting methods, airline pricing, marketing, scheduling, and the process for selecting appropriate aircraft for the company¿s needs. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2312 **3 credits**
Aviation Dispatch
This course prepares students for practical dispatching responsibilities in the aviation industry. The course teaches students elements required for practical dispatching applications including: Federal Aviation Regulations, flight planning, aircraft systems, human factors, emergency procedures, and weather. In addition, students will learn about airline dispatching functions and responsibilities. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary

Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OTJ)

AVIA 2324 1 credits
Seaplane Rating
This seaplane course includes dual instruction required in order to acquire the FAA Airplane Single-Engine Sea class rating. Instruction includes all requirements as listed in the Federal Aviation Regulations. Topics include but are not limited to: Water and seaplane characteristics, maritime rules, seaplane bases, taxing and sailing, confined area take offs and landings, rough water take offs and landings, glassy water take offs and landings, emergency procedures, docking, mooring, and beaching. Students will receive 20 hours of ground training in preparation for the FAA practical test. Students must successfully complete and document 10 hours of Airplane Single-Engine Sea flight training and successfully test for the FAA Airplane Single-Engine Sea class rating to fulfill course requirements. (Prerequisites: AVIA1201 and AVIA1250 or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2325 2 credits
Turbine Transition/External Load: Helicopter
This course will assist the student in obtaining the knowledge, skill, and experience necessary to meet the Federal Aviation Regulation requirements for Rotorcraft External-Load Operations under FAR Part 133, and to safely transition from a piston to a turbine powered helicopter. Instruction includes the specialized material specific to helicopter operations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2102 and AVIA 2335 or concurrent enrollment or instructor approval) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2335 1 credits
Turbine Transition/External Load Flight Lab: Helicopter
This course will assist the student in obtaining the knowledge, skill, and experience necessary to meet the Federal Aviation Regulation requirements for Rotorcraft External-Load Operations under FAR Part 133, and to safely transition from a piston to a turbine powered helicopter. This course will include actual flight training in a helicopter with an FAA Certified Flight Instructor and one-on-one ground instruction in order to gain the knowledge and proficiency required for external load and turbine operations. Students should obtain an FAA 2nd class medical certificate prior to the beginning of class. (Prerequisites: AVIA2102 and AVIA2155 or instructor approval; a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (0 hrs lec/2 hrs lab/0 hrs OJT)

AVIA 2340 3 credits
Aviation Law
This course teaches the history of aviation legislation and federal regulations of air transportation. An introduction to civil law will also be covered by way of studying, analyzing, and discussing current aviation case law. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2350 3 credits
Aircraft Accident Investigation
This course examines techniques and procedures for investigating aircraft accidents and incidents. The student will learn processes the NTSB uses to investigate accidents, such as: operations, air traffic control, meteorology, witnesses, human factors, cockpit voice recorders, flight data monitoring, aircraft structures, power plants, systems,

performance, and maintenance records. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (3 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2361 **2 credits**
Human Factors
This course studies the human factor design elements of aircraft and standard operating procedures. This course also covers the human error factors involved in aircraft accidents. The student will identify the psychological and physiological aspects of aviation. In addition, elements of the human-machine relationship will be analyzed and how it relates to aviation. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2370 **2 credits**
Management of Aviation Services
This course will present elements related to the air transportation industry. The course will include: the evolution of the air transportation industry, structure and economics of the air transportation industry, and management aspects of the air transportation industry. Topics that will be covered throughout this course will include: the industry regulators and associations, the general aviation industry, the airline and cargo industry, and the different labor contracts and relations that impact the air transportation industry. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2380 **2 credits**
Crew Resource Management
This course will compare and contrast single pilot resource management and crew resource management as they relate to the safe and efficient operation of aircraft. The student will study the benefits, standard operating procedures, and challenges associated with crew resource management. In addition, this course will describe the roles and responsibilities of the aircraft captain, first officer, pilot flying, pilot monitoring, and other crew members who function together under CRM. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, or completion of either ENGL0950 or READ0950 or ENGL0955 or READ0955, or equivalent transfer course or higher; and a score of 71 or higher on the Elementary Algebra skills portion of the CPT, or completion of MATH 0520, or equivalent transfer course or higher) (2 hrs lec/0 hrs lab/0 hrs OJT)

AVIA 2999 **1-3 credits**
Special Topics in Aviation
Special topics in aviation. Special course topics will be announced in the class schedule.

Biology

BIOL 1000 **5 credits**
Human Body in Health and Disease
This course is an introduction to body structure and function and their correlation to basic disease processes. Also included are basic cell structure and function, and an introduction to genetic principles. (Prerequisites: College level reading and writing) (4 hrs lec/2 hrs lab/0 hrs OJT)

BIOL 1005 **1 credits**
Introduction to Cell Biology
An introduction to the field of cell biology with a focus on the basic unit of life, the cell - its function, chemistry, metabolism, and structure. Must be passed with a grade of "C" or better to qualify as a prerequisite for other Biology courses. (Prerequisites: College-level reading and writing) (0 hrs lec/2 hrs lab/0 hrs OJT)

BIOL 1007 **4 credits**
Biology and Society
This course uses fundamental principles in biology and biochemistry to examine contemporary biological issues facing society. Students will evaluate the ethical implications and political aspects of scientific topics. Topics include the scientific method, genetics and inheritance, evolution by natural selection, the intersection between environmental health and human health, ecology, conservation, and sustainability. MTC goal areas: (3) Natural Sciences and (9) Ethics and Civic Responsibility. (Prerequisites: College-level reading) (3 hrs lec/2hrs lab/0 hrs OJT)

BIOL 1009 **3 credits**
Introduction to Forensic Biology: Concepts and Techniques
Hands-on instruction in chemical and biological forensic lab techniques which are also used in environmental, medical, and molecular biology. Primarily a lab-based course designed to teach introductory cell and molecular biology employing the scientific method to solve cases. Labs, assignments, readings, and instructions will be chosen from the following topics: lab safety, microscope use (hair and fiber analysis), DNA extraction, fingerprinting and replication, chemistry of life, protein separation and analysis (electrophoresis, Western blot), bacterial culture and transformation, chromatography, genetically-modified organisms (GMO), cell replication forensic entymology. Serves as a prerequisite for Biology 1140, 1150, 1130, 1170 covering concepts and lab techniques of Intro to Cell Biology. MTC goal areas: (3) Natural Sciences. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (1 hr lec/4 hrs lab/0 hrs OJT)

BIOL 1105 **3 credits**
Biology of Women
This course explores aspects of biology relative to women. The following topics will be emphasized: anatomy and physiology, reproductive biology, health issues which disproportionately affect women (eating disorders, osteoporosis, breast cancer, etc.), aging, genetics, hormones as they relate to women's lifestyles and reproduction, nutrition, and cultural views on women's reproductive biology. MTC goal areas: (3) Natural Sciences, and (7) Human Diversity. (Prerequisites: College level reading and writing) (2 hrs lec/2 hrs lab/0 hrs OJT)

BIOL 1110 **4 credits**
The Ecology of Minnesota
An introduction to fundamental ecological principles and management of biological and ecological resources. Students will learn and apply ecological concepts to Minnesota's terrestrial ecoregions and aquatic environments to gain to gain understanding of ecosystem function and implications for human use and management decisions. Extensive outdoor laboratory time and field trips to regional natural and managed communities are included. Topics addressed will include current and historic issues. One day-long field trip required. MTC goal areas: (3) Natural Sciences and (10) People and the Environment. (Prerequisites: College-level reading and writing) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 1120 **4 credits**
General Biology 1
An introduction to the field of biology focusing on unifying biological principles, concepts, and theories. Includes the scientific method; life's chemical basis; cell theory; cellular structure, function, metabolism, and reproduction; genetics and inheritance; evolution, and an introduction to community and ecosystem ecology. Lab includes conducting, interpreting, and communicating results of lab exercises and experiments. MTC goal areas: (3) Natural Sciences (Prerequisites: College level reading) (3 hrs lec/2 hrs lab/0 hrs OJT)

BIOL 1130 **4 credits**
General Biology 2
An introduction to the classification, structure and function, evolution, and ecology of animals, plants, protistans, fungi, and bacteria. Includes hypothesis testing, data interpretation and presentation, and formal introduction to use of primary and secondary scientific literature. May include dissection. MTC goal areas: (3) Natural Sciences. (Prerequisites: BIOL1120 with a grade of C or better or equivalent from other college or university or instructor permission) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 1140 **4 credits**
Human Anatomy and Physiology I
A study of the anatomy and physiology of the human body with emphasis on the relationship between structure and function. Topics studied are tissues, integumentary system, skeletal system, articulations, muscle system, nervous system, and special senses. Includes laboratory dissections. MTC goal area (3) Natural Sciences. (Prerequisites: BIOL 1000, or BIOL 1005, or BIOL 1007, or BIOL 1120, or equivalent, with a grade of C or better) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 1141 **4 credits**
Human Anatomy and Physiology II
Continued study of body structure and function. Incorporates principles of chemistry, biochemistry, and molecular biology. A study of the endocrine system, cardiovascular system, immune system, respiratory system, urinary system, digestive system, and reproductive systems. For students in health related fields. Helps to fulfill general education lab-science requirements. Includes laboratory dissections. Builds on principles studied in BIOL 1140. MTC goal areas: (3) Natural Sciences. (Prerequisites: BIOL1140) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 1170 **3 credits**
Microbiology
This course includes study of classification, structure and function of microbes with an emphasis on microbes that cause disease. Topics include microbial metabolism and growth, control of microbes, microbial genetics, and basic laboratory techniques used to study microorganisms. The course is intended for Liberal Arts students and/or students in health fields. MTC Goal areas: (3) Natural Sciences. (Prerequisites: BIOL 1120 or BIOL 1005 or test out; college level reading and writing) (2 hrs lec/2 hrs lab/0 hrs OJT)

BIOL 2005 **4 credits**
Cell and Molecular Biology
A study of the structure and function of eukaryotic and prokaryotic cells. Topics include; cytoplasmic physiology, molecular trafficking, signaling mechanisms within and between cells, matrix proteins, and cell motility. Lab includes microscopy and use of selected biotechnologies. Hypothesis testing, data analysis, use of primary literature, and scientific writing are incorporated. Intended for biology majors. (Prerequisites: BIOL1120, BIOL1130 and CHEM1210 or equivalents required) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 2170 **3 credits**
Pathophysiology
This class uses a case study approach to the study of human physiology as it is affected by the disease process, the bodys attempts to compensate, and integration of systems to maintain homeostasis. The focus is on cardiopulmonary, gastrointestinal, reproductive, renal, immunological, endocrine, and neuromuscular disruptions. Environmental, cultural, and ethical influences are included where relevant. Critical thinking is emphasized. MTC goal area: (2) Critical Thinking (Prerequisites: Completion of BIOL 1141 or BIOL 1160 with a grade of C or better, or instructor consent; college-level reading and writing) (3 hours lec/ 0 hours lab/ 0 hours OJT)

BIOL 2200 **4 credits**
General Ecology
Exploration of theories and principles that govern relationships between organisms and the environment for individuals, populations, communities, ecosystems, and the biosphere. An emphasis is placed on use of primary literature, experimental design, hypothesis testing and statistical analysis, and scientific writing. Lab includes travel to local sites of ecological significance and interest. Intended for students interested in majoring in biology, environmental science, or natural resources. MTC goal area: 10 (People and the Environment) (Prerequisites: BIOL 1130 or equivalent, or instructor's consent) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 2210 **4 credits**
Genetics
A survey of modern molecular and classical Mendelian principles underlying biological inheritance. Emphasis on understanding and applying genetic concepts at the molecular, cellular, organismal, and population levels. Includes an introduction to statistical analysis of genetic data, and use of traditional and modern laboratory techniques. Includes development of scientific writing skills in combination with use of primary literature. Includes lab. (Prerequisites: BIOL 1120 and CHEM 1210; or

equivalents required, BIOL1130 strongly recommended.) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

BIOL 2400 0.5-3 credits
Topics in Biology
Specific or advanced topics in biology not included in the regular curriculum. MTC goal areas: (3) Natural Sciences. (Prerequisites: Depends on the topic)

BIOL 2999 1-3 credits
Special Topics in Biology
Study of special topics in biology. Special course topics will be announced in the class schedule.

Business

BUS 1404 3 credits
Introduction to Finance
This course provides an overview of the different areas of finance as well as a foundation in the basic tools and techniques of finance. It also covers the impact of markets and institutions on business. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1410 3 credits
Intro to Business and Entrepreneurship
This course is an introductory survey of the major areas of business and its environment. The course is designed to explain the environment and language of business and entrepreneurship. The course will examine the major functional areas of business: accounting, human resource management, marketing, management and organization. The course will explore social, ethical, and global issues that impact businesses and entrepreneurial thinking. (Prerequisites: College-level reading or concurrent enrollment in READ/ENGL 0955) (3 hrs lec/0 hours lab/0 hours OJT)

BUS 1420 3 credits
Effective Management
This course is an introduction to the theory and practice of leadership and management. The emphasis is on understanding the key skills employed by highly successful leaders/managers such as thinking critically, communicating effectively, handling conflict, delegating successfully, building teams, controlling resources, improving quality, managing stress, and leading change. In addition there is a unit dedicated to multiple aspects of managing human resources. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1422 3 credits
Systems Management
This course stresses use and application of established and proven business systems. It is designed to provide an understanding of group dynamics, cross-functional business applications, individual and organizational strategic planning, integrating current relevant technological applications in the organization. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1424 3 credits
Management Ethics
This course stresses ethical issues, the development of a moral frame of reference and the need for an awareness in ethics in management practices and business activities. Includes discussion and activities on ethical responsibilities and relationships between organizational departments, division, management, and the public. Case studies will be analyzed using frameworks for understanding ethical decision making in a business organization. (Prerequisite: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1426 3 credits
Coaching and Facilitating
This course is designed to help you become a more effective leader and manager by enhancing your knowledge, skill and abilities in facilitation, coaching and mentoring, behaviors essential in creating the conditions to enhance the performance of others, resulting in the creation of "winning organizations," organizations that produce leaders at all levels in the organization. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1440 3 credits
Promotion
This course covers the fundamentals of promotion, the types of promotion tools available, and effective use of those tools. The course focuses on current promotion methods, use of media, and some of their creative aspects. Students will prepare an advertising campaign and sales promotion plan. (Prerequisites:

BUS1400 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1442 3 credits
Consumer Behavior
This course will study how and why consumers buy and gain an understanding of the factors influencing a purchase decision. An emphasis on consumer decision processes, social structures, individual adoption and resistance behavior, and marketing efforts based on consumer research. (Prerequisites: BUS1400 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1444 3 credits
International Business Practices
This course is an overview of the international nature of business focusing upon international marketing development strategy. Topics to be covered will range from concepts and theory of international trade to a base of understanding of global monetary systems to marketing and management of global products. (Prerequisite: BUS1400 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1446 3 credits
Making the Sale
This course is designed to provide the student with an understanding of selling techniques and the opportunity to apply these techniques through role-play presentations. (Prerequisite: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1448 3 credits
Leadership Development
This course is designed to provide the student with experience in undertaking an active leadership role, interpersonal business communication, and observing others in leadership activities. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1460 4 credits
Industry Analysis and Business Planning
This course will cover what it takes to own, operate, and manage a small business successfully. The student will learn the personal traits and characteristics necessary to succeed in the fast-paced small business environment. This course will examine the various skills and habits necessary for making a business a success. Various case studies will be examined as to why some businesses fail while others succeed. The student will identify their individual strengths and weakness and will learn what area they need to work on to insure success in their small business venture. The student will be exposed to many types of small businesses and other types of entrepreneurial ventures, and will generate personal preferences for the type of small business they would like to own. (Prerequisite: None) (4 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1462 4 credits
Developing a Financial Plan
This course emphasizes the importance of good record keeping systems, reports and the records necessary for a small business. Financial analysis techniques are explored through hands-on Income Statements and Cash Flow Projections for small businesses. Financial and other technical support resources are identified throughout the course. (Prerequisite: None) (4 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1464 4 credits
Developing a Marketing Plan
Students will be given a complete overview of all aspects of marketing for a small business. Specific topics will include research, determining the target market, developing a marketing strategy, direct mail tactics, public relations tactics, advertising tactics, direct response tactics, and Internet marketing tactics. The student will be exposed to various case studies and will use these to develop a marketing strategy for a specific product or service. (Prerequisites: None) (4 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1466 4 credits
Developing a Management Plan
This course covers management theories and analysis of basic management functions; planning, organizing, staffing, directing, and controlling for establishing and accomplishing business objectives. Case studies will be utilized to develop a management plan. (Prerequisites: None) (4 hrs lec/0 hrs lab/0 hrs OJT)

BUS 1468 1 credits
Business Plan Portfolio
This course is designed as a capstone project to aid the student in completing a business plan utilizing

previous coursework in the Entrepreneurial certificate. (Prerequisite: None) (1 hr lec/0 hrs lab/0 hrs OJT)

BUS 1999 **1-3 credits**
Special Topics in Business
Special course topics will be announced in the class schedule.

BUS 2400 **3 credits**
Principles of Marketing
This course is designed to provide the student with an overview of basic marketing principles and practices, centering on the component of the marketing mix and the contribution each component makes toward the overall marketing effort of large and small businesses and organizations. (Prerequisites: College-level reading or concurrent enrollment in READ/ENGL 0955) (3 hrs lec/0 hrs lab/0 hrs OTJ)

BUS 2402 **3 credits**
Principles of Management
This course is designed to provide the student with an overview of basic and current management principles and practices. The course addresses managerial functions ranging from front-line supervisor positions to upper management levels. Trends in quality orientation, team building, and leadership are also included. (Prerequisites: College-level reading or concurrent enrollment in READ/ENGL 0955) (3 hrs lec/0 hours lab/0 hours OJT)

BUS 2410 **1-3 credits**
Business Internship
This course is intended for students in the second year of the business program. It provides the student with work site experience in which skills and knowledge learned in previous courses may be applied. These internship experiences include safety procedures, quality control systems, personnel procedures, company organization, contractual agreements and other employer expectations. The students can register for varying credits based on their needs and number of hours of expected work. One credit is equivalent to 48 hours of work time. Students can repeat this course for up to 6 credits. (Prerequisites: Instructor consent) (0 hrs lec/0 hours lab/3-9 hours OJT)

Engineering CAD Technology

CADE 1407 **3 credits**
AutoCAD
This course covers engineering Computer Aided Design graphic image production through the use of computer hardware, software, and peripheral devices. (Prerequisites: READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0520; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1440 **3 credits**
Inventor I
This course covers the basic areas of Computer Aided Design using Inventor three-dimensional design software. Students will design and draw model components and sub-assemblies of mechanical and industrial products in animation. (Prerequisites: CADE 1407) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1450 **3 credits**
Mechanical Details
This course covers engineering Computer Aided Design procedures as applied to a variety of manufacturing and industrial situations. The student will additionally learn systems of drawing integration to product definition. (Prerequisites: INMG1410 or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1468 **3 credits**
Solidworks I
This course covers the basic areas of Computer Aided Design using SolidWorks three-dimensional design software. Students will design and draw model components and subassemblies of mechanical and industrial products in animation. SolidWorks has become widely used in the manufacturing industry. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT and MATH0520; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1470 **3 credits**
Solidworks II
This course covers the intermediate areas of Computer Aided Design using SolidWorks three dimensional software. Students will design and draw

model components and subassemblies of mechanical and industrial products in animation. (Prerequisites: CADE1468) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1474 3 credits
Reverse Engineering
This course will focus on reverse engineering of an existing product utilizing current high tech tools, methods and CAD software for thorough analysis and design. New or revised product ideas will also be taken through the process of design, analysis, and practical application as well. (Prerequisites: CADE 1468, MTCC 1432, MTCC 2504, college-level reading and writing, or concurrent enrollment or instructors consent) (2 hr lec/2 hr lab/0 hr OJT)

CADE 1480 3 credits
Industrial/Mechanical CAD Applications I
This course covers basic applications of Computer Aided Design within the Industrial/Mechanical trades. Various areas will be explored including: jigs and fixtures, industrial piping, electronics, and structural steel. (Prerequisites: CADE 1450 or concurrent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1482 3 credits
Industrial/Mechanical CAD Applications II
This course covers intermediate applications of Computer Aided Design within the Industrial/Mechanical trades. It continues with advanced content from CADE1480 (Industrial/Mechanical CAD Applications I) and explores new trades. Areas include: industrial piping, sheet metal development, structural steel, and conveying systems. (Prerequisites: CADE1480) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 1490 3 credits
Revit Industrial/Structural (BIM) Applications
This course covers the basics of Autodesk Revit Structure software applied to industrial facilities. The student will sketch various models and then edit the features and apply appropriate details, dimensions and annotations. The creation of final drawings with necessary views will also be learned. (Prerequisites: CADE1407 or concurrent or instructor's consent). (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2400 3 credits
AutoCAD II
This course covers intermediate engineering Computer Aided Design graphic image production through the use of computer hardware, software, and peripheral devices. (Prerequisites: CADE1407) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2407 1-3 credits
Engineering Technology Internship
This course provides the student with work site experience in which skills and knowledge learned in previous courses may be applied. These internship experiences include safety procedures, quality control systems, personnel procedures, company organization, contractual agreements, and other employer expectations. Technical skills and knowledge can include surveying, inspection, testing, computer design, and architectural applications. Students can register for varying credits based on their needs and number of hours of expected work. One credit is equivalent to 48 hours of work time. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/3-9 hrs OJT)

CADE 2420 3 credits
Electrical/Electronic Drawings
This course covers basic introductions to wiring and layout diagrams used by workers who install and repair electrical/electronic equipment and wiring in manufactured products, power plants, and electrical distribution systems. (Prerequisites: CADE1407 or concurrent enrollment or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

CADE 2430 3 credits
Industrial Piping
This course explores piping, instrumentation, and fixtures in 2D schematics. Students will utilize industry standards and CAD software to develop the drawings used in the identification and fabrication of industrial piping systems. (Prerequisites: CADE2400 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

CADE 2434 3 credits
3D Process Piping Design
The course will cover the basics of Plant 3D (and/or similar CAD software) as applied in process piping systems. The students will draw and identify process

piping systems, equipment and instruments in a 3D environment coordinating the layout with architectural, structural and mechanical features and systems. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, OR completion of ENGL/READ 0950 or 0955, or equivalent course or higher. ENGL/READ 0955 may be taken concurrently with a score of 56-77 on the reading comprehension portion of the CPT; and a score of 33 or higher on the Elementary Algebra Skills portion of the CPT, or completion or concurrent enrollment of MATH 0520, or equivalent transfer course or higher. (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2452 3 credits
PTC Creo Fundamentals
This course covers the basic areas of Computer Aided Design using PTC Creo three-dimensional design software. Students will design and draw model components and subassemblies of mechanical and industrial products in animation. (Prerequisites: a score of 78 or higher on the reading comprehension portion of the CPT, OR completion of ENGL/READ 0950 or 0955, or equivalent course or higher. ENGL/READ 0955 may be taken concurrently with a score of 56-77 on the reading comprehension portion of the CPT; and a score of 33 or higher on the Elementary Algebra Skills portion of the CPT, or completion or concurrent enrollment of MATH 0520, or equivalent transfer course or higher. (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2472 3 credits
AutoCAD Design Project
This course covers project completion incorporating total learning experiences into a workable, economical design. Engineering Computer Aided Design procedures will be utilized within the AutoCAD three dimensional software platform. (Prerequisites: CADE2400 or concurrent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2474 3 credits
Inventor Design Project
This course covers project completion incorporating total learning experiences into a workable, economical design. Engineering Computer Aided Design procedures will be utilized within the Inventor three dimensional software platform. (Prerequisites: CADE1442 or concurrent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2476 3 credits
SolidWorks Design Project
This course covers project completion incorporating total learning experiences into a workable, economical design. Engineering Computer Aided Design procedures will be utilized within the SolidWorks three dimensional software platform. (Prerequisites: CADE1470 or concurrent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2492 3 credits
Revit Industrial/Mechanical (BIM) Applications
This course covers the basics of Autodesk Revit MEP systems and similar three dimensional software. The student will sketch various Mechanical, Electrical and Plumbing (MEP) models and then edit the features and apply appropriate details, dimensions and annotations. The creation of final drawings with necessary views will also be learned. (Prerequisites: CADE1490 or concurrent or instructor's consent). (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2500 3 credits
SolidWorks Associate Exam Preparation
This course prepares students for the Certified SolidWorks Associate (CSWA) Examination. Students will design, draw, and analyze advanced three-dimensional part and assembly models. (Prerequisite: CADE1470 or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2502 3 credits
SolidWorks Weldments Exam Preparation
This course prepares students for the Certified SolidWorks Professional Weldments (CSWP) Examination. Students will design, draw, and analyze advanced three-dimensional part and assembly models utilizing SolidWorks tools for weldments. (Prerequisites: CADE1470 or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CADE 2999 1-3 credits
Special Topics in Computer Aided Design Engineering
Study of special topics in computer aided design engineering. Special course topics will be announced in the class schedule.

Carpentry

CARP 1402 **1 credits**
OSHA Training
This course covers the basic requirements set by OSHA to meet the 10 hour OSHA outreach training and provides students with basic hazard identification and abatement techniques. This course covers scaffolding, and ladders used in the construction industry. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1404 **1 credits**
Tool and Machine Safety
This course covers the safe operation of hand, portable, and stationary tools used in the industry. The primary focus of this class will be learning the safe use of shop power equipment. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1406 **2 credits**
Blueprint Reading
This course covers the basics of interpreting and reading architectural drawings for the construction industry both in residential and commercial construction. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (1 hr lec/2 hrs lab/0 hrs OJT)

CARP 1408 **1 credits**
Foundations and Concrete
This course covers forming procedures for concrete structures. Site built and commercial forming systems will be discussed. Concrete design and usage will covered. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1410 **2 credits**
Framing Principles I
This course is an introduction to wood framing for residential structures including wood foundations, floors, walls, stairs, and roofs. This course will also cover the various materials and fasteners used in the construction industry. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (2 hrs lec/0 hrs lab/0 hrs OJT)

CARP 1412 **1 credits**
Carpentry Framing Lab I
This course is used in conjunction with CARP1410, Framing Principles I. This class will be a skill building lab designed to introduce fundamental framing. Most of class time will be spent performing hands on lab situations meant to build a skill and knowledge in fundamental framing. (Prerequisites: CARP1404, CARP1406 and BLDG1430, or concurrent enrollment; and 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (0 hrs lec/2 hrs lab/0 hrs OJT)

CARP 1413 **4 credits**
Carpentry Framing Lab II
This course is used in conjunction with CARP1410, Framing Principles I. This class will be a skill building lab designed to teach intermediate framing. Most of class time will be spent performing hands on lab situations meant to expand skills and knowledge in framing. (Prerequisites: CARP1404, CARP1406, CARP1410, CARP1412 and BLDG1430, or concurrent enrollment; and 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (0 hrs lec/8 hrs lab/0 hrs OJT)

CARP 1416 **1 credits**
Roof Covering
This course covers the basics in the installation of residential roof covering. The students will learn the basic installation of materials used to make a roof waterproof. (Prerequisites: CARP1404 and CARP1406, or concurrent enrollment; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (0 hrs lec/2 hrs lab/0 hrs OJT)

CARP 1418 **1 credits**
Cabinetmaking I
This course covers the design, construction, and preparation for finishing of wooden cabinets. The

student will become familiar with fundamental cabinetmaking techniques. The student will design and develop preliminary casework using appropriate construction procedures. (Prerequisites: CARP1404 and CARP1406, or concurrent enrollment; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (0 hrs lec/2 hrs lab/0 hrs OJT)

CARP 1420 **1 credits**
Carpentry Leveling and Layout Methods
This course covers the proper use of the leveling and layout instruments as it relates to the carpentry industry. (Prerequisites: 33 or higher on the Elementary Algebra portion of the CPT or completion of MATH0460, or its equivalent transfer course or higher, and 78 or higher on the Reading comprehension portion of the CPT) (0 hr lec/2 hrs lab/0 hrs OJT)

CARP 1422 **1 credits**
Metal Framing
This course covers framing with metal for Residential and Commercial construction. (Prerequisites: CARP1404, CARP1410, CARP1412 and CARP 1413) (0 hrs lec/2 hrs lab/0 hrs OJT)

CARP 1502 **1 credits**
Interior Finish I
This course covers the basics in assembly of interior finish materials such as doors and windows in residential construction. This course also covers the safe installation of insulation and drywall products. (Prerequisites: CARP1404 and CARP1406; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1504 **1 credits**
Carpentry Interior Lab I
This course is used in conjunction with CARP1502, Interior Finish I. Class time will include hands on lab situations meant to build fundamental skills and knowledge in interior carpentry work. (Prerequisites: CARP1404, CARP1406 and CARP1502, or concurrent enrollment; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (0 hr lec/2 hrs lab/0 hrs OJT)

CARP 1505 **3 credits**
Carpentry Interior Lab II
This course is used in conjunction with CARP1502, Interior Finish I. This class will be a intermediate skill building lab related to interior finish. Most of class time will be spent performing hands on lab situations to further develop skills and knowledge in interior carpentry work. (Prerequisites: CARP1404, CARP1406, CARP1502 and CARP1504, or concurrent enrollment) (0 hr lec/6 hrs lab/0 hrs OJT)

CARP 1508 **1 credits**
Exterior Finish I
This course covers the basics in assembly of exterior finish materials such as soffit, fascia,and siding in residential construction. (Prerequisites: CARP1404 and CARP1406; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1510 **1 credits**
Carpentry Exterior Lab I
This course is used in conjunction with CARP1508, Exterior Finish I. This class is a fundamental skill building lab designed for exterior carpentry finish work. Most of class time will be spent performing hands on lab situations. (Prerequisites: CARP1404, CARP1406 and CARP1508, or concurrent enrollment) (0 hr lec/2 hrs lab/0 hrs OJT)

CARP 1511 **3 credits**
Carpentry Exterior Lab II
This course is used in conjunction with CARP1508, Exterior Finish I and CARP1510, Carpentry Exterior Lab I. This class develops an intermediate level of skill for exterior finish work. Most of class time will be spent performing hands on lab situations. (Prerequisites: CARP1404, CARP1406, CARP1508 and CARP1510, or concurrent enrollment) (0 hr lec/6 hrs lab/0 hrs OJT)

CARP 1514 **1 credits**
Deck Construction
This course covers design, framing, and materials for building decks on a residence. (Prerequisites: CARP1404, CARP1406, CARP1410, CARP1412, CARP1413 and BLDG1430) (1 hr lec/0 hrs lab/0 hrs OJT)

CARP 1518 2 credits
Cabinetmaking II
This course covers the construction and finishing of wooden cabinets. The student will build skills in custom cabinetmaking techniques. The student will be completing the cabinet started in Cabinetmaking I. (Prerequisites: CARP1404, CARP1406 and CARP1418, or concurrent enrollment; 33 or higher on the Elementary Algebra portion of the CPT and 78 or higher on the Reading comprehension portion of the CPT.) (1 hr lec/2 hrs lab/0 hrs OJT)

CARP 1520 2 credits
Estimating for Carpentry
This class is designed for students pursuing a career in carpentry. This course will cover how to make fast accurate estimates of the materials needed in the Foundation, Framing, Interior and Exterior Finish phases of construction. The student will be introduced to the methods used to calculate material used by the carpenter or contractor. (Prerequisites: CARP1406) (2 hrs lec/0 hrs lab/0 hrs OJT)

CARP 2402 2 credits
Reading Project Plans
This class covers advanced skill building in reading a blueprint for a project to be constructed. Most of class time is spent evaluating the project plans in order to perform the construction of the project to meet the requirements of the prints provided. (Prerequisites: Completion of first year program courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

CARP 2404 2 credits
Lead Carpenter Floor Framer
This class is an advanced skill building lab designed for the work a lead carpenter performs in floor framing. Most of class time is spent performing hands-on lab situations meant to build a skill and knowledge in floor framing carpentry work. (Prerequisites: Completion of first year program courses) (1 hrs lec/2 hrs lab/0 hrs OJT)

CARP 2406 5 credits
Lead Carpenter Wall Framer
This class is an advanced skill building lab designed for the work a lead carpenter performs in wall framing. Most of class time is spent performing hands-on lab situations meant to build a skill and knowledge in leading wall framing carpentry procedure work. (Prerequisites: Completion of first year program courses) (0 hrs lec/10 hrs lab/0 hrs OJT)

CARP 2408 3 credits
Lead Carpenter Roof Framer
This class is an advanced skill building lab designed for the work a lead carpenter performs in roof framing. Most of class time is spent performing hands-on lab situations meant to build a skill and knowledge in leading roof framing carpentry procedure work. (Prerequisites: completion of first year program courses) (0 hrs lec/6 hrs lab/0 hrs OJT)

CARP 2410 5 credits
Lead Carpenter Stair Framer
This class is an advanced skill building lab designed for the work a lead carpenter performs in stair framing. Most of class time is spent performing hands-on lab situations meant to build a skill and knowledge in leading stair framing carpentry procedure work. (Prerequisites: Completion of first year program courses) (1 hr lec/5 hrs lab/0 hrs OJT)

CARP 2412 2 credits
Lead Roofer
This class is an advanced skill building lab designed for the work a lead carpenter performs in roofing procedures. Most of class time is spent performing hands-on lab situations meant to build a skill and knowledge in the leading of a roofing task. (Prerequisites: Completion of first year program courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

CARP 2414 4 credits
Lead Carpenter Interior Finisher
This class is an advanced skill building lab designed for the work a lead carpenter would perform in interior building finishing. Most of class time will be spent in hands-on lab situations meant to build a skill and knowledge in leading residential carpentry procedure work. (Prerequisites: CARP1402, CARP1404, CARP1406, CARP1508, CARP1510 and CARP1511) (0 hrs lec/8 hrs lab/0 hrs OJT)

CARP 2416 4 credits
Lead Carpenter Exterior Finisher
This class is an advanced skill building lab designed for the work a lead carpenter would perform in exterior

building finishing. Most of class time will be spent in hands-on lab situations meant to build a skill and knowledge in leading residential carpentry procedure work. (Prerequisites: CARP1402, CARP1404, CARP1406, CARP1508, CARP1510 and CARP1511). (0 hrs lec/8 hrs lab/0 hrs OJT)

CARP 2510 3-5 credits
Carpenter Internship
This internship is intended for carpentry students who have completed their first year with at least a 3.0 GPA. This course provides the student with work site experience in which technical skills and knowledge learned in previous courses may be applied. In addition, students will learn about company organization, personnel procedures, and employer expectations which include productivity, dependability, and time management. The intern will be working from 144 ¿ 240 hours depending on the credit value. The student is responsible for setting up their own internship site prior to the beginning of the internship. (Prerequisites: Successful completion of first year of the carpentry program with a minimum of 3.0 GPA) (0 hrs hrs/0 hrs lab/9-15 hrs OJT)

Civil Engineering Technology

CETT 1400 3 credits
Introduction to Civil Engineering Technology
This course covers an introduction to Civil Engineering Technology focusing on areas of employment, life long learning, engineering terminology, and what it takes to succeed as a Civil Engineering Technician. Specific technical topics introduced include highway terminology, contour drawings, legal property descriptions, GIS, Excel, and a brief overview of surveying and computer design. (Prerequisites: (ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

CETT 1402 3 credits
Introduction to Surveying
This course covers the basic skills needed for surveying. The course stresses the proper care and handling of equipment, fundamental concepts of leveling, horizontal and vertical distances, and format, neatness, and accuracy of field notes. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or concurrent enrollment) (1 hr lec/4 hrs lab/0 hrs OJT)

CETT 1410 3 credits
Introduction to Materials Testing
This course covers an introduction to construction materials and material testing including concrete field tests, gradations, and aggregates. Students will be prepared to sit for the MnDOT certification upon completion of the course. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1415 3 credits
Introduction to Field Sampling
This course covers the basic introductory skills needed for environmental engineering technicians to perform field sampling of soil, water and air. The course will stress the proper procedures to collect, save, and document a sample along with record keeping and the need for following protocols. (Prerequisites: College-level reading, writing and math as defined by TABE testing) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1420 3 credits
Route Survey
This course covers defining, calculating, laying out, and staking alignments for roadways. In addition, students will gain experience using data collectors with total station instruments. (Prerequisites: CETT 1402) (1 hrs lec/4 hrs lab/0 hrs OJT)

CETT 1430 4 credits
Civil CAD Applications
This course covers advanced AutoCad software commands for use with civil survey data. In addition, students will prepare Civil Engineering drawings using these commands. (Prerequisites: CETT1450, College-level reading, writing, MATH 0470 or concurrent enrollment)(2 hr lec/4 hrs lab/0 hrs OJT)

CETT 1440 2 credits
Engineering Problem Solving
This course is designed to give students the ability to take previously learned mathematical concepts and

apply them to engineering applications. In addition, the course will cover the use of an engineering calculator and help students learn critical thinking and problem solving techniques. (Prerequisites: College level reading, writing and MATH0470 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

CETT 1450 4 credits
Engineering Graphics
Introduction to the AutoCAD software package. Topics include setting up a drawing, creating and editing geometric entities, hatching, layering, adding text, dimensioning, incorporating blocks and attributes, merging drawings, laying out views, and plotting. (Prerequisites: College level reading, writing and MATH0470 or concurrent enrollment) (2 hr lec/4 hrs lab/0 hrs OJT)

CETT 1600 2 credits
Introduction to Civil/Environmental Engineering Technology
This course covers an introduction to Civil and Environmental Engineering Technology, specifically technology and skills common to both fields. Specific technical topics introduced include contour drawings, legal property descriptions, CAD, GIS, Excel, and a brief overview of computer design. (Prerequisites: ENGL0460, MATH0460 and READ0465 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

CETT 1602 1 credits
Introduction to Environmental Engineering Technology
This course covers an introduction to Environmental Engineering Technology focusing on areas of employment, environmental terminology, and what it takes to succeed as an Environmental Engineering Technician. (Prerequisites: ENGL0460, MATH0460 and READ0465 or concurrent enrollment) (1 hr lec/0 hrs lab/0 hrs OJT)

CETT 1610 3 credits
Properties of Soil
This class focuses on the physical, biological, and chemical makeup of soil, different soil classifications and the properties of soil which can affect development patterns and pollution effects. Also studied is the Earth's hydrological cycle on global and local levels, soil conservation, and the effects of environmental and economic change on the local soils. (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1615 3 credits
Technical Communications
This course covers writing reports in a technical style suitable for the field of environmental technology. The course will focus on writing for technical and general audiences, specific reports for soil boring and field samples, along with a research report with correct documentation. (Prerequisites: ENGL1106) (3 hrs lec/0 hrs lab/0 hrs OJT)

CETT 1620 3 credits
Erosion Control
The course focuses on Storm Water Pollution Prevention Plans (SWPPP) involving design elements for most construction sites under the National Pollutant Discharge Elimination System (NPDES) permit system. The course emphasizes selection and design of appropriate temporary and permanent Best Management Practices (BMPs). (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1622 3 credits
OSHA Regulations/Hazardous Waste
This course covers OSHA regulations and the use of Material Safety Data Sheets (MSDS). The materials expected to be found on a contaminated site will be stressed. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

CETT 1624 3 credits
Wetland Mapping
This class focuses on identifying wetlands according to the soil types and plants present along with mapping wetlands using surveying equipment and placing wetlands onto CAD and GIS maps. In addition, wetland types and categories will be introduced. (Prerequisites: CETT1402) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1626 3 credits
Introduction to Project Management and Contracts
This class focuses on the skills needed to plan, organize, motivate, and apply resources to accomplish a specific project. Timelines and materials required

will be the primary focus. In addition, an introduction to contracts and contract law will be covered. (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1628 3 credits
Environmental Restoration
This class focuses on restoring the environment to a more natural state after it has been damaged through erosion, development, land-use changes, and climate change. (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1630 3 credits
Environmental Site Assessment
This course covers the analysis required to prepare an environmental site assessment report. Students will learn to identify potential or existing environmental contaminants and possible liabilities. Both the land and improvements on the land will be covered. (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 1650 1–5 credits
Certification Preparation for Technicians
This class focuses on possible certifications in: EPA site assessments, pipelines (Veriforce, NCCER, and ISnetworld), wetland delineation, NACE CP1, CIP level 1 certification, and other certifications pertinent to their planned employment. Class can be taken multiple times for different certification preparations. (Prerequisites: none) (1-5 hrs lec/0 hrs lab/0 hrs OJT)

CETT 1652 3 credits
Pipeline Corrosion Monitoring
This class focuses on understanding and locating corrosion in buried pipelines. The effects of a variety of fluids on pipes will be covered. In addition, basic chemistry and electrical circuits necessary to understand and monitor corrosion will be covered. A lab field day to see the operation of monitoring equipment is required. (Prerequisites: College-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 2400 3 credits
Intermediate Survey
This course covers the application of surveying principles to practical survey problems. The student will demonstrate the ability to apply data collection, traverse, and staking principles to practical problems. In addition, GPS and laser level surveys will be introduced. (Prerequisites: CETT1402; college-level reading, writing, and math) (1 hr lec/4 hrs lab/0 hrs OJT)

CETT 2407 1-7 credits
Engineering Technology Internship
This course provides the student with work site experience in which skills and knowledge learned in previous courses may be applied. These internship experiences include safety procedures, quality control systems, personnel procedures, company organization, contractual agreements and other employer expectations. Technical skills and knowledge can include surveying, inspection, testing, computer design, and architectural applications. The students can register for varying credits based on their planners and number of hours of expected work. One credit is equivalent to 45 hours of work time. (Prerequisites: Completion of first year CET program) (0 hrs lec/0 hrs lab/3-9 hrs OJT)

CETT 2410 4 credits
Storm Water Management
This course covers the fundamentals of hydraulics and hydrology as they relate to the design of roadways, subdivisions, and storm/sanitary sewer design. It covers both the theory of hydraulics along with practical applications in storm sewer, culvert, and detention pond design. (Prerequisites: College level reading, writing and math) (3 hrs lec/2 hrs lab/0 hrs OJT)

CETT 2420 3 credits
Land Survey Systems
This course covers an introduction to the public land system, legal descriptions of properties, basic mapping terminology, and how legal land descriptions affect property transfer. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 2430 3 credits
Site Development
This course covers the various aspects of a property subdivision. Actual local platting regulations are used as a guide. The project is CAD drawn using industry

standard software. (Prerequisites: CETT1430) (1 hr lec/4 hrs lab/0 hrs OJT)

CETT 2440 **3 credits**
Civil Estimating
This course covers the calculation of quantities from highway, bridge, building, and site plans. (Prerequisites: CETT1450; college-level reading, writing and MATH0470 or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CETT 2450 **3 credits**
Highway Design
This course covers the various aspects of a highway design. The use of horizontal and vertical curves, earthwork computation and balancing, and storm water drainage will be emphasized. The final project will be drawn using industry standards and AutoCad. (Prerequisites: CETT1420 and CETT1450) (1 hr lec/4 hrs lab/0 hrs OJT)

CETT 2460 **3 credits**
Advanced Survey
This course covers advance topics in surveying and is designed to give students an understanding of how to apply survey operations learned in previous courses to property surveys. In addition, students will gain further experience in control surveys, state plane coordinates, and GPS surveying. (Prerequisites: CETT 2400 or instructor consent. College level reading, writing and math.) (1 hr lec/4 hrs lab/0 hrs OJT)

CETT 2999 **1-3 credits**
Special Topics in Civil Engineering Technology
Special topics in civil engineering technology. Special course topics will be announced in the class schedule.

Chemistry

CHEM 1110 **3 credits**
Aspects of Chemistry I
An introduction to the study of chemistry and its applications requiring a minimum of mathematics. The topics of this course include an introduction to stoichiometry, nomenclature, bonding, gas laws, and acids and bases. This course is intended primarily for those with no or a limited or outdated background in chemistry. MTC goal area: (3) Natural Sciences. (Prerequisites: MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT; a CHEM1110-CHEM1210 sequence may not be taken to meet the laboratory science requirement) (2 hrs lec/2 hrs lab/0 hrs OJT)

CHEM 1111 **2 credits**
Aspects of Chemistry II
This course is a continuation of the CHEM1110-CHEM1111 sequence. Topics covered in this course include solution chemistry, oxidation/reduction, nuclear chemistry, and topics in organic chemistry. MTC goal area: (3) Natural Sciences. (Prerequisites: CHEM1110 or instructor's consent) (1 hr lec/2 hrs lab/0 hrs OJT)

CHEM 1210 **5 credits**
General Chemistry I
CHEM 1210 is the first semester of a two semester course sequence. It will provide preparation for students considering pre-professional and applied science careers as well as satisfying requirements for transfer curriculum. The basic fundamentals of chemistry will be covered, including modern atomic theory, the periodic table, stoichemetry, nomenclature, solutions, bonding, solution chemistry, the energy of reactions, properties of gases, and properties of solids and liquids. MTC goal area: (3) Natural Sciences. (Prerequisites: High school chemistry or CHEM1110 and high school algebra; or MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT) (4 hrs lec/2 hrs lab/0 hrs OJT)

CHEM 1211 **5 credits**
General Chemistry II
CHEM 1211 is the second semester of a two-semester course sequence. It prepares students considering pre-professional and applied science careers as well as satisfying transfer curriculum requirements. Topics include the basic fundamentals of chemistry including equilibrium, aqueous solutions, (acids, bases, and salts), solubility, electrochemistry, kinetics, chemistry of metals, and nuclear chemistry. MTC goal area: (3) Natural Sciences. (Prerequisites: CHEM1210 or instructor's consent) (4 hrs lec/2 hrs lab/0 hrs OJT)

CHEM 2110 **5 credits**
Organic Chemistry I
This is the first of a two-semester sequence of courses in organic chemistry. Topics covered include the study of structures, properties, syntheses and reactions of the major classes of organic compounds. Basic principles of chemical bonding, kinetics, mechanisms and molecular spectroscopy will also be addressed. (Prerequisites: CHEM1211) (3.5 hrs lec/3 hrs lab/0 hrs OJT)

CHEM 2111 **5 credits**
Organic Chemistry II
This is the second of a two-semester sequence of courses in organic chemistry. Topics include the study of structures, properties, syntheses, and reactions of the major classes of organic compounds. Basic principles of chemical bonding, kinetics, mechanisms and molecular spectroscopy will also be addressed. (Prerequisites: CHEM2110) (3.5 hrs lec/3 hrs lab/0 hrs OJT)

CHEM 2999 **1-3 credits**
Special Topics in Chemistry
Special topics in chemistry. Special course topics will be announced in the class schedule.

Computer Information Systems

CIS 1400 **2 credits**
Introduction to Computers
This course is designed for non-CIS majors who are novice computer users. It covers basic computer terminology and an introduction to the Windows operation system. Students will also have the opportunity, through hands-on projects, to work with some of the most popular desktop tools including word processing, spreadsheets, database applications, presentation software, and simple Web page design. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

CIS 1402 **3 credits**
Foundations of CIS
An introduction to foundational concepts in Computer Information Systems (CIS), such as virtual computing, number systems, intermediate office productivity software, computer networking, elementary programming, and cybersecurity. Students will be expected to demonstrate communication skills in writing and a presentation to the class. This course is for students intending to pursue a degree in CIS and for students wishing to learn more about Information Technology. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT, and MATH0460) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1406 **3 credits**
HTML & CSS
Learn how to create web sites using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Hands-on exercises will guide students through the design and construction of complete HTML web sites styled with CSS while utilizing images, animations, other multimedia, tables, and forms. (Prerequisite: College-level reading) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1408 **4 credits**
Scripting and Frameworks
This course will help students understand the fundamentals of developing both interactive and responsive websites. Programming concepts in relation to the web will be taught using JavaScript language and jQuery library. A CSS framework will also be leveraged to quickly develop site templates. This course has a service learning component. (Prerequisites: CIS1406) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1410 **3 credits**
Web Site Design
This course provides the student with a basic understanding of web site design principles and the ability to create interactive, multimedia websites using current software. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or instructors consent) (2 hrs lec/2 hrs lab/0 hrs OJT

CIS 1412 **3 credits**
Web Graphics I
This course introduces students in using a graphics program, scanner, and other digital devices to create and edit graphic images for the Web. Topics also include optimization, layers, color transformation, clone, masks, and special effects of graphics and images. (Prerequisites: CIS1402; ENGL0950 or

ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1415 **4 credits**

Introduction to Programming

This course introduces the student to the essential concepts and skills of computer programming. Students learn about data representation, algorithms, program logic, and structured and object oriented programming. Students develop their skills through application of these ideas using flowcharts, pseudocode, design, coding and testing. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, may be taken concurrently, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460, may be taken concurrently) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1420 **4 credits**

Advanced Web Site Design

This course is continuation of CIS1410 Web Site Design course where students will learn about Search Engine Optimization (SEO), E-commerce and advanced concepts in Content Management Systems (CMS). Students will develop projects using current web design tools and applications. (Prerequisites: CIS1410) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1421 **3 credits**

Strategies for E-Commerce Marketing

This course requires students to investigate new strategies in marketing and customer relations in the context of electronic commerce. The majority of the course focus is on the integration of the electronic marketing and selling with traditional advertising media. An understanding of customer management systems that electronic (WEB) based business are implementing will be developed by the learners.

CIS 1430 **3 credits**

Data Analytics Fundamentsl

This is an introductory data analytics course using Excel, Access, and Tableau or current data analytics software. Students will create Access databases, tables, forms, and queries to gather data; prepare and analyze the data using Excel spreadsheet formulas, graphs, and charts; and use current data analytics/visualization tools. (Prerequisites: CIS 1402 or ADSC 1430 or instructor permission) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1500 **3 credits**

Computer User Support

This course introduces the student to concepts and methods in computer user support, effective customer service, problem solving and case management, and the use of help desk management systems and software. (Prerequisites: Completion of CIS1521 and CIS1522 or instructor consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1510 **2 credits**

Microcomputer Database

This course introduces the student to microcomputer database software used to manage data. It covers essential windows skills; planning, creating, testing, and changing database files; adding, changing, importing, and deleting records from a database; querying database tables; designing, creating, and using forms and filters. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460; or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

CIS 1521 **3 credits**

A+ Operating System Technologies

This course prepares the student to describe the technologies and apply the skills identified in the CompTIA A+ Operating Systems Technologies Examination Objectives. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 250 or higher on the NGA; and MATH 0950/0955, or concurrent) (2 hr lec/2 hrs lab/0 hrs OJT)

CIS 1522 **3 credits**

A+ Core Hardware

This course prepares the student to describe the technologies and apply the skills identified in the CompTIA A+ Core Hardware Examination Objectives. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 250 or higher on the NGA; and MATH 0950/0955, or concurrent) (2 hr lec/2 hrs lab/0 hrs OJT)

CIS 1532 **3 credits**
Data Driven Websites
ASP.Net and SQLServer will be used to develop data driven websites. Students will learn to ASP.Net basics, Web Application development basics, database design and development techniques using Structured Query Language (SQL). (Prerequisites: CIS1406, CIS1415 and CIS1510) (2 hr lec/2 hrs lab/0 hrs OJT)

CIS 1610 **4 credits**
Server-side Development
This course teaches students to make dynamic web pages and applications using server-side scripting languages. Students will learn to write SQL queries to pull dynamic data from a database. They will connect web pages to databases using server-side scripting as well as some client side pulls. Students will learn to process forms sent from web pages. Students will also learn about plugin creation for popular CMS systems. (Prerequisites: CIS1406 and CIS1415 or instructor consent) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1745 **3 credits**
UNIX System Administration
An introduction to the increasingly popular UNIX operating system using free Linux. Students will understand the architecture of UNIX (file system, processes, and device management), learn how to use common UNIX application and utility programs, program in scripting languages, and learn basic UNIX systems and network administration methods and techniques. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1810 **3 credits**
Security Fundamentals
This course introduces students to fundamental concepts and methods in data and network security and prepares them to take industry Security+ certification examination. (Prerequisites: CIS1946 or instructor's consent) (2 hrs lab/2 hrs lec/0 hrs OJT)

CIS 1946 **3 credits**
CISCO Networking I
This course is the first in a series of four courses that deal with the CISCO core content. This course prepares the student to take the CCNA (CISCO Certified Networking Associate) exam. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1947 **3 credits**
CISCO Networking II
This course is the second in a series of four courses that deal with the CISCO core content. This course prepares the student to take the CCNA or CISCO Certified Networking Associate exam. (Prerequisites: CIS1946) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1950 **3 credits**
Windows Client Administration
This course is intended to help students learn how to plan, implement, manage, and support the Microsoft Windows client operating system. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1952 **3 credits**
Windows Server Administration
This course is designed to help students learn how to plan, implement, manage, and support the Microsoft Windows Server operating system. (Prerequisites: CIS1950 or instructor consent; ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460; or concurrent enrollment) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 1999 **1-3 credits**
Special Topics Computer Information Systems
Study of special topics in computer science. Special course topics will be announced in the class schedule.

CIS 2560 **3 credits**
Web Server Administration
The student will receive instruction on basic server setup and the issues involved in web server administration. Elementary programming, database management, and web integration topics will be applied. Concepts will be applied to UNIX and

Windows based web servers. (Prerequisites: CIS1402) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2620 4 credits
Game Development and Object-Oriented Programming
This course will teach introductory concepts of Object-Oriented programming language and game development. Game theory with respect to programming layouts will also be taught during this course. Topics covered will include classes, objects, I/O, decisions and loop structures, the game loop, saving and loading data from a file, and more. (Prerequisites: CIS 1415) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2621 4 credits
Advanced Game Development and Object-Oriented Programming
This course builds on the concepts taught in the Game Development and Object-Oriented Programming course. Topics covered in this course include advanced game development and programming concepts, as well as an introduction to Virtual and Augmented Reality programming. (Prerequisites: CIS 1415 and CIS 2620) (3 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2635 3 credits
Java Programming
This course teaches the use of Java programming language to solve problems and develop applications. Topics covered will include classes, objects, I/O and built-in functions, loop structures, decisions structures, and array manipulation. (Prerequisites: CIS 1415 or instructor consent) (2 hrs lec/2 hrs lab/ 0 hrs OJT)

CIS 2640 3 credits
Mobile App Development
This course is an introduction to developing mobile applications. It will begin with an overview of mobile app development environments and proceed to focus on cross-platform mobile application development. It is an introductory course, but students will be expected to have web programming experience. (Prerequisites: CIS1408 and CIS1610 or instructor consent) (2 hr lec/2 hrs lab/0 hrs OJT))

CIS 2811 3 credits
Intrusion Detection and Prevention Systems Fundamentals
In this course, students gain a thorough grounding in the design, implementation, and administration of IDSes/IPSes, as well as practical, hands-on experience working with these systems. In addition, students analyze various attack signatures and the network traffic these IDS/IPS systems collect. Intrusion Detection/Prevention Systems are critical components of well-designed network architectures. These systems act as a line of defense, helping protect company assets from attacks. (Prerequisites: CIS1810 or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2812 3 credits
Network Security
This course prepares students for entry-level security specialist careers by developing an in-depth understanding of network security principles and the tools and configurations needed to secure a network. (Prerequisite: CIS1810 or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2813 3 credits
Forensics and Incident Response
This course explores security incidents and intrusions, including identifying and categorizing incidents, responding to incidents, log analysis, network traffic analysis, various tools, and creating an incident response team. (Prerequisite: CIS1810 or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2814 3 credits
Ethical Hacking and Systems Defense
The course combines an ethical hacking methodology with the hands-on application of security tools to better help students secure their systems. Students are introduced to common countermeasures that effectively reduce and/or mitigate attacks. (Prerequisite: CIS1810 or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2815 3 credits
Cloud Computing
In this course, students will learn to configure, secure, manage, maintain, and troubleshoot cloud-based information systems. (Prerequisite: CIS 1952 or

instructor consent; and ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent; and MATH 0950/0955, or concurrent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2820 3 credits
Network Administration:Advanced Windows Server
This course covers advanced configuration of services necessary to deploy, manage and maintain a Windows Server infrastructure, such as advanced networking services, Active Directory Domain Services (AD DS), Active Directory Rights Management Services (AD RMS), Active Directory Federation Services (AD FS), Network Load Balancing, Failover Clustering, business continuity and disaster recovery services as well as access and information provisioning and protection technologies such as Dynamic Access Control (DAC), and Web Application Proxy integration with ADFS and Workplace Join. (Prerequisites: CIS2952) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2845 3 credits
Network Administration: UNIX Networking and Security
This, the second of two UNIX courses, introduces the student to advanced UNIX server administration skills: system installation and configuration; user access and process management; Web and FTP server administration; network printing and file server administration; and Gateway services and security. (Prerequisites: CIS1745) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2948 3 credits
CISCO Networking III
This course is the third in a series of four courses that deal with the CISCO core content. This course prepares the student to take the CCNA (CISCO Certified Networking Associate) exam. (Prerequisite: CIS1947) (2 hrs lec/2 hrs lab/ 0 hrs OJT)

CIS 2949 3 credits
CISCO Networking IV
This course is the fourth in a series of four courses that deal with the CISCO core content. This course prepares the student to take the CCNA (CISCO Certified Networking Associate) exam. (Prerequisite: CIS2948) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2954 3 credits
Network Administration:Windows Server Infrastructure
This course primarily covers the administrative tasks necessary to maintain a Windows Server infrastructure such as configuring and troubleshooting DNS, user and group management with Active Directory Domain Services (ADDS) and Group Policy, implementing Remote Access solutions such as DirectAccess, VPNs and Web Application Proxy, implementing Network Policies and Network Access Protection, Data Security, deployment and maintenance of server images, as well as update management and monitoring of Windows Server environments. (Prerequisites: CIS2952) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2962 3 credits
Network Administration:Microsoft Exchange Server
This course provides students with the knowledge and skills necessary to plan and implement Microsoft Exchange Server.

CIS 2972 3 credits
SQL Server Administration
This course provides students with the knowledge and skills required to install, configure, administer, and troubleshoot the Microsoft SQL Server client-server database management system. (Prerequisite: CIS1402; students must have completed Semesters I, II, and III of the program planner from which the student intends to graduate or instructor approval) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2973 3 credits
Server Virtualization
This lab-oriented course explores installation, configuration, and management of server virtualization technology using enterprise-level virtualization products. (Prerequisites: CIS1947 or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2976 1 credits
Emerging Technologies in Information Systems
In this laboratory course, the student will research and apply emerging technologies in Information Systems. Students will propose, design, and implement one or more working systems involving current technologies, while reinforcing project

management and teamwork skills. (Prerequisites: Completion of Semester II of any CIS degree or diploma program or instructor's consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2980 **1-4 credits**
Computer Careers Internship
This course enables students to acquire practical experience in a variety of professional settings that draw on the skills learned in the student's program of study. It also enables students to test the practical range of some of the ideas presented in their coursework and to experience first-hand some of the career possibilities available to them, as well as an opportunity to network and to gain the job experiences necessary to employment success after graduation. (Prerequisites: Permission of the department and concurrent enrollment in second-year courses) (0 hrs lec/0 hrs lab/1-4 hrs OJT)

CIS 2987 **3 credits**
CIS Capstone
This course is designed as a "capstone" for the CIS program. It provides students with the opportunity to apply the full range of technical and communication skills they have developed throughout the program. In this course students will work under the guidance of faculty to design, implement and document one or more complete IT solution for a typical set of business and/or scientific computing requirements. (Prerequisites: Students must have completed Semesters I, II and III of the program planner from which the student intends to graduate) (2 hrs lec/2 hrs lab/0 hrs OJT)

CIS 2999 **1-3 credits**
Special Topics
Study of special topics in computer science. Special course topics will be announced in the class schedule.

Center for Manufacturing and Applied Engineering

CMAE 1502 **3 credits**
Technical Mathematics
This is an introductory technical math course. This course is for students who have basic math skills and for those who need basic technical math concepts. The primary goals of this course are to help individuals acquire a solid foundation in the algebra and geometry used in a technical setting. This course will show how these skills can model and solve authentic real-world problems. (Prerequisites: 52 on the Reading portion of the Accuplacer and 45 on the Math portion of the Accuplacer) (3 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1506 **2 credits**
Introduction to Computers
This is an introductory course in Microsoft Office computer applications for technical fields. The primary goal of this course is to help individuals acquire a hands-on working knowledge of current personal computer applications including word-processing, spreadsheets, database, presentation, and internet browser software. (2 hrs lec/0 hrs lab/0 hrs OJT) (Prerequisites: 52 on the Reading portion of the Accuplacer)

CMAE 1510 **2 credits**
Print Reading
This course will give students an understanding of basic mechanical drawing principles. Topics include the alphabet of lines, arrangement of views, orthographic projections, scaling, dimensioning, tolerancing, and symbols. Students will read and interpret mechanical drawings. (Prerequisites: 52 on the Reading portion of the Accuplacer) (2 cr lec/0 cr lab/0 cr OJT)

CMAE 1514 **2 credits**
Safety Awareness
This course aligns with the Manufacturing Skill Standards Council's (MSSC) assessment and certification system for Safety. The curriculum is based upon federally endorsed national standards for production workers including Occupational Safety Health Administration (OSHA) standards relating to Personal Protective Equipment (PPE), lockout/tagout (LOTO), Hazardous Material (HAZMAT), tool safety, and confined spaces. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Read NGA) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1518 **2 credits**
Manufacturing Processes and Production
This course aligns with the National Skill Standard assessment and certification system for Safety Awareness. The curriculum is based on federally-endorsed national standards for production workers emphasizing lean manufacturing principles, basic supply chain management, communication skills, and customer service. (Prerequisites: 52 on the Reading portion of the Accuplacer) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1522 **2 credits**
Quality Practices
This course aligns with the National Skill Standard assessment and certification system for Quality Practices. The curriculum is based on federally-endorsed national standards for production workers. Emphasis is placed on continuous improvement concepts and how they relate to a quality management system. Students will be introduced to a quality management system and its components. These include corrective actions, preventative actions, control of documents, control of quality records, internal auditing of processes and control of non-conforming product. (Prerequisites: 52 on the Reading portion of the Accuplacer) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1526 **2 credits**
Maintenance Awareness
This course aligns with the Manufacturing Skill Standards Council's (MSSC) assessment and certification system for Maintenance Awareness. The curriculum is based upon federally endorsed national standards for production workers. The course introduces the concepts of predictive and Total Productive Maintenance (TPM) with the fundamental principles of lubrication, electricity, hydraulics, pneumatics, and power transmission systems. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1528 **1 credits**
Career Success Skills
This is an introductory career success skills course. The primary goals of this course are to help individuals acquire a solid foundation in the basic skills for a successful career. This course will identify the skills important to businesses and help the student access his/her level of skill. The course will provide suggestions for how the student can improve his/her level of skill. (Prerequisite: 52 on the Reading portion of the Accuplacer) (1 hr lec/0 hrs lab/0 hrs OJT)

CMAE 1530 **2 credits**
Machining Math
This is a math course designed for students in a machine shop environment. The primary goals of this course are to help individuals acquire a solid foundation in the basic skills of math that relate directly to the machine shop and industrial manufacturing. This course will show how these skills can model and solve authentic real-world problems. This is a blended on-line course utilizing Tooling "U", D2Land proctored unit exams. (Prerequisites: CMAE1502) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1532 **2 credits**
Machine Tool Print Reading
Students will engage in learning how to read basic blueprints. (Prerequisites: CMAE1510) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1534 **2 credits**
Machine Tool Technology Theory
This is a shop theory course designed for students in a machine shop environment. The primary goals of this course are to help individuals acquire the basic knowledge of shop machines operation and machine components. This is an on-line course utilizing D2L and ToolingU. (Prerequisites: none) (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1536 **2 credits**
Machine Tool Technology Lab I
This course will address the operations of a drill press, tool grinder, vertical milling machine, engine lathe, and saws. Machine safety, machine component identification, as well as turning, milling, sawing, bench work, drilling and single-point tool grinding projects are also included in the components listed above. The student will also learn the care and use of inspections and layout tools. (Prerequisite: CMAE 1534) (0 hrs lec/4 hrs lab/0 hrs OJT)

CMAE 1538 2 credits
Machine Tool Technology Lab II
This course will address the advanced operations of a drill press, vertical milling machine, engine lathe, surface grinder and saws. Machine safety, machine component identification, as well as turning, milling, sawing, drilling and surface grinding projects are also included in the components listed above. The student will also learn the care and use of high precision measuring equipment. (Prerequisite: CMAE1534 and CMAE1536) (0 hrs lec/4 hrs lab/0 hrs OJT)

CMAE 1540 3 credits
Introduction to CNC
This online course is an introduction to CNC machining. The focus will center on CNC machining centers and will include the history of CNC machining, G&M codes, programming, set-up and operating procedures. This is an on-line course utilizing ToolingU and D2L. (Prerequisites: CMAE1536 and CMAE1538) (3 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1542 2 credits
Geometric Dimensioning and Tolerancing
Students will engage in learning how to read prints with Geometric Dimensioning and Tolerancing applications. Each of the geometric controls will be examined so the student may determine the allowable variation in form and size between part features. The Y14.5 M standard will be part of the overall instruction. Using precision equipment most of the geometric controls will be inspected to print specifications. Prerequisites: None (2 hrs lec/0 hrs lab/ 0 hrs OJT)

CMAE 1560 2 credits
Interpreting Welding Symbols
Welding symbols are used to facilitate communication among the designer, fabricator, and inspection personnel. To accurately layout and fabricate parts, the welder will need basic knowledge of working drawings and their significance to the welding industry. Students will break down welding prints to develop skills necessary to fabricate individual component parts of welded structures. Written and fundamental tests will be administered in accordance with the American Welding Society (AWS) standards and the appropriate correlating code books (AWS A2.4). Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA (2 hrs lec/0 hrs lab/0 hrs OJT)

CMAE 1562 3 credits
Oxyfuel Welding and Cutting Process
This course covers the use of oxy-fuel equipment while welding, cutting, brazing, and using the Plasma Arc Cutting (PAC) and Air Carbon Arc Cutting (CAC-A) processes. There will also be an introduction into laser cutting equipment. A very important part of this course will be discussing safety as it relates to the thermal welding and cutting equipment. Time will be spent in the lab developing skills using the thermal welding and cutting processes. Welds will be made in the flat, horizontal, vertical, and overhead positions. Cuts will be made in the flat and horizontal positions. Written and fundamental tests will be done in accordance with the American Welding Society (AWS) codes and standards. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (1.5 hr lec/3 hrs lab/0 hrs OJT)

CMAE 1564 3 credits
Shielded Metal Arc Welding (SMAW)
Students will study the safety concerns connected with the Shielded Metal Arc Welding (SMAW) process, along with an introduction into the types of power sources used for arc welding, process applications, electrode selections, overview of weld types, and other work-related safety conditions in the welding field. Time will be spent in the lab developing skills using the SMAW processes. Welds will be made in the flat, horizontal, vertical, and overhead positions. Written and fundamental tests will be done in accordance with the American Welding Society (AWS) codes and standards. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (1.5 hr lec/3 hrs lab/0 hrs OJT)

CMAE 1566 3 credits
Gas Metal Arc Welding (GMAW)/Flux Cored Arc Welding (FCAW)
Students will study and demonstrate safety practices with Gas Metal Arc Welding (GMAW) and Flux Cord Arc Welding (FCAW). The GMAW and FCAW processes will be discussed in depth including the different type of modes of transfer available, shielding gases, and the different types of materials that can be welded. The differences in the electrode types of gas-

shielded wires and self-shielded wires will be discussed, along with the types of shielding gases that are used. There will be discussions on the importance of how the welding process intersects with the arc welding symbols and codes. There will also be a review of procedures used in visual inspections of welds. Time will be spent in the lab developing skills using the GMAW and FCAW processes. Welds will be made in the flat, horizontal, vertical, and overhead positions. Written and fundamental tests will be completed in accordance with the American Welding Society (AWS) codes and standards. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (1.5 hr lec/3 hrs lab/0 hrs OJT)

CMAE 1568 3 credits
Gas Tungsten Arc Welding (GTAW)
This course covers the safety hazards and applications for Gas Tungsten Arc Welding (GTAW) in the welding industry. Material covered will be power sources, setup, types of current, current selection, shielding gases and torch types. Procedures and potential problems welding different metals (Aluminum, Stainless Steel, and Mild Steel) will be addressed in this course. Applications for the process in different industries, as well as the use of back purging will be discussed. Welds will be made in the flat, horizontal, vertical and overhead positions. Written and Fundamental tests will be completed in accordance with the American Welding Society (AWS) codes and standards. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (1.5 hr lec/3 hrs lab/0 hrs OJT)

CMAE 1570 1 credits
Metallurgy
This course covers the study of metals and the effects of welding and heat treatments on them. Metallurgical terminology will be an important part of the course. Physical and mechanical properties of ferrous and nonferrous metals will be covered along with the classifications of different types of metals. The range of materials and their usefulness in particular applications will be discussed. Written tests will be completed in accordance with the American Welding Society (AWS) codes and standards. (Prerequisites: 52 on the Reading portion of the Accuplacer or 234 on the Reading NGA) (1 hr lec/0 hrs lab/0 hrs OJT)

CMAE 2582 3 credits
Mechanical/Industrial Design Layouts
Students will create design layouts and analyze parts for location, function, fit and integrity. Students will incorporate revisions into the design process. Design layouts will include the selection of machine elements as they relate to various design options. (Prerequisites: CMAE2602) (1 hr lec/4 hrs lab/0 hrs OJT)

CMAE 2586 3 credits
Advanced Mechanical Drafting
This course will cover isometric and auxiliary mechanical drawing applications. Students will create various auxiliary views according to industry standards/applications. Students will work with isometric part presentation views for components. (Prerequisites: CMAE2602) (1 hr lec/4 hrs lab/0 hrs OJT)

CMAE 2606 3 credits
Mechanical/Industrial Assemblies
This course covers welded, bolted assemblies, parts lists and bill of materials. Students will design and draw components, sub-assemblies and assemblies of mechanical and industrial products. These topics will show the students the relationship between individual parts of various assembled products. (Prerequisites: CMAE2602) (1 hr lec/4 hrs lab/0 hrs OJT)

CMAE 2618 3 credits
Mechanical Applications
This course will have students working with fasteners, threads, tolerancing and finish marks. Students will apply finish marks, thread designations and tolerances to drawings as required by industry standards. Fastener selection will also be incorporated in the process. (Prerequisites: CMAE2602) (1 hr lec/4 hrs lab/0 hrs OJT)

Communication

COMM 1100 3 credits
Introduction to Communication
This course introduces students to the concepts, models, and theories of human communication and their application to interpersonal, small group, and

public speaking situations. MTC goal areas: (1) Communication (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1105 3 credits
Interpersonal Communication
This course provides opportunities for students to understand the process of human communication, to assess their strengths and weaknesses as communicators, to assist them in solving problems of an interpersonal nature, and develop interaction skills for interpersonal settings. MTC goal areas: (1) Communication (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1110 3 credits
Public Speaking
This course provides opportunities for students to become familiar with a variety of techniques to develop skills in research, organization, and presentation of informative and persuasive speeches. Students should expect to reduce speech apprehension and develop self-confidence in their ability to communicate in public. MTC goal areas: (1) Communication (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1115 3 credits
Intercultural Communication
This course allows the student an opportunity to study the process of communicating across cultures. Major ethnic cultures, as well as significant co-cultures, will become the focus of study. The course will provide experiential as well as cognitive learning. MTC goal areas: (1) Communication and (7) Human Diversity. (Prerequisites: College-level reading or Instructor consent or permission) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1120 3 credits
Media and Society
This course analyzes the various media of mass communication and the manipulative influence of this media on American society. Included will be an introduction to the history and development of the mass communication systems: newspapers, magazines, books, recorded music, radio, television, movies and social networking. MTC goal areas: (5) History and Social and Behavioral Sciences, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1125 3 credits
Small Group Communication
This course is designed for students to learn the basic principles of small group communication and improve participation by practicing and analyzing the processes of group structures, functions, roles, tasks. Leadership functions with practical application of problem-solving and oral communication skills may develop through project analyses and applications. (MTC goal area: (1) Communication) (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1600 3 credits
Communication in the Workplace
This course is designed to enhance students' understanding of and ability to communicate effectively in a multicultural workplace. The history of organizational communication, conflict trends, and personal responsibility in the modern multicultural workplace will be studied to enhance opportunities and skills for life-long employment. MTC goal areas: (5) History and Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 1601 1 credits
Interviewing Procedure and Practice
An applications course in the job-seeking process. Students will explore self-confidence and the interviewing process, understand employer expectations, and identify personal and job-related skills. Job-seeking, resume writing and interview skill-building will be covered. (Prerequisites: None; computer skills necessary) (1 hr lec/0 hrs lab/0 hrs OJT)

COMM 2205 3 credits
Relationship Communication
Covers advanced topics in interpersonal communication concerning communication in close (romantic/family) relationships. Topics for this course will include historical perspective of relationship development, theories of relationship issues, (conflict/maintenance/termination) as well as examining the influence of gender, ethnicity and nationality on the process of relationship

communication. MTC goal areas: (5) History and Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: COMM1110 or COMM1105) (3 hrs lec/0 hrs lab/0 hrs OJT)

COMM 2999 **1-3 credits**
Special Topics in Communication
Study of special topics in communication. Special course topics will be announced in the class schedule.

Dental Hygiene

DENH 1401 **2 credits**
Dental Anatomy
This lecture and laboratory course is designed to educate the dental hygiene student in dental terminology; morphological characteristics of the permanent and primary teeth; anatomical and soft tissue landmarks; structure and function of the teeth and associated oral tissues; and includes an introduction to occlusion. (Prerequisites: All pre-technical requirements completed with a "C" or better and an overall GPA of 2.6 or better. Admission to the dental hygiene program.) (1.5 hrs lec/1 hr lab/0 hrs OJT)

DENH 1405 **2 credits**
Developmental Head & Neck Anatomy
This course blends anatomy, embryology, and histology in a study of the gross and microscopic structures of the head and neck. Practical applications are related to clinical cases in the dental field. (Prerequisites: All pre-technical requirements completed with a "C" or better, an overall G.P.A. of 2.6 or better, and admission to the dental hygiene program) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 1420 **5 credits**
Dental Hygiene Theory and Practice I
This course introduces the student to the dental hygiene process of care with emphasis on professionalism, the theory and practice of preventive dentistry, use of preventive dental aids, infection control, patient assessment and clinical instrumentation skills. (Prerequisites: All pre-technical requirements completed with a "C" or better, an overall G.P.A. of 2.6 or better, and admission to the dental hygiene program, and concurrent registration with DENH1425) (3 hrs lec/4 hrs lab/0 hrs OJT)

DENH 1425 **1 credits**
Dental Hygiene Practice I SimLab
This supervised simulation laboratory course provides the student with the opportunity to practice oral physiotherapy aids, patient operator positioning, and dental hygiene instrumentation skills on a mannequin prior to clinical practice. (Prerequisites: All pre-technical requirements complete with a "C" or better, an overall G.P.A. of 2.6 or better, admission to the dental hygiene program, and concurrent registration with DENH1420) (0 hrs lec/2 hrs lab/0 hrs OJT)

DENH 1470 **1 credits**
Medical and Dental Emergencies
This course emphasizes reduction of risk for emergencies and familiarity with critical steps in prevention, preparation, early recognition and appropriate management of common medical emergencies in a dental setting. Medical terminology is also included in this course. (Prerequisites: All pre-technical requirements completed with a "C" or better, an overall G.P.A. of 2.6 or better, and admission to the dental hygiene program.) (1 hr lec/0 hrs lab/0 hrs OJT)

DENH 1505 **2 credits**
General and Oral Pathology
This course covers the study of general and oral disease processes including inflammatory and immunological responses, and the process of wound healing and repair. Special emphasis is placed on the recognition of abnormalities, neoplasms, and the clinical and radiographic recognition of oral pathology. (Prerequisites: Completion of all previous semester courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 1511 **4 credits**
Dental Materials
This course introduces students to preventive, diagnostic and restorative materials used in modern dentistry, including: chemical/physical composition, properties, appropriate uses, safe handling, and proper manipulation of materials. Students participate through hands-on learning projects. (Prerequisites: Completion of all previous semester courses with a "C" or better. Computer literacy, and a working knowledge of D2L) (2 hrs lec/4 hrs lab/0 hrs OJT)

DENH 1520 **2 credits**
Dental Hygiene Theory II
This course is designed to continue the student's education in dental hygiene patient care to include the management of patients with special needs, patient communication and fluoride treatment modalities. Active learning in evidence-based dental hygiene research is included. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH1528) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 1528 **4 credits**
Dental Hygiene Practice II
This supervised clinic course provides students with the opportunity to practice clinical procedures to include patient assessments, planning, implementation and evaluation. Additional focus includes instrumentation, fluoride therapy, radiographs, and expanded functions. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH1520) (0 hrs lec/8 hrs lab/0 hrs OJT)

DENH 1530 **3 credits**
Dental Radiology
This course is designed to prepare the dental hygiene student in the art and science of producing intraoral radiographic surveys utilizing simulated and patient experiences. Course content includes theoretical concepts of radiation physics and biology; characteristics of radiation, dental radiographic equipment; film processing and mounting; digital radiography; patient selection; infection control; and quality assurance programs. (Prerequisites: Completion of all previous semester courses) (2 hrs lec/2 hrs lab/0 hrs OJT)

DENH 1560 **1 credits**
Periodontology I
This course provides a study of the histology, pathogenesis, dental hygiene diagnosis, risk indicators, epidemiology and treatment of periodontal disease. (Prerequisites: Completion of all precious semester courses) (1 hr lec/0 hrs lab/0 hrs OJT)

DENH 2401 **2 credits**
Pharmacology for the Dental Hygienist
This course is designed to educate the dental hygiene student with applying pharmacology knowledge to dental hygiene clinical practice. (Prerequisites: Completion of all previous semester courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 2420 **2 credits**
Dental Hygiene Theory III
This course is designed to be a continuation of Dental Hygiene Theory II (DENH1520) with emphasis on scientific principles, advanced dental hygiene skills, utilization of professional judgment and providing optimal comprehensive dental hygiene patient management and oral health assessment. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH2428) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 2428 **6 credits**
Dental Hygiene Practice III
This course is a continuation of Dental Hygiene Practice II (DENH1528) with supervised clinical experiences, which incorporates practice management, radiographic interpretation and oral health promotion and disease prevention. Active learning will involve assessing, planning, implementing appropriate treatment and evaluating comprehensive patient care and management to diverse populations. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH2420) (0 hrs lec/12 hrs lab/0 hrs OJT)

DENH 2431 **2 credits**
Radiographic Interpretation
This course is an advanced study of the principles of radiographic interpretation which recognizes the limitations and benefits of dental radiography in evaluating periodontal disease, dental caries, developmental abnormalities and pathological conditions. Course content also includes: film positioning devices, extraoral radiography, localization techniques, and identification of dental materials and foreign objects. (Prerequisites: Completion of all previous semester courses) (1 hrs lec/2 hrs lab/0 hrs OJT)

DENH 2460 **2 credits**
Periodontology II
This course is designed to expand the knowledge of the dental hygiene student in the field of periodontology. Areas of discussion include innovations in nonsurgical and surgical therapy, comprehensive periodontal assessment, clinical decision making outcomes, assessment of periodontal maintenance and incorporating research evidence into clinical practice. (Prerequisites: Completion of all previous semester courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 2501 **2 credits**
Pain Management
This lecture and clinical course educates students in the use of nitrous oxide/oxygen analgesia and local anesthesia. Course content emphasizes assessment, pharmacology, anatomy, physiology and emergency procedures. Clinical experiences develop skills in safe and effective administration techniques. (Prerequisites: Completion of all previous semester courses with a "C" or better) (1 hr lec/2 hr lab/0 hrs OJT)

DENH 2520 **2 credits**
Dental Hygiene Theory IV
This course is designed to be a continuation of DENH2420 Dental Hygiene Theory III with emphasis on case based learning, the development and presentation of a case study and ethical dilemma, and completion of a program portfolio. The integration of case studies are utilized throughout the course. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH2528) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 2528 **6 credits**
Dental Hygiene Practice IV
This course is a continuation of Dental Hygiene Practice III (DENH2428) with supervised clinical experiences. Advanced enhancement in critical thinking decision-making skills are integrated during the provision of patient care and management to diverse populations. Clinical practice becomes more demanding with increased patient experiences. (Prerequisites: Completion of all previous semester courses and concurrent registration with DENH2520) (0 hrs lec/12 hrs lab/0 hrs OJT)

DENH 2550 **2 credits**
Community Dental Health
This course introduces students to the disciplines and principles of dental public health, ethical principles governing health care, principles of professional and oral communications, epidemiologic methods, and biostatistical measurement and analysis. Review of preventive dentistry, dental health education, and program development and evaluation are included. Students conduct community-based oral health programs. (Prerequisites: Completion of all previous semester courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

DENH 2590 **1 credits**
Dental Hygiene National Board Review
This elective course is a prepared content review on all topics covered in the dental hygiene program and intended to be a supplement to the student's preparation to taking the Dental Hygiene National Board Exam. (Prerequisites: Completion of all previous semester courses) (1 hr lec/0 hrs lab/0 hrs OJT)

DENH 2592 **1 credits**
Career Readiness for the Dental Hygienist
This course prepares the student for entry into the dental hygiene profession through the integration of theory, knowledge, research and professional growth/development. Course content includes ethical, legal and regulatory concepts to the provision and/or support of oral health care and explores the dental hygienists' employment considerations in both traditional and non-traditional settings. Active learning experiences include the development of resume and cover letter; preparation for national, regional clinical boards, and jurisprudence examinations. Prerequisites: Completion of all previous semester courses. (1 hr lec/0 hrs lab/0 hrs OJT)

DENH 2600 **1 credits**
Clinical Remediation
This course focuses on areas of clinical deficiencies and utilizes supervised clinical practice to develop competence. (Prerequisites: Recommendation and instructor's consent. Must be a student in the Lake Superior College Dental Hygiene Program or a recent graduate [within one year]) (0 hrs lec/2 hrs lab/0 hrs OJT)

DENH 2999 **1-3 credits**
Special Topics for the Dental Hygienist
Study of special topics in dental hygiene. Special course topics will be announced in the class schedule.

Distinctions

DSTC 1410 **1 credit**
Distinction in Leadership
In this course, students will begin work on their Distinction in Leadership in two parts: a specific leadership activity and engagement in the community via 24 hours of volunteer work. Leadership activities may include serving as an elected member of Student Senate, significant participation in an active LSC-chartered club or as a second-year athlete, participation in a program-approved preceptorship or internship, or acceptance into the Mentor Connect program. Students will also begin keeping a record of activities completed and knowledge gained to be used in the second course in the sequence. (Prerequisites: Instructor consent) (0.5 hr lec/0 hrs lab/0.5 hrs OJT)

DSTC 1999 **1 credits**
Special Topics: Distinction
Study of special topics in a distinction area.

DSTC 2999 **1 credits**
Special Topics: Distinction
Study of special topics in a distinction area.

Economics

ECON 1100 **3 credits**
Introduction to Economics
This course covers a general description of the United States economy and the fundamental concepts of economics. These concepts will be applied in both microeconomic and macroeconomic situations. MTC goal areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ECON 1150 **3 credits**
Principles of Economics:Macroeconomics
This course introduces the student to the study of business cycles, economic growth, and the role of government within the context of market economies. Policy decisions, past and present, and their effects on unemployment and inflation are examined. MTC goal areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspectives. (Prerequisites: MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT; college-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ECON 1160 **3 credits**
Principles of Economics:Microeconomics
The study of microeconomics gives a foundational understanding of how price and quantity are determined in the market place. Students will learn how consumers determine spending and how firms decide what and how much to produce. A variety of market structures will be compared along with the role of the consumer in each market. MTC goal area: (5) History and the Social and Behavioral Sciences. (Prerequisites: MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT; College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ECON 2030 **3 credits**
Economics of Sustainability
This course will explore the economics behind the application of sustainable processes and practices. The course will examine the microeconomic choices consumers and businesses face to meet sustainable objectives as well as macroeconomic choices for long-term economic sustainability. MTC goal areas: (5) History and Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: College-level reading; MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT;) (3 hrs lec/0 hrs lab/0 hrs OJT)

Education

EDUC 1100 **1 credits**
Field Experience in Teaching
This course is designed to engage pre-program teacher education students in two areas: 1) the exploration of teaching as a career and 2) the completion and documentation of field experience with students in educational settings. A varying amount of such field experience is prerequisite to acceptance in most Teacher Education Programs. When students take EDUC 2000-Introduction to Teaching, this course must be taken concurrently, and

students are encouraged to take it separately when EDUC 2000 is not offered. This course may be repeated for up to four credits. (Prerequisites: Students should enroll in this course consecutively each semester until they transfer to a four year institution. College level reading and writing.) (1 hr lec/0 hrs lab/0 hrs OJT)

EDUC 2000 **3 credits**
Introduction to Teaching
Introduction to schooling, teaching, and the foundations of education. The major purpose is to help students clarify their thoughts and feelings about becoming a teacher. Topics include teachers, students, schools, teaching, school finance, history of U.S. education, and philosophy of education. Must be taken concurrently with EDUC1100 Field Experience in Teaching. (Prerequisites: College-level reading and writing. Co-requisite: EDUC1100) (3 hrs lec/0 hrs lab/0 hrs OJT)

Commerical and Residential Wiring

ELEC 2403 **4 credits**
Residential Wiring
This course covers the requirements for services, feeders, and branch circuits for residential dwellings and the practical application and installation of those circuits. Topics of study include the calculation of cables and conductors, calculation of service entrance equipment, use and installation techniques of general circuits and apparatus of a residential dwelling. Also covered are general safety practices and the basics of residential blueprint reading. (Prerequisites: Completion of the first year courses and successful application to the Commercial and Residential Wiring program.) (1 hr lec/6 hrs lab/0 hrs OJT)

ELEC 2405 **2 credits**
Electrical Blueprint Reading
This course covers the basics on reading and interpreting various architectural drawings for the electrical industry in residential, commercial, and industrial construction. (Prerequisites: Completion of first year courses, or consent of instructor.) (2 hrs lec/0 hrs lab/0 hrs OJT).

ELEC 2423 **4 credits**
Commercial Wiring I
This course covers the requirements for and practical application of calculating and installing transformers, raceways, conduits, junction boxes, elevators, service entrances, sub panels, and various types of lighting found in commercial properties. (Prerequisites: Completion of the first-year courses and successful application to the Commercial and Residential wiring program.) (1 hr lec/6 hrs lab/0 hrs OJT)

ELEC 2433 **3 credits**
Motor Control
This course covers the theoretical and application of controls for electrical systems. Topics will include the control of various types of lighting, motors, and other electrical equipment, safe work practices, and blueprint reading. (Prerequisites: Completion of the first year courses and successful application to the Commercial and Residential Wiring program.) (2 hrs lect/2 hrs lab/ 0 hrs OJT)

ELEC 2440 **2 credits**
National Electrical Code I
This course covers the history and application of the National Electrical Code towards residential and commercial properties and business. It is designed to support the third semester curriculum of the Commercial and Residential Wiring program. (Prerequisites: Completion of the first year courses or instructor's consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELEC 2461 **2 credits**
Electrical Troubleshooting
This course covers the practical approach to troubleshooting electrical systems. Topics will include the common problems with various types of lighting, motors, controls, and other electrical equipment, safe work practices and blueprint reading. (Prerequisites: Completion of the first year courses or instructor's consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELEC 2490 **1-4 credits**
Electrical Internship
This course provides the student with work site experience where skills and knowledge learned in previous courses may be applied. The internship experience includes safety procedures, quality control systems, personnel procedures, company

organization, contractual agreements, and other employer expectations. The students can register for varying credits based on their planner and the number of hours of work available from the employer. One credits is equivalent to 48 hours of work time. (Prerequisite: Instructor's consent) (0 hrs lec/0 hrs lab/48-196 hrs OJT)

ELEC 2503 3 credits
Electrical Controls
This course covers the theoretical application of controls for electrical systems. Topics will include the control of various types of lighting, motors, and other electrical equipment, safe work practices, and blueprint reading. (Prerequisites: Completion of first year courses and successful application to the Commercial and Residential Wiring program.) (2 hrs lec/2 hrs lab/0 hrs OJT)

ELEC 2510 2 credits
National Electrical Code II
This course covers the history and application of the National Electrical Code towards commercial and industrial properties and business. It is designed to support the fourth semester curriculum of the Commercial and Residential Wiring program. (Prerequisites: Completion of the first year courses or instructor's consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELEC 2511 1 credits
Introduction to the National Electrical Code
This course covers the history and application of the National Electrical Code towards residential, commercial and industrial properties, and business. It is designed to give working knowledge of the National Electrical Code to students with little background in the electrical field. (Prerequisites: Instructor's consent) (1 hr lec/0 hrs lab/0 hrs OJT)

ELEC 2523 4 credits
Commercial Wiring II
This course is a continuation of Commercial Wiring I. Topics include theoretical aspects and installations practices for lighting, motors, and other electrical equipment. Also covered are safe work practices and blueprint reading. (Prerequisites: Completion of first year courses and successful application to the Commercial and Residential Wiring program.) (1 hours lecture/6 hours lab)

ELEC 2533 4 credits
Industrial Wiring
This course covers the theoretical and practical application of industrial wiring methods and materials for electrical systems. Topics will include hazardous locations, lighting, motor selections, other electrical equipment pertaining to industrial settings, safe work practices, and blueprint reading. (Prerequisites: Completion of first year courses and successful application to the Commercial and Residential Wiring program.) (2 hrs lec/4 hrs lab/0 hrs OJT)

ELEC 2999 1-3 credits
Special Topics in Commercial and Residential Wiring:
Study of special topics in commercial and residential wiring. Special course topics will be announced in the class schedule.

ELTN 1406 4 credits
DC Electricity
This course covers essential entry-level topics in DC electricity, electronic devices, and associated circuit analysis techniques. The lab portion of this course teaches the use of electronic test equipment to test components and measure circuit values to determine performance. In doing so, the student will verify the laws and theorems presented in the lectures. (Prerequisites: MATH 0950/0955 and college-level reading) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

ELTN 1408 4 credits
AC Electricity
This course covers essential entry-level topics in AC electricity, electronic devices, and associated circuit analysis techniques. The lab portion of this course teaches the use of electronic test equipment to test components and measure circuit values to determine performance. In doing so, the student will verify the laws and theorems presented in the lectures. (Prerequisites: ELTN 1406) (2.5 hrs lec/3 hrs lab/0 hrs OJT)

ELTN 1412 2 credits
Digital Electronics
In this course the student will study basic logic gates and flip-flops and learn to use them in simple digital circuits. Number systems used in digital electronics will be studied. Truth tables and Boolean algebra will be used to analyze, design, and manipulate digital

logic circuits. In the lab, students will learn to build digital circuits which will serve to reinforce the material covered in lecture. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1420 **1 credits**
Soldering and Surface Mount Lab
This course covers soldering, desoldering, repair of printed circuit boards with discreet and surface mount components, and electrostatic precautions. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

ELTN 1422 **2 credits**
Media and Cabling
In this course, the student will learn various wiring strategies using various types of cables and connectors. The student will learn to run and terminate cables in accordance with industry standards and will learn to use cable testing equipment to troubleshoot faulty installations. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1428 **1 credits**
Electrical Safety
This course is designed to familiarize students with safety practices and procedures necessary while working in the electrical field. Students will identify potential hazards, identify and use proper Personal Protective Equipment (PPE). This course will also cover safety practices including lock out tag out (LOTO) and safety data sheets (SDS). (Prerequisites: None) (0 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1432 **5 credits**
Solid-State Devices
This course covers the theory and operation of basic solid-state devices including various types of diodes, transistors, thyristors, and linear integrated circuits. The student then learns how these devices are used in simple circuits such as power supplies, amplifiers, and switching circuits. In the lab portion of this course, the student will build and observe the operation of various circuits studied in lecture. (Prerequisites: ELTN 1408) (3 hrs lec/4 hrs lab/0 hrs OJT)

ELTN 1442 **6 credits**
Motors and Generators
This course covers the basic construction, operation, and control of DC, single, and three phase motors and generators. In the lab portion of this course the student will investigate the operation of various types of motors and generators reinforcing the lecture material. (Prerequisite: ELTN 1408) (3 hrs lec/6 hrs lab/0 hrs OJT)

ELTN 1452 **4 credits**
Microcontrollers
This microcontroller's course covers the practical aspects of how a microcontroller can be programmed and used as an embedded control device. In doing so, the student learns the basic internal architecture of a microcontroller, as well as its instruction set and how to interface it with various external input and output devices. The student will also learn to use microcontroller software and hardware development tools to write assembly language code, assemble, link, and download it into the microcontroller memory thus enabling the microcontroller to function independently as an embedded controller. In the lab, students will interface a microcontroller with devices such as LED's, stepper motors, temperature and optical sensors, and digital displays. (Prerequisites: ELTN 1406, ELTN 1412 (may be concurrent)) (2 hrs lec/4 hrs lab/0 hrs OJT)

ELTN 1470 **1 credits**
Systematic Troubleshooting
This course provides the student with a systematic, rational approach to analyze problems and avoid future problems. (Prerequisites: ELTN 1406) (1 hr lec/0 hrs lab/0 hrs OJT)

ELTN 1475 **2 credits**
Introduction to the National Electrical Code
An introduction to the National Electrical Code will acquaint the student with the history and use of the electrical document used by electricians, electrical engineers, architects, and insurance professionals not only in the US, but in many countries around the world. This course will instruct on how to navigate through the NEC and learn how it relates to everyday work as an electrician. (Prerequisites: None) (2 hr lec/0 hrs lab/0 hrs OJT)

ELTN 1480 **3 credits**
Fluid Power
On completion of this course the student will understand the basic laws of physics as they apply to fluid power, as well as understand schematics and basic system design. The student will also study the various components found in typical pneumatic and hydraulic systems and how these components function and interact with each other. (Prerequisites: ELTN1402, READ0465, ENGL0460) (2 hrs lec/2 hrs lab/0 hrs OJT)

ELTN 1500 **2 credits**
Practical PC Maintenance
The students will learn to use various common office applications and an Internet browser. They will also learn to install and use several operating systems and to install and configure various computer hardware components. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1520 **3 credits**
Practical Electricity
Practical Electricity provides an introduction to basic electrical principles and applies them to various common electrical circuits. This course also investigates various electrical components such as switches, relays, motors, sensors, wires, and connectors and how they function in common electrical circuits. Basic home wiring practices and various other electrical applications will also be discussed. In the lab portion of this course, the student will explore the electrical principles and devices presented in the course and in the process learn to build simple circuits and measure various electrical quantities. (Prerequisites: READ0465, ENGL0460) (2 hrs lec/2 hrs lab/0 hrs OJT)

ELTN 1530 **3 credits**
Renewable Energy Systems
The Renewable Energy Systems course is for students who wish to learn the basics of renewable energy systems. The course will investigate various renewable energy systems including solar electric, solar hot water, passive solar, wind, and geothermal. The student will learn how the systems work, the components used to build the systems, and the advantages and disadvantages of each. In the lab portion of the course the student will build several renewable energy systems and in doing so see how the various components function. (Prerequisites: Concurrent enrollment in ELTN 1406) (1 hrs lec/4 hrs lab/0 hrs OJT)

ELTN 1600 **2 credits**
Basic Telecommunications Theory
Course content includes basic telecommunication topics including: antennas, RF, telephone, modulation, wireless and related technology systems that require a low voltage, qualified technician to install. Additional class discussion will address current techniques and future trends for the control of a premise. (Prerequisites: Current registration in ELTN1400 and ELTN1410) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 1610 **2 credits**
System Planning/Blueprints/CAD
General procedures and steps involved in the site survey in order to establish and confirm the installed locations of new and/or existing sensors/equipment and related routing of cabling and raceways will be covered. Drawing and layout software will be covered. Documentation and presentation techniques will be covered and assigned. (Prerequisites: Semester 1 of the Power Limited Certificate or instructor consent) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1620 **2 credits**
NEC/Conduit/Pathways
The NEC code will be addressed for procedures and steps involved in the system layout in order to establish and confirm the installation methods of new and/or existing sensors/equipment and related routing of cabling and raceways. Methods of blocking airflow between airspaces -firestopping will be discussed. Types of conduit and raceways used in managing the many types and sizes of cable and media and tie in with the system plan will be addressed. Wireless media and basic telecommunications terms and definitions will be covered. (Prerequisites: Semester 1 of the Power Limited Certificate or instructor consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 1625 3 credits
NEC/Conduit/Pathways Lab
In conjunction with the NEC/Conduit/Pathways the lab will install a structured media center, cable trays, under floor raceways, surface metal and nonmetallic raceways and associated mounting devices using system layout blueprints. The NEC code will be applied. Firestopping of airspaces will be implemented as appropriate. (Prerequisites: Semester 1 of the Power Limited Certificate or instructor consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

ELTN 1630 3 credits
PLT Control Systems
This course covers sensor and module devices that when installed and activated will enhance the premise environment. These devices will provide for control and monitoring of temperature, water/humidity, electrical/surges, lighting, motion detection (security), sound, video and fire. A further course objective is to cover software/hardware integration. The premise will be defined in terms of a system layout. Devices and loads will be added; addressing and component assignments will be added to the system layout. Device programming sequences will be set up for both manual and automatic control. (Prerequisites: Semester 1 Power Limited Certificate or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 1635 3 credits
PLT Control Systems Lab
In conjunction with the PLT Control Systems course, the objective of the lab is to focus on proper device terminations, input/output states of the device and the appropriate interface to set an alarm or initiate a remedy within the premise. (Prerequisites: ELTN 1422) (0 hrs lec/6 hrs lab/0 hrs OJT)

ELTN 1640 2 credits
PLT Networking and Support
The course objective is to network all of the systems into a controlled environment. Systems will be built from the main equipment room using a structured media center (SMC) and expand out to zones throughout the premise. Vendor software, control touch pads and PC will be implemented. (Prerequisites: Semester 1 of the Power Limited Certificate or instructor consent.) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 1999 1-3 credits
Special Topics in Electronic Engineering Technology
Study of special topics in electronic engineering technology. Special course topics will be announced in the class schedule.

ELTN 2400 2 credits
CET Exam Preparation
This course prepares the student for the Certified Electronics Technician examination. This nationally recognized certification exam covers a wide range of electronic theory and applications. (Prerequisites: ELTN 1432) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 2401 2 credits
FCC Exam Preparation
This course prepares the student for the Federal Communications Commission (FCC) General Radiotelephone Operator's License (GROL) examination. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 2420 2 credits
Robotics
This course covers the basics of robotics and how robots are interfaced with microprocessor controllers and sensors. (Prerequisites: ELTN1410) (1 hr lec/2 hrs lab/0 hrs OJT)

ELTN 2430 3 credits
Introduction to Instrumentation
This course covers instrumentation concepts including theory of instrumentation loops, common symbols, acronyms, input/output devices, controllers, and troubleshooting. (Prerequisites: ELTN 1408) (1 hr lec/4 hrs lab/0 hrs OJT)

ELTN 2440 3 credits
Motor Speed Controllers
This course covers the basic methods of DC, AC, magnetic, and mechanical speed control. Installation and testing methods will be practiced. (Prerequisites: ELTN 1442) (2 hr lec/2 hrs lab/0 hrs OJT)

ELTN 2442 3 credits
Automation Controllers
In this course, the student will learn the basics of industrial automation controllers. The student will

learn the fundamentals of how these devices operate and how to program them to perform simple control functions. To do this the student will learn Ladder Logic programming using the Allen Bradley RSLogix software and interface simple I/O devices to the PLC. (Prerequisites: ELTN 1408, ELTN 1412) (2 hrs lec/2 hrs lab/0 hrs OJT)

ELTN 2444 **4 credits**
Power Distribution for Industrial Controls
The student will gain a general understanding of industrial power distribution systems and related topics. Topics covered will include industrial switch gear and its associated operation, metering, and protection as well as single line distribution diagrams. Additional topics will include common safety standards and practices as they apply to industrial power distribution and motor control systems. (Prerequisites: ELTN 1442) (2 hrs lec/4 hrs lab/0 hrs OJT)

ELTN 2450 **5 credits**
Automation Controller Applications
In this course, the student will apply and expand on what they have previously learned in the Automation Controllers and Process Control Theory courses. They will use Automation Controllers to control real-life processes and investigate and observe process control theory in action. (Prerequisites: ELTN2442 and concurrent enrollment in ELTN2452) (1 hr lec/8 hrs lab/0 hrs OJT)

ELTN 2452 **3 credits**
Process Control Theory
The student will learn about basic process control principles including the differences between open and closed loop systems, concepts such as process load, lag, stability, and dynamic response as well as various control modes such as on-off, proportional, integral, and derivative control. The student will also be exposed to various transducers and sensors commonly used in industrial control systems. (Prerequisites: ELTN 2442 and concurrent enrollment in ELTN 2450) (3 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 2477 **1-4 credits**
Electronics Internship
This course provides the student with work-site experience in which skills and knowledge learned in previous courses may be applied. Technical skills and knowledge will include design, assembly, installation, operation, maintenance, and repair of machines, and equipment as appropriate to the internship site. (Prerequisites: Instructor's consent) (0 hrs lec/0 hrs lab/3-12 hrs OJT)

ELTN 2480 **5 credits**
Communications Electronics
This course covers the essential topics underlying basic electronic communications theory. Topics covered include, various analog and digital modulation schemes, basic antenna theory, EM wave propagation theory, transmission line and waveguide theory, and applications of these topics related to specific modern wireless communications systems. (Prerequisites: Concurrent enrollment in ELTN1430) (5 hrs lec/0 hrs lab/0 hrs OJT)

ELTN 2999 **1-3 credits**
Special Topics In Electronic Technology
Study of special topics in electronic engineering technology. Special course topics will be announced in the class schedule.

English

ENGL 0950 **5 credits**
Read/Write College Prep: Intermediate
This course provides comprehensive practice in reading and writing skills necessary for success in college-level courses. Students need a "C" or better in this course to enroll in ENGL1106, College Composition I. (Prerequisites: none) (5 hrs lec/0 hrs lab/0 hrs OJT).

ENGL 0955 **4 credits**
Read/Write College Prep: Advanced
This course provides comprehensive practice in reading and writing skills necessary for success in college-level courses. Students need a "C" or better in this course to enroll in ENGL1106, College Composition I. (Prerequisites: 56-77 on the Reading portion of the Accuplacer or 236-249 on the Next-Generation Accuplacer or a "D" in ENGL0950 or READ0950) (4 hrs lec/0 hrs lab/0 hrs OJT).

ENGL 1100 **3 credits**
Creative Writing
This course is designed to stimulate creativity in thought and perception and to enhance each student's abilities to express his or her personal vision in written form. Students will be introduced to the basic language, concepts, and structures of fiction, poetry, and creative non-fiction. MTC goal area: (1) Communication (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1102 **3 credits**
Social Media Writing
This course asks students to critique and create the type of writing that is used for online social networking platforms. Students analyze and discuss rhetorical situations presented by specific social media sites, evaluating writing choices in terms of purpose, audience, and effectiveness. Writing assignments focus on language choice, topic relevance, and the development of personal voice. MTC goal area: (1) Communication (Prerequisite: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1106 **3 credits**
College Composition I
First semester college-level composition course focusing on writing expository prose using word processing as a tool for composing. Emphasis is on writing as a process, critical reading, developing a voice, and grammar review. Presupposes competency in Standard English. This course is required of all students working toward an AA degree. MTC goal areas: (1) Communication (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955 with a "C" or better, or 77.50 or higher on the reading comprehension portion of the CPT.) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1109 **3 credits**
College Composition II
Second semester college-level composition course focusing on academic writing using primary and secondary sources, including basic research using print and electronic sources. Emphasis is on writing as a process, critical analysis, summarizing, research, logical argumentation, and documentation. Presupposes competency in standard English. Required of all students working toward an AA or AS Degree, unless special exemption is granted. MTC goal areas: (1) Communication (Prerequisites: ENGL1106 with a grade of "C" or better) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1112 **3 credits**
Introduction to Literature
This foundational course introduces the study of literature as a mode of discourse for defining, exploring, and expressing human experience. The students will learn the skills of reading and writing about literature along with knowledge of its basic concepts. This survey course introduces the students to the major forms of literature: novels, short stories, poetry, plays and creative non-fiction. MTC goal areas: (6) Humanities/Fine Arts (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1132 **3 credits**
Utopian/Dystopian Literature
This course introduces students to the literature of utopias and dystopias around the world, which are literary works that focus on imaginary places to explore alternative models of political, cultural, and societal structures. This course seeks to challenge existing ideas about governments, social communities, and constructions of human identity while exploring sometimes novel, radical, and transformative ideas regarding the reformation of existing human societies. MTC goal areas: (6) Humanities and Fine Arts and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1134 **3 credits**
Modern Fantasy
Elements of fantasy historically been part of artistic expression and have remained so through modern times. This course will utilize a variety of genres of modern fantasy such as literature, film, television, video games, role playing games, and art. Attention will be given to contemporary fantasy trends and their relation to current events, including how fantasy can reflect cultural values and provide a more nuanced understanding of complex structures like systemic racism. MTC goal areas: (6) Humanities and

Fine Arts, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1136 3 credits
Folklore
Humans have historically used folklore for entertainment purposes as well as to make sense of their world and reflect cultural values. This course uses a variety of lenses to engage with many types of folklore, from historical myths, legends, and folktales to contemporary folklore. MTC goal areas: (6) Humanities and Fine Arts, (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 1999 1-3 credits
Special Topics in English
Special topics in English. Special course topics will be announced in the class schedule.

ENGL 2000 3 credits
Poetry Writing
Creative writing workshop in which students develop original poetic work and voice through writing, reading, and responding to a variety of poetic styles and ideas. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1100 or instructor's consent. College level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2002 3 credits
Creative Nonfiction Writing
Creative writing workshop in which students use imaginative means to express factual content. Drawing from personal history and formal research, students explore a variety of genres such as memoir, literary journalism, travel writing, and lyric and braided essays. MTC goal areas: (6) Humanities and Fine Arts. (Pre-requisites: English 1100 or instructor consent. College-level reading.) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2004 3 credits
Fiction Writing
Creative writing workshop in which students develop style and voice through writing, reading, and responding to a variety of fiction styles, forms, and techniques. MTC goal areas: (6) Humanities and Fine Arts (Prerequisites: ENGL1100 or instructor's consent. College level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2020 3 credits
Introduction to the Short Story
Analysis of selected short stories with reference to elements of plot, character, setting, theme, point of view, and symbolism, with a focus on critical analysis. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2022 3 credits
Introduction to the Novel
Analysis of selected novels with reference to elements of plot, character, setting, theme, point of view, and symbolism, with a focus on critical analysis. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent or instructor consent.) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2024 3 credits
Introduction to Drama
A study of plays, focusing on identifying and analyzing themes, patterns, and conventions of drama. Emphasis is placed on seeing the human context, values, and assumptions embedded in dramas from the Ancient to Contemporary periods. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2026 3 credits
Introduction to Poetry
A study of poetry to develop an understanding of structural patterns, idioms, and meanings. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2101 3 credits
British Literature:12th to 17th Century
This course includes the study of major authors and works of British literature from the twelfth through the seventeenth centuries. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106

or concurrent enrollment or equivalent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2102 3 credits
British Literature: 18th Century to Present
This course includes the study of major authors and works of British literature from the eighteenth century to present time. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2105 3 credits
American Literature:Pre-Colonial to Civil War
This course includes the study of major authors and movements of the Colonial, Revolutionary, Romantic, and Civil War periods of American Literature. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2106 3 credits
American Literature:Civil War to the Present
This course includes the study of major American authors and movements from the turn of the century (1890-1910), including American literature written between World War I and World War II to the present. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2108 3 credits
American Gothic Literature
A survey of American Gothic literature from early Americana to present day. Readings will include selections of short stories, novels, and poetry. Attention will be paid to the literature as a sociological reflection of history and culture during different American eras, as well as the psychological effects of using terror, horror, and the uncanny as literary devices. MTC Goal Area: (6) Humanities & Fine Arts (Prerequisites: ENGL1106 with a grade of "C" or better, or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2114 3 credits
Adolescent Literature
This course covers a range of adolescent novels and short fiction from standard classics to current publications. Students will study common literary themes in adolescent literature and investigate the evolution of adolescent literary content in the past century. Literature will also be studied where it has been translated into film (where possible). MTC goal areas: (6) Humanities and Fine Arts and (7) Human Diversity. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2115 3 credits
Children's Media
This course is based on the understanding that media saturates much of society and its influence begins in childhood. The course explores the history of media meant to instruct and entertain children and will utilize sociological and psychological perspectives and literary theories to examine a variety of media artifacts (including books, cartoons, television shows, video games, and movies). The course focuses on developing a critical understanding of how media directed at children (toddler through adolescent) both reflects and creates the interests, ethics, and multi-ethnic culture in which children grow up. MTC goal areas: (6) Humanities and Fine Arts, and (7) Human Diversity. (Prerequisites: ENGL1106 or equivalent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2116 3 credits
American Immigrant Literature
Deeply rooted in the United States are conversations about who is allowed into the country and what it means to be an American. This course uses the literary writings of immigrants to develop nuanced understanding of the issues surrounding "the huddled masses yearning to breathe free" and resultant cultural diversity in America. Reading a cross-section of works from the diaspora, students apply critical thinking to the concepts of status, exclusion, assimilation, discrimination, intersectionality, and group differences. Class content focuses on the conflicts and motivations, traditions and values, successes and failures of those who have chosen to make the United States their home. MTC goal areas: (6) Humanities and Fine Arts, and (7) Human Diversity. (Prerequisites: ENGL1106 or equivalent or concurrent enrollment or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2118 **3 credits**
From Literature to Film
Comparative analysis of literary works and their screen adaptations. Focus on aesthetic and interpretive similarities and differences. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2120 **3 credits**
African-American Literature
This course is an introduction to African-American literature through a study of representative samples of writing in a variety of genres. These writings will reflect the development of African-American literature over the past hundred years in America. Attention will be paid to the diversity and changes in the political climate both internal and external to African-American communities. MTC Goal areas: (6) Humanities and Fine Arts and (7) Human Diversity. (Prerequisites: ENGL1106 or concurrent enrollment, or equivalent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2130 **3 credits**
Native American Literature
This is an introduction to Native American oral tradition and its transition to today's literary works. Attention will be given to religious, political, familial, and economic pressures that have shaped today's emerging literary tradition. MTC goal areas: (6) Humanities and Fine Arts and (7) Human Diversity. (Prerequisites: ENGL1106 or concurrent enrollment or equivalent) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2132 **3 credits**
Minnesota Literature
This course will introduce students to Minnesota writers through major forms of literature: novel, short story, poetry, drama, essay, autobiography, and prose. It is designed to provide students with a chance to get to know local literary artists through their work. Primary emphasis is on reading, discussing, interpreting, and writing about Minnesota literature. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2140 **3 credits**
World Literature
A survey of world literature. Includes selections of fiction, poetry, and essays from Africa, the Middle East, Australia, Oceania, Europe, Latin America, the Caribbean, and North America. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: ENGL1106 or concurrent enrollment) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGL 2160 **3 credits**
Environmental Literature
This course explores environmentally-focused non-fiction, fiction, Poetry, and the relationship of people and policy with nature both in conflict and in harmony. Emphasis is on United States writers but will also include current worldwide environmental issues and events. Students will be encouraged to explore their own relationship to environment and nature throughout the course. MTC goal areas: (6) Humanities and Fine Arts, and (10) People and the Environment. (Prerequisites: ENGL1106 or instructor's consent) (3 hrs lec/0 hrs lec/0 hrs OJT)

ENGL 2999 **1-3 credits**
Special Topics in English
Study of special topics in English. Special course topics will be announced in the class schedule. (Prerequisites: ENGL1106 or concurrent enrollment)

Pre-Engineering

ENGR 1100 **2 credits**
Introduction to Engineering
This course introduces students to the various engineering professions and their role in the world. Students are introduced to the basic principles and physical laws present in engineering study. Computational engineering tools are explored. Students are introduced to the design process through a team design project. The importance of effective communication will be emphasized. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

ENGR 2101 **3 credits**
Statics
This course is designed for engineering majors. The course covers static equilibrium in two and three-dimensions. Students will use vector algebra to calculate force/moment vectors and their resultants.

Applications of equilibrium include particles, rigid-bodies, trusses, frames and machines, and friction. Also covered are centroids and moments of inertia. (Prerequisites: PHYS2201) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGR 2103 **3 credits**
Dynamics
This course is designed for engineering majors. The course utilizes a vector approach to the principles of dynamics. It includes simple particle and rigid-body kinematics/kinetics. Topics covered include Newton's laws of motion, work, energy, and impulse-momentum principles for particle and rigid body motion. (Prerequisites: ENGR2101 and MATH2220) (3 hrs lec/0 hrs lab/0 hrs OJT)

ENGR 2105 **4 credits**
Circuit Analysis 1
Circuit Analysis 1 is the first course in electrical circuits for all engineering majors. The foundations of electrical engineering are introduced. These concepts are used in developing the fundamentals of energy conversions, electronics, and circuit theory. The lab component provides hands-on learning of the lecture concepts and introduces proper use of the laboratory equipment. (Prerequisites: PHYS 2202 or equivalent, corequisite MATH 2220 or equivalent OR MATH 2206 or equivalent) (3 hrs lec/2 hrs lab/0 hrs OJT)

ENGR 2107 **3 credits**
Mechanics of Materials
This course includes the study and analysis of simple stress and strain, shear and bending moment, flexural and shearing stresses in beams, combined stresses, deflection of beams, statically indeterminate members, and columns. (Prerequisite: ENGR 2101) (3 hrs lec/0 hrs lab/0 hrs OJT)

Environmental Science

ENSC 1200 **4 credits**
The Environment and Sustainability
This class focuses on the relationship of humans to their environment from local, regional, and global perspectives. It includes the study of natural ecosystems, the impact of human activity on natural resources and environmental quality, environmental ethics, and strategies to maintain a sustainable biosphere. The laboratory component includes experiences in the scientific method, basic ecological and environmental field techniques and assessment, and selected field trips to local agencies, research facilities, and businesses. MTC goal areas: (3) Natural Sciences and (10) People and the Environment. (Prerequisites: College-level reading) (3 hrs lec/2 hrs lab/0 hrs OJT)

ENSC 1202 **1-3 credits**
Environmental Field Studies
An opportunity for students to study and pursue areas of special interest by performing field research projects under the supervision of a faculty member. This course may include extended field trips to selected regions. (Prerequisites: College level reading and writing)

ENSC 2010 **3 credits**
World Health and the Environment
This course introduces the student to populations, cultures and environments of the world and how they are connected with the health of both the planet and its inhabitants. Environmental, cultural, political, and ethical issues related to world health will be explored as well as measures being taken by the global community to improve world health. Students will be introduced to the chain of infection as it relates to infectious disease and pandemics and learn to apply data from major world health organizations for research purposes. Case studies and current issues will be used to explore the relationship between human health and the environment. Lab components of this course include the scientific method, the basic biology of pathogens, and basic epidemiology. MTC goal areas: (3) Natural Sciences and (10) People and the Environment. (Prerequisites: BIOL 1120 or ENSC 1200 or BIOL 1170 or BIOL 1007 or BIOL 1140 or BIOL 1000) (2 hrs lec/2 hrs lab/0 hrs OJT)

ENSC 2999 **1-3 credits**
Special Topics in Environmental Science
Study of special topics in environmental science. Special course topics will be announced in the class schedule.

Fire Technology & Administration

FIRE 1401 **2 credits**
Today's Fire Service
This course provides an overview to fire protection; career opportunities in fire protection and related fields; philosophy and history of fire protection/ service; fire loss analysis; organization and function of public and private fire protection services; fire departments as part of local government; laws and regulations affecting the fire service; fire service nomenclature; specific fire protection functions; basic fire chemistry and physics; introduction to fire protection systems; introduction to fire strategy and tactics. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 1404 **3 credits**
Fire Behavior and Combustion
This course explores the theories and fundamentals of how and why fires start, spread, and how they are controlled. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1408 **7 credits**
Fire Fighter I and II
This course is designed to teach the minimum job performance requirements for a Professional Fire Fighter in accordance with the National Fire Protection Association 1001, Fire Fighter I and II Professional Qualifications, with the focus on subjects not covered in further course work within the degree program. Note: A uniform is required. (Prerequisites: Medical approval (doctor's physical); (ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0460 or concurrent enrollment) (3 hrs lec/8 hrs lab/0 hrs OJT)

FIRE 1410 **3 credits**
Building Construction for Fire Protection
This course provides the components of building construction related to fire fighter and life safety. The elements of construction and design of structures are shown to be key factors when inspecting buildings, preplanning fire operations, and operating at emergencies. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1412 **3 credits**
Fire Apparatus Operation
This course provides a foundation of theoretical and practical knowledge to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and solve water supply problems. The basic functions of firefighting pumping apparatus will be taught including safe operation and operator maintenance. (Prerequisites: valid state driver's license) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 1414 **3 credits**
Fire Protection Hydraulics and Water Supply
This course provides a foundation of theoretical knowledge in order to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and to solve water supply problems. (Prerequisites: Valid driver's license) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 1420 **3 credits**
Inspection Codes & Practices
The Uniform Fire Code, the NFPA Life Safety Code, the Uniform Building Code, and the basics of conducting a fire prevention inspection will be learned through lecture, worksheets, and basic inspections. The student will also learn the details of inspection preparation, delivery, and methods for taking corrective actions. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 1430 **2 credits**
Hazardous Materials Operations
This course is designed to meet NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents, Operations Level. This course is also designed to comply with 29 CFR 1910.120 Hazardous Materials Operations Level. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 1431 **1 credits**
HazWoper/Safety Refresher
This course is designed to meet the requirements of various OSHA ongoing training requirements for various types of CFR part 29 industries. It focuses on what to do in a Hazardous Materials emergency both on and off site. Various types of environmental monitoring methods are used by the students, along with the equipment they need to assess the problem.

Required reports are also covered. (Prerequisites: Initial OSHA HazWoper Training as required by CFR 29 1920.120) (1 hr lec/0 hrs lab/0 hrs OJT)

FIRE 1432 0.5 credits
Hazwoper Refresher
This course is designed to meet NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents, Awareness, Operations,Technician, Specialists, and Incident Commander Levels. This course is also designed to comply with 29 CFR 1910.120 Hazardous Materials Response, DOT - applicable standards and EPA - applicable standards. This course allows the student to review the current standards and to strengthen their competencies. (Prerequisites: FIRE 2571, or Hazwoper 40-hour, 24-hour, or 8-hour) (.5 hr lec/0 hrs lab/0 hrs OJT)

FIRE 1435 2 credits
40-Hour Hazardous Waste
The purpose of this course is to promote safety and awareness among students to ensure that when employed in the future they operate in the safest possible manner in situations where contact with potentially hazardous materials is likely. (College-level reading, writing and math as defined by the TABE testing) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 1452 1 credits
Introduction to Heavy Vehicles
This course is designed to introduce safe, efficient operation of a heavy vehicle with emphasis on proper driving techniques, procedures, and vehicle inspection. This course is a prerequisite or must be taken in conjunction with FIRE1450. (Prerequisites: Valid driver's license) (0 crs lec/2 hrs lab/0 hrs OJT)

FIRE 1460 3 credits
Firefighting Tactics and Strategy
This course covers the basic fire fighting tactics and strategy used in all types of fire emergencies. Preplanning, size up, and application of tactics based on the selected strategy will be described and simulated for student learning. (Prerequisites: FIRE1406, FIRE2406 and concurrent enrollment in FIRE2511) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 1470 2 credits
Wildland Firefighting
This course covers basic fire fighting operations and equipment used in wildland fire fighting. The course will use appropriate state and federal wildland fire fighting procedures and references. There will be live fire exercises. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 1472 3 credits
Wildland Fire Leadership
This course pulls together the entry level supervisory courses (S-131 Firefighter Type 2 (Squad Boss), L-180 Human Factor & L-280 Fellowship to Leadership) for an individual who has the ability and desire to become a first level fireline supervisor as a lead firefighter or squad boss. This course covers situational awareness, basic communication responsibilities, attitudes and stress barriers, decision making process and teamwork principles. Some course delivery may be arduous in nature. These courses follow the National Wildfire Coordinating Group (NWCG) standards for Wildland Firefighters. (Prerequisites: FIRE 1470, "Red Card" eligible or approval of instructor) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1474 2 credits
S-211 Wildland Portable Pumps and Water Use
S-211 Wildland Portable Pumps and Water Use is a course designed to meet the training needs of those individuals needing formal training in order to gain competency in the use of protable pumps and water. (Prerequisites: FIRE1470 or currently Red Card eligible or approval of instructor) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 1476 3 credits
S-212 Wildland Fire Chain Saws
S-212 Wildland Fire Chain Saws is a course designed to provide introduction to the function, maintenance and use of internal combustion engine powered chain saws, and their tactical wildland fire application. Field exercises support entry level chain saw by providing hands-on cutting experience in surroundings similar to fireline situations. This course is required training for all wildland fire chain saw operator positions. It provides basic instruction in chain saw use for tactical fireline applications. (Prerequisites: FIRE1470 or

currently Red Card eligible or approval of instructor; currently certified in Basic First Aid and CPR)

FIRE 1478 2 credits
S-290 Intermediate Wildland Fire Behavior
This is a classroom-based skills course designed to prepare the prospective fireline supervisor to undertake safe and effective fire management operations. It is the second course in a series that collectively series to develop fire behavior prediction knowledge and skills. Fire environment differences are discussed as necessary; instructor should stress local conditions. This course meets the National Wildfire Coordinating Group (NWCG) standards for Wildland Firefighters. (Prerequisites: FIRE1470 or currently Red Card eligible or approval of instructor) (2 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 1502 3 credits
Fire Protection Systems
This course provides information relating to the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, water supply for fire protection and portable fire extinguishers. (Prerequisites: FIRE1401, FIRE 1404, FIRE 1410) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1504 3 credits
Principles of Fire and Emergency Services Safety and Survival
This course introduces the basic principles and history related to the national firefighter life safety initiatives, focusing on the need for cultural and behavior change throughout the emergency services. (Prerequisites: FIRE1401, FIRE1404, FIRE 2450) (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 1506 3 credits
Occupational Health and Safety for the Fire Service
This course introduces the basic concepts of occupational health and safety as it relates to emergency service organizations. Topics include risk and hazard evaluation and control procedures for emergency service organizations. (Prerequisites: FIRE1401, FIRE1504) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1510 1 credits
Public Fire Education
This course covers public fire education programs that are used throughout the United States and will teach the student the fundamental techniques involved in education. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1520 1 credits
Rope Rescue
For members of all Emergency Service Organizations. This course teaches the procedures for; selection, use, and maintenance of rope, rescue equipment and rope rescue systems. The students will learn the correct method(s) of tying knots, identify recommended personal protective equipment, construct single point anchor systems, select proper equipment and place edge protection, construct and use a belaying system, safety descend a fixed rope, construct and use lowering system. Students participate in high-line rope system skills to simulate the rescue of a victim. This course meets components of the NFPA 1671 Standards.

FIRE 1530 1 credits
Low Angle Rescue
This course is designed to teach the student proper techniques for safely performing rescues on low angle rugged terrain. The student will be able to perform rescues and patient transfer from both above and below when the patient is conscious or unconscious. (Prerequisites: FIRE1520 or FIRE2500, or instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1540 3 credits
Fire Fighter I and II
The intent of this course is to teach the student the minimum job performance requirements for a professional fire fighter in accordance with the National Fire Protection Association 1001, Fire Fighter Professional Qualifications and the National Fire Protection Association 1403, Live Fire Training for Evolutions In Structures. This course must be taken in concert with FIRE1550. (3 hrs lec/0 hrs OJT)

FIRE 1550 3 credits
Fire Fighter I and II Lab
The intent of this course is to teach the student the minimum job performance requirements for a

professional fire fighter in accordance with the National Fire Protection Association 1001, Fire Fighter Professional Qualifications and the National Fire Protection Association 1403, Live Fire Training for Evolutions In Structures. This course must be taken in concert with FIRE1540. (Prerequisites: Doctor's medical approval required) (0 hrs lec/6 hrs lab/0 hrs OJT)

FIRE 1556 3 credits
EMS First Responder
This is a Department of Transportation course that can lead to certification as a First Responder both at the state and national levels. This course covers the basics of out-of-hospital emergency care and patient packaging. It emphasizes use of available materials as well as prepackaged medical care supplies. (Prerequisites: If the student wishes to attain either state or national registration they must be 18 years of age prior to taking the exams and must be free of any felony convictions.) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1558 1 credits
EMS First Responder Refresher
This course fulfills the requirements for ongoing certification as a First Responder at either the state or national level. It covers all the topical areas included in the Department of Transportation EMS First Responder Curriculum. (Prerequisites: Current certification as a First Responder) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 1560 1 credits
Basic Life Support for Emergency Medical Service Providers
The American Heart Association designed the BLS for Healthcare Provider Course to prepare a wide variety of healthcare professionals to recognize several life-threatening emergencies and to provide CPR, use an AED and relieve choking in a safe, timely and effective manner. The course includes adult, child and infant rescue skills in both the out-of-hospital and in-hospital settings. (AHA course description) This course will go beyond the general BLS for Healthcare Providers of the AHA definition. It will be focused on additional care and treatment in the out-of-hospital environment. This will include, but not be limited to, bag valve mask of all ages, and oral airways, advanced airway use to include King Air, more in-depth cardiac anatomy and physiology, cardiac conduction, physiology of cardiac arrest dysrhythmias, and physiology of defibrillation. Participants taking this for the Emergency Medical Technician course should be enrolled in FIRE2480, FIRE2482 and FIRE2484. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

FIRE 1565 2 credits
Wilderness Survival
At the completion of this course, knowledge and experience gained through practical application of the concepts covered in the classroom will give an individual the tools they might need to survive in a wilderness environment with minimal equipment. This course is applicable to anyone who might find themselves in a survival situation away from civilization and supplies. Pilots, sportsmen, rescue workers, and others who might find themselves in the outdoors by circumstance and not by choice will benefit from the concepts presented. The goal is to raise awareness and the ability to make sound decisions in critical situations, and to be able to prioritize needs based on what is going on around the individual or group. (Prerequisites: None) (1 hr lec/2 hours lab/0 hrs OJT)

FIRE 1571 2 credits
Wilderness Search Concepts and Operations
This course will introduce the concepts and techniques that rescuers involved in outdoor and environmental searches will need to organize and conduct those activities. The qualities of the rescue personnel and strategies and tactics will be presented based on nationally accepted models and local case studies. There will be table top and outdoor activities related to these concepts that the students will complete. These concepts will have practical application exercises in the outdoor environment all year around. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 1573 1 credits
Water Search, Rescue, and Recovery
This course will introduce the basic concepts of water environment search, rescue, and recovery. The focus will be on the initial response to water and ice related emergencies and the operations that need to occur. There are considerations included for equipment choice, patterns, and tactics of searching for a

submerged object, scuba diving responses, and managing the scene that the rescuer may face when arriving at an emergency scene. Pathophysiologic issues of the victim and the responders will be discussed and planned. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

FIRE 1575 **1 credits**
Land Navigation
This course will provide the basic concepts and practices of navigating on land by using a compass, a map, and visualization skills. The use of Global Positioning Satellites and a handheld receiver will also be covered. The features of maps, compasses, and GPS units will be described and demonstrated. Practical navigation courses will be used to reinforce the skills and concepts delivered in the course. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

FIRE 2400 **3 credits**
Fire Service Reporting
This course covers the fundamentals of writing reports and the written transmission of official information required of fire service personnel. This information includes SOP/SOG's MNFIRS/NFIRS run reports including confined space and HazMat, and related letters, memos, and press releases. The principles of clear writing, grammar, spelling, and punctuation will be studied to complete required documentation. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2406 **3 credits**
Fire Fighter 2
This course is designed to teach the minimum job performance requirements for a Professional Fire Fighter in accordance with the National Fire Protection Association 1001, Fire Fighter Professional Qualifications with the focus on subjects not covered in further course work within the degree program. (Prerequisites: Medical approval physical, FIRE1406) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2420 **2 credits**
Fire Instructor
This course will focus on educational techniques both within and outside of the fire service. (Prerequisites: FIRE2430 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2430 **2 credits**
Fire Officer
This course is designed to introduce the student to the role of the Fire Officer. The course will focus on individual development, leadership techniques, team building, and problem solving. (Prerequisites: FIRE2420 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2440 **3 credits**
Fire Chem I
This course is designed to increase the working knowledge of the hazardous materials responders. Emphasis will be placed on understanding the basic chemical behavior and reasons for this behavior for hazardous materials. (Prerequisites: Hazard materials operations course and a college chemistry course are strongly recommended) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2445 **3 credits**
Hazardous Materials Chemistry
This course provides basic fire chemistry relating to the categories of hazardous materials including problems of recognition, reactivity, and health as encountered by firefighters. (Prerequisites: FIRE1401, FIRE1404) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2450 **3 credits**
Fire Prevention
This course provides fundamental information regarding the history and philosophy of fire prevention, organization and operation of a fire prevention bureau, use of fire codes, identification and correction of fire hazards, and the relationships of fire prevention with built-in fire protection systems, fire investigation, and fire and life-safety education. (Prerequisites: Enrollment in the Fire Technology program) (2 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2460 **3 credits**
Fire Inspection and Prevention Applications
The techniques and application of fire inspection and prevention practices will be developed and applied. Advanced concepts, code enforcement, and public education will be the primary focus with some special hazards explored. (Prerequisites: FIRE1420 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2462 3 credits
Introduction to Fire and Emergency Services Administration
This course introduces the student to the organization and management of a fire department and the relationship of government agencies to the fire service. Emphasis will be placed on fire service leadership from the perspective of the company officer. (Prerequisites: FIRE1401, FIRE1504, FIRE2450) (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2464 3 credits
Legal Aspects of the Fire Service
This course introduces the federal, state, and local laws that regulate emergency services, national standards influencing emergency services, standard of care, tort, liability, and a review of relevant court cases. (Prerequisites: FIRE1401, FIRE1504, FIRE2450) (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2470 3 credits
Fire Investigation I
This course is intended to provide the student with the fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the firesetter, and types of fire causes. (Prerequisites: FIRE1404, FIRE1410, FIRE2450) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2472 3 credits
Fire Investigation II
This course is intended to provide the student with advanced technical knowledge on the rule of law, fire scene analysis, fire behavior, evidence collection and preservation, scene documentation, case preparation and courtroom testimony. (Prerequisite: FIRE2470) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2480 2 credits
Introduction to Emergency Medical Technician
This is the first part of the three part Department of Transportation course designed as an introduction to the basic emergency care concepts and practices required to work for a Basic Life Support ambulance service throughout the United States. It covers introductory techniques and principles of out-of-hospital care. This course is required to achieve the National Registered Emergency Medical Technician level of out-of-hospital personnel. (Prerequisites: This class needs to be taken concurrently with FIRE2482 and FIRE2484. Current card for American Heart Association, CPR Health Care Provider) (1 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2482 3 credits
Emergency Medical Technician
This is the second part of the three part Department of Transportation course that is designed to expand on the introduction of the basic emergency care concepts and practices required to work for a Basic Life Support ambulance service throughout the United States. It covers techniques and principles of out-of-hospital care. This course is required to achieve the National Registered Emergency Medical Technician level of out-of-hospital personnel. (Prerequisites: This class needs to be taken concurrently with FIRE2480 and FIRE2484. Current card for American Heart Association, CPR Health Care Provider. Students must be 16 years old to take this course, and 18 years old and have a felony-free record to become nationally certified. Completion of FIRE2480 & FIRE2484; or current First Responder/EMR Certification; or instructor approval. Current NetStudy background check required. (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2484 3 credits
Emergency Medical Technician Lab
This is the third part of the three part Department of Transportation course designed for the basic emergency care concepts and practices required to work for a Basic Life Support ambulance service throughout the United States. It covers techniques and principles of out-of-hospital care. This course is required to achieve the National Registered Emergency Medical Technician level of out-of-hospital personnel. (Prerequisites: This class needs to be taken concurrently with FIRE2480 and FIRE2482. Current card for American Heart Association, CPR Health Care Provider. Students must be 16 years old to take this course, and 18 years old and have a felony-free record to become nationally certified. Completion of FIRE2480 & FIRE2482; or current First Responder/EMR Certification; or instructor aproval. Current NetStudy background check.) (0 hrs lec/6 hrs lab/0 hrs OJT)

FIRE 2486 **9 credits**
Emergency Medical Technician
This course will provide students the requirements to be eligible to test for the National Registry EMT Certificate. Emergency Medical Technicians provide out of hospital emergency medical care and transportation for critical and emergent patients who access the emergency medical services (EMS) system. EMTs have the basic knowledge and skills necessary to stabilize and safely transport patients ranging from non-emergency and routine medical transports to life threatening emergencies. Emergency Medical Technicians function as part of a comprehensive EMS response system, under medical oversight. Emergency Medical Technicians perform interventions with the basic equipment typically found on an ambulance. Emergency Medical Technicians are a critical link between the scene of an emergency and the health care system. (Prerequisites: None) (5 hrs lec/8 hrs lab/0 hrs OJT)

FIRE 2500 **2 credits**
Rescue Water Emergencies
This course covers the concepts, theories, and applications of rescue involving water and/or ice rescue. Specific focus will be placed on scenarios involving still and moving water and ice rescue. (Prerequisites: FIRE 2502) (0 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2502 **3 credits**
Rescue-Basic
This course covers the basic rescue techniques, tools and equipment. Specifically, students will participate in high-level rescue, ice rescue, confined-space rescue, auto extrication, and water rescue. (Prerequisites: FIRE 1408) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2503 **3 credits**
Rescue 2
This course is to develop the student's knowledge and skills in selected rescue scenarios. Focus will be on both high angle and low angle rescues and automobile extrication. (Prerequisites: FIRE 2502 Rescue-Basic) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2504 **3 credits**
Rescue 3
This course is to develop the student's knowledge and skills in selected rescue scenarios involving confined spaces and search, rescue, and recovery involving both water and wilderness situations. (Prerequisite: Fire 2502 Rescue-Basic) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2511 **3 credits**
Company Functions
This course is designed apply the knowledge and skills from previous courses and translate their application to the fire ground. We will specifically address Engine and Truck Company functions and their inter-relationship on the fire ground. (Prerequisites: Fire Fighter Skills Lab or FIRE 1408) (2 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2512 **3 credits**
Fire Fighting Tactics and Strategy
This course covers basic fire fighting tactics and strategy used in all types of fire emergencies. Preplanning, size-up, and application of tactics based on the selected strategy will be described and simulated for student learning. (Prerequisites: FIRE2511 or concurrent enrollment; ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0460 or concurrent enrollment) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2520 **2 credits**
Fire Management
This course covers the basic management techniques and procedures to improve crew production and morale. Other information will address the details of tactical response, budgeting processes, and the written information required for a fire department. (Prerequisites: 20 FIRE prefix credits) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2530 **2 credits**
Fire Apparatus Advanced
This course covers photographic principles, composition, film types, strobe and available light photography, camera handling techniques, preparation, and care and maintenance of photographic equipment. Students are shown techniques to enable them to take underwater

photographs that are properly composed, focused and exposed. (0 hrs lec/4 hrs lab/0 hrs OJT) (Prerequisites: FIRE1412)

FIRE 2540 **1 credits**
High Angle Rescue
This course is designed to teach the student proper techniques for safely performing rescues on steep or vertical terrain. The student will be able to perform rescues and patient transfer from both above and below when the patient is conscious or unconscious. (Prerequisites: FIRE1520 or FIRE2500 or instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2550 **1 credits**
Confined Space Rescue
This course is designed to acquaint students with the applicable State and Federal regulations pertaining to confined space operations. It will enable the students to select and use proper monitoring, ventilation, and retrieval systems for safe and effective confined space entry and rescue situations. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2551 **2 credits**
Rope Rescue Technician
This course is designed to teach the student the uses of ropes and rescue systems used in the fire service. Focus will be on the safest and proper ties, lifts, and belays for proper application to both self-rescue and to rescue others. This is a physically demanding course requiring the student to work in tight spaces and from varying heights and rescue scenarios. This course is designed to meet the technician level as defined in Chapter 6, Rope Rescue, of NFPA1670. (Prerequisites: FIRE2502) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2553 **2 credits**
Automobile Extrication and Rescue
This course is designed to teach the student the proper techniques and procedures for search and rescue, extrication, and disentanglement from motor vehicles. This course is based on the standards described in Chapter 8, Vehicle and Machinery Search and Rescue of NFPA1670. (Prerequisites: FIRE2502, FIRE1560 strongly suggested) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2560 **1 credits**
Fire Chem 2
This course is designed to increase the working chemical knowledge of the fire fighter and will focus on corrosive acids and alkalis, flammable solids, Class A fuels, and the hazards of plastics. (Prerequisites: FIRE2440 or instructor permission) (1 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2570 **3 credits**
Hazardous Materials Technician
This course is designed to meet NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents, Technician Level. This course is also designed to comply with 29 CFR 1910.120 Hazardous Materials, Technician Level. (Prerequisites: FIRE1430 and FIRE2440 or instructor's consent) (1 hr lec/4 hrs lab/0 hrs OJT)

FIRE 2571 **3 credits**
Hazardous Materials (HazWoper)
This course is designed to meet NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents, Technician Level. This course is also designed to comply with 29 CFR 1910.120 Hazardous Materials, Technician Level. (Prerequisites: Instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2600 **2 credits**
Emergency Medical Technician Refresher
This course covers the material and new techniques for the currently practicing EMT-Basic to successfully make the transition to the 1992 DOT curriculum. It will prepare the student to take the exams required by the MNEMSRB and the NREMT to continue providing emergency care in the field. The student must be currently registered as an EMT-Basic, or no more than one year past the expiration date. (Prerequisites: Current state or national registration as an EMT-B) (1 hr lec/2 hrs lab/0 hrs OJT)

FIRE 2602 **2 credits**
Concepts of Fire Service Careers
This course provides an overview of career opportunities in fire protection and related fields. The student will learn about fire department hiring and testing practices. The student will gain practical experience with job seeking skills including resume

building and preparation for oral board interviews. Special topics such as labor contracts and relations, fire department culture, recruitment and retention in the fire service will also be covered. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

FIRE 2605 **1 credits**
Fire Service Career Entry
This course provides an overview of fire service career opportunity and the typical processes involved for the candidate. The course will focus on applications, resumes', written and oral exams and the interview process. (Prerequisites: Fire Fighter skills lab or FIRE1408, FIRE1410 and FIRE1412) (0 hrs lec/2 hrs lab/0 hrs OJT)

FIRE 2610 **1 credits**
Fire Internship 100
This class is designed to give the student actual fire experience while under close supervision. Program schedule varies dependent on each fire department's schedule and needs. The student will be assigned a duty shift and will follow the rules of the internship and the rules of the individual department. (Prerequisites: FIRE 1408) (50 hrs/semester OJT)

FIRE 2620 **2 credits**
Fire Internship 200
This class is designed to give the student actual fire experience while under close supervision. Program schedule varies dependent on each fire department's schedule and needs. The student will be assigned a duty shift and will follow the rules of the internship and the rules of the individual department. (Prerequisites: FIRE 1408) (100 hrs/semester OJT)

FIRE 2630 **3 credits**
Fire Internship 300
This course is designed to give the student actual fire department experience while under close supervision. Program length and hours vary dependent on each fire department's schedule and needs. The student will be assigned a duty shift and will follow the rules of the internship and the rules of the individual department. This course may be taken for a maximum of three semesters. (Prerequisites: Refer to the specific requirements of each internship agreement, and successful completion of 18 FIRE prefix credits) (300 hrs/semester OJT)

FIRE 2999 **1-3 credits**
Special Topics in Fire Administration & Technology
Study of special topics in Fire Administration and Technology. Special course topics will be announced in the class schedule.

First Year Experience

FYE 1000 **1 credits**
First Year Experience
This course is designed to develop those behaviors students need to be successful in academia and future careers, including setting and achieving goals, demonstrating professionalism, and utilizing digital and physical resources. (1 hr lec/0 hrs lab/0 hrs OJT)

FYE 1005 **1 credits**
First Year Experience - TRIO
This course is designed to develop those behaviors students need to be successful in academia and future careers, including setting and achieving goals, demonstrating professionalism, and utilizing digital and physical resources. (1 hr lec/0 hrs lab/0 hrs OJT)

Geography

GEOG 1110 **3 credits**
Human Geography
Human Geography is the study of people, places, cultures, and the environment from a global perspective. Students learn about human populations and migrations, the world's cultural groups and realms, the political organization of the world, the global economy, and lifestyle differences between more and less developed regions. MTC goal areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: College level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

GEOG 1120 **4 credits**
Physical Geography
Students are introduced to the physical systems of the earth. Weather and climate, the earth's vegetation and ecological regions, and the processes of mountain building and gradation which shape the earth's landscapes are studied from a global perspective. MTC goal areas: (3) Natural Science and (10) People and the Environment. (Prerequisites: College level reading and writing) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOG 1130 **3 credits**
World Regional Geography
World regional geography is the study of people, places, cultures and the environment from a regional perspective, with a focus on individual nations within the following regions: North America, Middle/South America, Europe, Russia, North Africa/Southwest Asia, Sub-Saharan Africa, East Asia, South/Southeast Asia and Oceania. Students will examine the physical characteristics of these regions, including topography, water resources in rivers, lakes and aquifers, climate zones and vegetation patterns. Students will become acquainted with the important environmental, historical, economic, political and socio-cultural issues that have shaped the worlds major regions. Students will use political and physical maps, along with satellite images, to further understand each world regions. MTC Goal Areas: (5) History and Social and Behaviroal Sciences and (8) Global Perspective (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

GEOG 1202 **3 credits**
Introduction to Maps
This course focuses on the creation and use of maps. Beginning with a historical perspective of map production, students will learn fundamental skills in mapmaking, reading, and interpretation. More recent cartographic techniques will be explored, including GIS, GPS, and remote sensing. Laboratory component is fulfilled through a series of hands-on exercises in map analysis, cartographic techniques and skills. This course is designed to be a general education course and fulfills MTC goal areas: (3) Natural Sciences and (10) People and the Environment. (Prerequisites: College level reading and writing) (2 hrs lec/2 hrs lab/0 hrs OJT)

GEOG 1204 **3 credits**
GIS 1: Concepts and Applications
This course will introduce students to the fundamental concepts of Geographic Information Systems (GIS). Students will study vocabulary, and concepts of GIS mapping, and will apply these concepts throughout a series of lab exercises designed to build fundamental understanding and skills of GIS. (Prerequisites: GEOG1202 or instructor's consent. College level reading and writing) (2 hrs lec/2 hrs lab/0 hrs OJT)

GEOG 2999 **1-3 credits**
Special Topics in Geography
Study of special topics in geography. Special course topics will be announced in the class schedule.

Geology

GEOL 1110 **4 credits**
Introduction to Geology
Students are introduced to the materials of the earth's crust and learn how to identify the earth's primary rocks and minerals. Students study the geologic processes of the earth: plate tectonics, volcanic activities, earthquakes, weathering, erosion, glaciation, and landscape change. Other topics include geologic time, earth resources, and environmental problems. MTC goal areas: (3) Natural Science and (10) People and the Environment. (Prerequisites: College level reading and writing) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOL 1115 **4 credits**
Minnesota's Geology
Students are introduced to the 3.6 billion year geologic history of Minnesota. From its earliest volcanoes, mountain ranges, inland oceans, to its infamous glaciers during the last ice age. Some local and regional field trips required. MTC Goal Areas: 3 (Natural Sciences) and 10 (People and the Environment). (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOL 1125 **4 credits**
Geology of Natural Disasters
Natural disasters are investigated from a geologic perspective along with the societal impacts. Topics include: earthquakes, volcanic eruptions, tsunamis, mass-extinctions, floods, mudslides, global-warming, meteorite impacts and sea level changes. MTC goal areas: (3) Natural Sciences and (10) People and the Environment. (Prerequisites: College-level reading and writing, or instructor's consent) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOL 1130 **4 credits**
Earth's Resources
Students will learn about the nonrenewable resources of earth's crust from a global perspective (metallic minerals, fossil fuels, and industrial minerals): how they form; where they are located; how they are extracted, processed, and used; and the economic, environmental, social, and political impacts of utilizing these resources. Fulfills MTC goal areas: (3) Natural Sciences and (8) Global Perspective. (Prerequisites: College-level reading and writing) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOL 1135 **4 credits**
Introduction to Weather and Climate
Students will learn about global and large scale weather patterns; including air masses, wind patterns, cloud formations, and severe weather events. The difference between weather and climate will be addressed as well as human interaction in atmospheric processes and global climate change. Paleoclimatic research methods and evidence of past climates will also be introduced. MTC goal areas: (3) Natural Sciences and (10) People and the Environment (Prerequisites: College-level reading and writing, or instructor's consent) (3 hrs lec/2 hrs lab/0 hrs OJT)

GEOL 2999 **1-3 credits**
Special Topics in Geology
Study of special topics in geology. Special course topics will be announced in the class schedule.

GS 1200 **1-3 credits**
Explorations Abroad
Designed to accompany educational travel opportunities for LSC students, this course prepares participants for a more meaningful experience abroad. Students will follow a prescribed course of readings and studies on the country or region they will be visiting. This course requires participation on the travel abroad component. Tuition and fees for this course do not include the costs of the associated trip. MTC goal areas: (8) Global Perspective (Prerequisites: College-level reading and writing) (1-3 hrs lec/0 hrs lab/0 hrs OJT)

GS 1210 **3 credits**
Global Service Learning
Designed to accompany educational travel opportunities, this course prepares participants for a meaningful service-learning experience abroad. Students will follow a prescribed course of reading and studies on the country or region they will be visiting. The course requires participation in the education abroad experience. MTC goal areas: (8) Global Perspective (Prerequisites: College-level reading) (1 hrs lec/4 hrs lab/0 hrs OJT)

History

HIST 1110 **3 credits**
European History:Ancient to 1500
This course is a survey history of Europe/Western Civilization from the ancient era through the dawn of the modern period. Topics covered include: the ancient Mediterranean and Near East, ancient Greece, the Roman Republic and Empire, medieval Europe, the Italian Renaissance, and the origins of the global expansion of European power in the modern period. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1120 **3 credits**
European History:1500 to Present
This course is a survey history of Europe/Western Civilization from the age of European global expansion to the present. Topics covered include: the Reformation, the rise of monarchical states, the Scientific Revolution, the Enlightenment, the decline of absolutism, the French Revolution, the Industrial Revolution, the rise of liberalism and nationalism through European imperialism and competition, World War I, the rise of totalitarianism, World War II, the decline of colonialism, the Cold War in Europe, and the emergence of the European Union in the post-war era. MTC goal areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1130 **3 credits**
World History:Ancient to 1500
Examines ancient, classical, and medieval civilizations prior to the emergence of the West as a world power

(3500 BCE-1450 CE). The course explores how economic, political, social, religious, intellectual, environmental, and cultural factors combined in different ways to influence the development of major world regions. The history of Mesopotamia, Egypt, West Africa, China, India, Greece and Rome, and the Americas will be addressed. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1135 **3 credits**
World History:1500 to Present
Surveys how the modern world that we live in today has come to be--world history from the rise of Europe to the present era (1500 to Present) and how the peoples of the world were linked through cultural, racial, religious contact and clash; migration and industrialization; and modern imperialism. Students will examine how technological, economic, social, religious, political, and cross-cultural factors combined to influence the expansion of the West and, in turn, the development of Africa, Latin America, and Asia. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1200 **3 credits**
Women in American History
This course surveys the history of women in the United States from the Colonial era to the present day. It explores how women and expected gender roles shaped American society and culture during key moments and transformations in history. The course examines why women are largely missing from most narratives of American history while considering how race, class, ethnicity, and historical circumstances structured the limits and possibilities of their lives. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1210 **3 credits**
United States' History to 1877
This course surveys the political, economic, and social history of the United States during the colonial and early national periods. It examines the plight of Native American peoples and the history of slavery in the United States, immigration patterns and the growth of the republic, as well as expansionism, sectionalism, Civil War, and the Reconstruction Era. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1220 **3 credits**
United States' History since 1877
This course surveys the political, economic, and social history of the United States during the period of Reconstruction, the new South and the new West. It also covers segregation, industrialization, immigration patterns, the Progressive era, World War I, the Great Depression and the New Deal, World War II, and Cold War America. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1230 **3 credits**
World History Since 1945
Considers historical issues and events that have shaped the world since the end of the Second World War--this course examines how the present world has come to be. Students will examine: the ideological, East-West divide during the Cold War and related conflicts; decolonization, revolution, and independence movements; economic and cultural globalization. The course will have a non-western focus with an emphasis on Asia, Africa, and Latin America. MTC Goal Areas: (5) History and Social and Behavioral Sciences, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 1999 **1-3 credits**
Special Topics in History
Special topics in history. Special course topics will be announced in the class schedule.

HIST 2110 **3 credits**
Minnesota History
This course examines Minnesota's history from the pre-historic and Native American periods through European discovery and American settlement to the present. Topics include: geographical aspects of Minnesota; Native American groups in Minnesota;

European exploration and the fur trade; initial American settlement; statehood; the Dakota Conflict; the Civil War; the connection between Minnesotans and the natural environment; the Progressive Era and the 1920's; the Depression and World War II; and the state's economic, cultural, and political history since 1945. MTC goal areas: (2) Critical Thinking, (5) History & the Social and Behavioral Sciences, and (10) People & the Environment. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 2125 **3 credits**
The World Wars 1914-1945
This course explores the contexts, course, and consequences of the First and Second World Wars. The early twentieth century world wars catalyzed the transformation of the world system from a centuries-long pattern of growing European power to one in which Europe was eclipse by US and Soviet superpower while formerly-colonized peoples regained autonomy. As such, these conflicts played a central role in shaping the global present. The course will trace diplomatic and military developments in the crucial contexts of underlying political, social, cultural, and economic changes in a modernizing world system. MTC Goal Areas: (5) History and the Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: READ0465 and ENGL0460) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 2130 **3 credits**
America's War in Vietnam
This course examines the evolution of America's war in Vietnam, including the political, ideological, military, and social history of the Vietnam War. It explores the antecedents and legacies of this now distant conflict, a crucial body of knowledge in understanding recent American history. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (9) Ethic and Civic Responsibility. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

HIST 2999 **1-3 credits**
Special Topics in History
Study of special topics in history. Special course topics will be announced in the class schedule.

Health, Physical Education, and Recreation

HPER 1100 **3 credits**
Career Exploration in Exercise Science
This course examines the historical and philosophical foundations, and professional careers in the field of exercise science. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1108 **1 credits**
Beginning Yoga
A beginning level course following the innovative techniques of Hatha and Raja Yoga, intended to promote strength, endurance and flexibility, reduce stress, and induce an overall sense of well-being. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1110 **1 credits**
Yoga II
This course expands on the fundamentals of beginning hatha yoga and is intended for those with some hatha yoga background. Through asanas (poses) and movement linking these postures, students will develop strength, balance and flexibility. Through breath control (Pranayama) students will also learn to improve one's ability to focus and concentrate. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1112 **1 credits**
Core Training
This course focuses on the stabilizing muscles of the spine, pelvis, and shoulder. During each class students participate in core strengthening exercises inspired by Pilates, Yoga, and other disciplines. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1114 **2 credits**
Self Defense for Life
A system of self-defense responses including awareness, assessment, action, and physical force in response to unwarranted aggression. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

HPER 1116 **1 credits**
Resistance Training
This course explores the fundamentals of resistance training. Using a variety of resistance techniques, students participate regularly in strength and

endurance training. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1206 2 credits
Weight Control through Walking
Introduction to walking as a blueprint for weight control and a healthier lifestyle. Various fitness parameters are measured, both pre- and post-. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

HPER 1214 2 credits
Running a Marathon
Introduction to the training and skills necessary to participate in a running race of marathon or half marathon distance. This course will cover many aspects of training for a marathon, including basic training principles, basic sports physiology, nutrition, equipment selection, and race strategy. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

HPER 1216 1 credits
Snowshoeing
This course is designed to introduce students to the techniques and preparation needed to successfully participate in and organize a snowshoe outing. The course will cover snowshoeing techniques, equipment, clothing, and preparation for day trips. The primary focus in this course is to have students take part in snowshoeing hikes on the Lake Superior College campus, as well as, local trails and actively experience the physical and mental benefits of this winter activity. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1230 1 credits
Summer Outdoor Activities
Introduction to the skills, techniques, and safety necessary for summer outdoor recreation. This course will briefly highlight the areas of archery, canoeing, orienteering, outdoor cooking, fire building, and challenge course. A personal property fee will be charged in addition to tuition. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1236 2 credits
Boundary Waters Experience
This is a beginning-level course introducing students to wilderness philosophy and ethics, safe and environmentally-sensitive camping and canoeing skills, and the pristine beauty, natural history, human history and geology of Northern Minnesota and the United States Boundary Waters Canoe Area Wilderness. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

HPER 1302 3 credits
Nutrition
This course examines the principles of human nutrition with an emphasis on nutrients, food sources, and their utilization in the body for growth, health maintenance and disease prevention. Students will also evaluate contemporary issues, dietary behaviors, and cultural influences in nutrition. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1304 2 credits
Nutrition/Athletic Performance Education
This course is designed to introduce the student to principles of nutrition as they specifically relate to the unique needs of physically active-people and athletes. The course builds on the knowledge of basic nutrition to provide the student with an understanding of how to use nutrition to get the most out of training and sports performance. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1306 3 credits
Tobacco, Alcohol and Other Drugs
This course approaches drugs and drug use from a variety of perspectives: behavioral, physiological, social, and legal. It is designed to provide students with the knowledge and skills necessary to evaluate drug use in their own lives. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1322 3 credits
Personal Training
This course is designed to provide the learner with the knowledge and abilities necessary to competently perform the tasks required of successful fitness and training professionals. Upon completion of this course students should be well prepared to take the NCSF-CPT (National Council on Strength and Fitness Certified Personal Trainer) certificate exam. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1324 **3 credits**
Personal Wellness
A course designed to develop and actively pursue individual health and fitness goals in a noncompetitive atmosphere. Students will examine current health issues and the dimensions of wellness in the wellness lifestyle. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1326 **2 credits**
Lifetime Fitness
A course designed to develop and actively pursue individual health and fitness goals. Students will regularly participate in a variety of indoor and outdoor activities to improve overall fitness and initiate a commitment to lifetime fitness. (Prerequisites: None) (1 hr lec/2 hrs lab/0 hrs OJT)

HPER 1330 **2 credits**
Fundamentals of Training Theory
Designed to introduce students to the basics of using a systematic approach to training athletes. The course will focus on using sound scientific principles derived from exercise physiology and applying those principles to a complete training plan. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1332 **3 credits**
Introduction to Exercise Science
Examines the physiological changes occurring as a direct result of applied physical movement. Major emphasis upon the principles of resistance training, conditioning, and the interplay of human body systems. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

HPER 1334 **3 credits**
Assessment of Physical Fitness
This course examines measurement of health related and skill-related components of physical fitness. Students will explore the principles of assessment and the application of appropriate testing for desired information and application to specific populations. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1402 **1 credits**
Intercollegiate Soccer I
This course is for students who participate on the intercollegiate soccer team only. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the National Junior College Athletic Association rules. (Prerequisites: Must be a member of intercollegiate soccer team and eligible based on the NJCAA rules) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1403 **1 credits**
Intercollegiate Soccer II
This course is for students who participate on the intercollegiate soccer team only. Athletes must be in their sophomore year and have completed Soccer I. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the National Junior College Athletic Association rules. (Prerequisites: HPER1402; must be a member of intercollegiate soccer team and eligible based on the NJCAA rules) (0 hrs lec/2 hrs lab/0 hrs OJT

HPER 1406 **1 credits**
Intercollegiate Cycling I
This course is for students who participate on the intercollegiate cycling team only. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the USA Cycling rules. (Prerequisites: Must be a member of intercollegiate cycling team and eligible based on the USAC rules) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1407 **1 credits**
Intercollegiate Cycling II
This course is for students who participate on the intercollegiate cycling team only. Athletes must be in their sophomore year and have completed Cycling I. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the USA Cycling rules. (Prerequisites: Must be a member of intercollegiate cycling team and eligible based on the USAC rules) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1408 **1 credits**
Intercollegiate Trapshooting I
This course is only for students who participate on the intercollegiate trapshooting team. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director. (Prerequisites: Must be a member of intercollegiate trapshooting team) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1409 **1 credits**
Intercollegiate Trapshooting II
This course is only for students who participate on the intercollegiate trapshooting team. This course is a continuation of advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director, be in their sophomore year, and have completed Trapshooting I. (0 hrs lec/2 hrs lab/0 hrs OJT) (Prerequisites: HPER 1408. Must be a member of intercollegiate trapshooting team.)

HPER 1410 **1 credits**
Intercollegiate Basketball I
This course is only for students who participate on the intercollegiate basketball team. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the National Junior College Athletic Association rules. (Prerequisites: Must be a member of intercollegiate basketball team and eligible based on the NJCAA rules) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 1411 **1 credits**
Intercollegiate Basketball II
This course is only for students who participate on the intercollegiate basketball team. Athletes must have completed Intercollegiate Basketball I. This course offers advanced skill instruction and an intercollegiate athletic experience. Students must have the consent of instructor or athletic director and be eligible based on the National Junior College Athletic Association rules. (Prerequisites: HPER1410; must be a member of intercollegiate basketball team and eligible based on the NJCAA rules) (0 hrs lec/2 hrs lab/0 hrs OJT)

HPER 2999 **1-3 credits**
Special Topics in Physical Education
Study of special topics in health, physical education and recreation. Special course topics will be announced in the class schedule.

Humanities

HUM 1105 **3 credits**
Introduction to Popular Culture
This course examines artifacts of popular culture (such as art, music, advertisements, social media, gaming) and their power to generate cultural capital. Drawing upon history and archetypal theory, students will explore how portrayals in popular culture shape personal identity, societal values, and global perceptions. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

HUM 1110 **3 credits**
The Bible as Literature
Selected readings and analysis of Old and New Testaments with emphasis on literary characteristics of the text, including archetypal plots, patterns and characters. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading and writing; READ1450 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

HUM 1123 **3 credits**
Film Genres: The Science Fiction and Fantasy Film
An examination and analysis of the conventions and innovations in the science fiction and fantasy film genre. Emphasis will be placed on the explication of landmark SF&F films from Fritz Lang's Metropolis (1926) to Peter Jackson's Lord of the Rings trilogy (2003). (Prerequisites: Prior completion of HUM1140. Modern Fantasy very helpful but not required. College level reading and writing.) (3 hrs lec/0 hrs lab/0 hrs OJT)

HUM 1130 **3 credits**
World Religion
Exploration of the teachings and practices of several major world religions selected from ancient and classical polytheism, Zoroastrianism, Gnosticism, Christianity, Judaism, Islam, Taoism, Buddhism, Hinduism, and various Native American, African and

Australian cultures. Emphasis given to literary as well as scriptural texts. MTC goal areas: (2) Critical Thinking, (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading and writing; READ1450 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

HUM 1160 **3 credits**
Classical Greek and Roman Mythology
The course includes important classical Greek and Roman myths, their major archetypal patterns, and their interpretation by various authors. This course is designed as a foundation to prepare students for other literature courses by introducing them to the literary illusions and mythological references found in American, British, and other literatures. MTC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: College-level reading and writing; READ1450 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT

HUM 1180 **3 credits**
World Mythology
An analysis and comparison of myths from around the world. Considerable emphasis will be placed on discerning archetypal characters, plots, motifs, and the discovery of universal patterns of human behavior in the myths. MTC goal areas: (6) Humanities and Fine Arts (fulfills literature requirement) and (8) Global Perspective (Prerequisites: College-level reading; ENGL 1106 recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

HUM 1999 **1-3 credits**
Special Topics in Humanities
Study of special topics in humanities. Special course topics will be announced in the class schedule.

HUM 2015 **3 credits**
Film Appreciation
This course examines the motion picture as an art form and as a medium for cultural expression, exploring the origins and evolution of film and the film industry through selected screenings, readings, and analysis. MIC goal areas: (6) Humanities and Fine Arts, and (8) Global Perspective. (Prerequisites: ENGL1106 with a grade of "C" or better; READ1450 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

Integrated Manufacturing Technology

INMG 1111 **3 credits**
Introduction to Project Management
Introduction to the principles and practices associated with project management in a professional environment, to include the utilization of project management methodology in support of planning the participants academic career as a student in the Engineering Technology program. In further support of the participants academic career, the course will also emphasize professional communications in various written and electronic formats. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

INMG 1400 **4 credits**
Introduction to Manufacturing Technology
This course covers the beginning introduction use of tools used in manufacturing such as saws, drill press, engine lathes, and milling machines. (Prerequisites: None) (2 hrs lec/4 hrs lab/0 hrs OJT)

INMG 1410 **3 credits**
Mechanical Print Reading
This course covers mechanical print reading principles. Topics included are sketching, lines, views, multiview drawings, scaling, dimensioning, tolerancing, and symbols. (Prerequisites: (ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and MATH0520; or concurrent) (3 hrs lec/0 hrs lab/0 hrs OJT)

INMG 1412 **3 credits**
Advanced Mechanical Blueprint Reading
This course would cover advanced blueprint reading activities. Geometric Dimensioning and Tolerancing will be covered in more depth. (Prerequisites: INMG1410) (3 hrs lec/0 hrs lab/0 hrs OJT)

INMG 1420 **3 credits**
Design Application Concepts I
This course covers the design and production of a complex assembly using manual and CNC machines. A team approach will be used to design and manufacture the product. Industrial and Engineering standards will be utilized in the design process. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

INMG 1422 **3 credits**
Design Application Concepts II
This course covers the design and production of a complex assembly using manual and CNC machines. Geometric Design and Tolerance (GD&T) principles will be incorporated into the design and inspection of the part. A team approach will be used to design and manufacture the assembly. Industrial and Engineering standards will be utilized in the design process. (Prerequisites: INMG1420) (1 hr lec/4 hrs lab/0 hrs OJT)

INMG 1450 **3 credits**
Prototyping Processes
This course will involve building a complete prototype using various cutting edge processes used in industry today and the skills learned throughout the Integrated Manufacturing Technology, Rapid Prototyping and Design program. (Prerequisites: CADE1450, college-level reading and writing, or concurrent enrollment, or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

INMG 1460 **2 credits**
Intro to Industrial Robotics
This course provides the student with introductory knowledge about industrial robotics, robot programming, integration and safety. Through classroom lectures, the student will receive information about robotics used in industrial environments. The students will also obtain hands-on skills while completing lab exercises using industrial robots. (Prerequisites: ENGL0950 or READ0950, or ENGL0955 or READ0955, may be taken concurrently, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and 33 or higher on the Elementary Algebra portion of the CPT, or completion of MATH 0520, may be taken concurrently, or equivalent transfer course) (1 hr lec/2 hrs lab/0 hrs OJT)

INMG 1462 **1 credits**
Intro to Manufacturing Automation
This course provides the student with introductory knowledge about automated manufacturing techniques, industrial automation, Automation Controllers (PLC's), Human Machine Interface (HMI) integration, and manufacturing automation safety. (Prerequisites: ENGL0950 or READ0950, or ENGL0955 or READ0955, may be taken concurrently, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; and 33 or higher on the Elementary Algebra portion of the CPT, or completion of MATH 0520, may be taken concurrently, or equivalent transfer course) (1 hr lec/0 hrs lab/0 hrs OJT)

INMG 1464 **2 credits**
Basic Industrial Control Devices
In this course, the student will learn the basics of industrial controls devices. They will learn the fundamentals of how these devices operate and how they are used for control of manufacturing automation. To do this the student will learn about control relays, motor starters, contactors, proximity sensors, limit switches, level detectors, and pneumatic valves and cylinders through classroom lectures and hands on lab exercises. (Prerequisites: Concurrently enrollment in ELTN 1402 and ELTN 1412) (1 hr lec/ 2 hrs lab/0 hrs OJT)

INMG 1466 **2 credits**
Industrial Controls Wiring
In this course, the student will learn the basics of industrial controls wiring which include: wire selection parameters (wire size and type, insulation composition and color, and minimum bend radius); conduit selection parameters (size, type, fill, bending and wire pulling techniques); and wire termination techniques (screw terminals, compression ends, strip length and labeling). (Prerequisites: INMG 1464) (1 hr lec/2 hrs lab/0 hrs OJT)

INMG 1560 **4 credits**
Advanced Industrial Robotics and Manufacturing Automation
In this course, the student will learn advanced skills in industrial robotics and manufacturing automation, robotics and industrial safety, and machine integration. Through lab exercises students will interface industrial robots with automation equipment while learning advanced robot programming skills such as tool paths, tool frames, tool offset and center points, and input/output control. The student will obtain skills in designing, building and programming a manufacturing cell in a team environment. (Prerequisites: INMG1460, INMG1462, INMG1464, concurrently enrollment in

INMG1466, ELTN1432, ELTN1470 and ELTN2442) (2 hrs lec/4 hrs lab/0 hrs OJT)

INMG 1570 3 credits
Mechanical Components
This course provides the student with an understanding of mechanical components related to automated manufacturing. Through classroom lectures and hands-on labs the student will receive instruction pertaining to the application, integration, safety, maintenance and trouble-shooting of mechanical devices. (Prerequisites: INMG1560) (2 hrs lec/2 hrs lab/0 hrs OJT)

INMG 1999 1-3 credits
Special Topics in Integrated Manufacturing
Study of special topics in integrated manufacturing careers. Special course topics will be announced in the class schedule.

INMG 2999 1-3 credits
Special Topics in Integrated Manufacturing
Study of special topics in integrated manufacturing careers. Special course topics will be announced in the class schedule.

Paralegal Studies

LGST 1400 3 credits
Legal Studies I: Terminology and Procedures
This course introduces the student to the specific terminology and procedures used by paralegal professionals and to the proper documentation of legal information. It also covers legal ethics, legal analysis, legal evidence, and investigation. (Prerequisites: College-level reading and writing and keyboarding and word processing ability) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1410 3 credits
Legal Studies II: Introduction to Research
This course covers methods of research and document preparation used by the legal profession, including citation forms, appellate procedure within the specific areas of the law. The administration of a law office and formal advocacy are included, as well as a review of legal writing style. (Prerequisites: LGST1400 or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1415 3 credits
Legal Ethics for the Paralegal
This course covers the ethical obligations of paralegals and other law office support staff. The course includes in-depth study of the ethical rules that govern the work of attorneys, paralegals, and others who work in the legal environment. Students will be introduced to the types of ethical dilemmas that they will face in a legal practice and be given a framework from which to undertake an analysis of an ethical problem. (Prerequisites: College level reading and writing and LGST 1400(Legal Studies I) or concurrent enrollment) (3 hrs lec/0 hrs lab/0hrs OJT)

LGST 1420 3 credits
Business Law - An Introduction
This course is an introductory course in the principles of business law as they apply to individuals and businesses. This course focuses on the ethical, social, and political perspectives underlying the United States legal system. Topics include the operation of the United States legal system, constitutional law as it affects businesses, intellectual property, contracts, contracts for the sale of goods, agency and employment law, and business organizations. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1425 2 credits
Business Law:Commercial Topics
This course is a continuation of the study of the principles of business law as they apply to individuals and businesses. Special attention is given to the law governing the performance and enforcement of commercial contracts. Topics include agency and employment law, business organizations, administrative law, negotiable instruments, secured transactions, creditor/debtor relations, federal and state law regulating consumer credit and collection procedures. (Prerequisites: College-level reading and writing) (2 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1429 3 credits
Legal Writing
This course will develop the writing skills of the paralegal student. Students will become familiar with the writing techniques used to create legal documents through the use of sample forms and

practical drafting exercises. Strong emphasis is placed on proper writing methodology and formatting. (Prerequisites: LGST 1410 or instructor consent; students are strongly encouraged to take ADSC 1420 prior to registering for this course) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1430 3 credits
Advanced Legal Research
This course will familiarize the paralegal student with advanced and specialized approaches to utilizing the legal sources available in the law library and online. In addition, this course will provide the student with experience in the developing the analytical reasoning and writing skills required of all legal professionals through the preparation of legal documents, memoranda, and letters. (Prerequisites: LGST 1429) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1455 3 credits
Civil Litigation
This course provides an introduction to civil litigation procedure and practice in state and federal courts. Specific attention is given to the paralegal's role in civil litigation, with emphasis on applicable rules of civil procedure that govern the commencement of litigation, the discovery process, and preparation for trial. (Prerequisites: LGST1410) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1460 3 credits
Criminal Law and Procedure
This course introduces the paralegal student to the substantive and procedural aspects of criminal law and the role of the paralegal in the criminal justice system. The course will focus on the prosecution and defense of criminal proceedings, with special attention to principles of criminal liability and substantive defenses to crimes under Minnesota law. The constitutional safeguards and protections afforded to criminal defendants by the U.S. Constitution and the Minnesota Rules of Criminal Procedure from arrest through trial, sentencing, punishment, and appeal will also be studied. (Prerequisites: LGST1410)(3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1470 3 credits
Wills, Trusts, and Probate
This course discusses the paralegal's role in estate planning and probate process. The course will explore various tools available to achieve the goal of estate planning: non-probate conveyances, wills, trusts, durable powers of attorney, intra-family gifts, and charitable transfers. Students will also be exposed to the ethical issues involved in estate planning and the increasing use of living wills and health care directives. (Prerequisites: College level reading and writing and LGST1400 (Legal Studies I) or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1480 3 credits
Family Law
This course presents fundamental common law and statutory concepts of family law with emphasis on the paralegal's role in this area. Topics include formal and informal marriages, separation, divorce, annulment, marital property, the parent-child relationship, child custody and support, adoption, paternity, and family court procedures. (Prerequisites: College level reading and writing and LGST1400 (Legal Studies I) or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1510 3 credits
Bankruptcy Law
This course is designed to introduce paralegal students to the complexities of bankruptcy law to help train them to work as paralegals in the area of bankruptcy. It also provides paralegals working in other areas of law with the knowledge they may need to assist their attorney with clients who receive notice of bankruptcy. (Prerequisites: College level reading and writing and LGST1400 (Legal Studies I) or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1520 3 credits
Real Property
This course examines the basic principles in the law of real property. Students will explore topics in the ownership and transfer of real property interests, including parties to a real estate transaction, the sales agreement surveys, deeds, leases, deeds of trust, mortgages and the role of a paralegal in each. The course stresses the understanding and preparation of legal instruments necessary for a real estate closing. (Prerequisites: College level reading and writing and LGST1400 (Legal Studies I) or instructor consent)(3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 1530 **3 credits**
Torts and Personal Injury
A review of the general nature of tort law covering intentional torts, negligence, appropriate standards of conduct, product liability law, tort immunities, and medical malpractice. Specific attention is given to the nature of personal injury litigation documentation, investigation, and practices, including the evaluation of claims for damages and the formalities of adjudication and settlement. (Prerequisites: College level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

LGST 2995 **3 credits**
Paralegal Internship
This course provides the student with practical work experience in the paralegal field. The internship should give the student the opportunity to apply what is learned in the classroom through the assignment of paralegal tasks and responsibilities consistent with an individually prepared learning objectives plan. (Prerequisites: Instructor consent required) (0 hrs lec/0 hrs lab/9 hrs OJT)

LGST 2997 **1 credits**
Paralegal Capstone
This course is designed to provide the paralegal student who is familiar with law office procedures, legal research, letter writing, document preparation, and client contact an opportunity to integrate classroom concepts into the legal working environment. Students will have opportunities to develop the skills and abilities required of practicing paralegals through completion of a paralegal internship, concurrent employment in a legal working environment, participation in providing pro bono legal services or equivalent service learning, or a combination of activities. In addition, students will prepare a comprehensive portfolio evidencing the completion of program outcomes. (Prerequisites: Completion of or concurrent enrollment in last semester of required Paralegal Studies (LGST) courses or instructor consent.) (0 hrs lec/2 hrs lab/0 hrs OJT)

LGST 2999 **1-3 credits**
Special Topics in Paralegal Studies
Study of special topics in Paralegal Studies. Special course topics will be announced in the class schedule.

Math

MATH 0460 **4 credits**
Algebra I
This course covers metric and US system of measurement, variable expressions, linear equations and inequalities, linear function graphing, systems of equations and inequalities, polynomials, factoring, and applications. (Prerequisites: READ0950 or ENGL0950 or a placement score of 236 or above on the NG Reading test and appropriate placement score of 236-250 on the NG QAS test AND 237-300 on the NG Arithmetic test OR 270-300 on the Arithmetic NG test) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0470 **3 credits**
Algebra II
This course covers factoring, operations with radical and rational expressions and equations, complex numbers, quadratic equations and function, non-linear inequalities, operations of functions, and applications. (Prerequisites: MATH0460, with a grade of "C" or higher, or its equivalent, or appropriate placement test score of 71-120 on the elementary algebra test) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0501 **3 credits**
Math Foundations 1
This is a self-paced, skill mastery developmental mathematics course. It is an individualized, computer-based learning experience which is an alternative delivery to the traditional developmental math sequence offered at Lake Superior College. The instructor will provide instruction, guidance, and monitor progress. A course placement test will determine which modules a student has yet to complete. Students must complete four modules in modules 1-11 with 80% mastery to pass the course; however students have the option of completing as many modules as needed in one semester. Students mastering modules 1-7 will have the equivalent of MATH0460; modules 8-11 is equivalent to MATH0470. If students in Math Foundations choose to register in the traditional developmental math sequence, the completion of module equivalents or a new Accuplacer score (at student cost) will determine their placement. Math Foundations 1 is a pre-requisite course to Math Foundations 2 where

students will be able to continue their individual developmental mathematical studies without repetition of previously mastered modules. (Prerequisite: students must have taken the Accuplacer Mathematics exam and place in the developmental math sequence: 33-70 on the elementary algebra test OR 70-120 on the arithmetic test OR 50-75 on the arithmetic diagnostic test; AND READ/ENGL0950 (can be taken concurrently) or placement score of 56 or higher on reading comprehension test) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0502 **3 credits**
Math Foundations 2
This is a self-paced, skill mastery developmental mathematics course. It is an individualized, computer-based learning experience which is an alternative delivery to the traditional developmental math sequence offered at Lake Superior College. The instructor will provide instruction, guidance, and monitor progress. Math Foundations 1 is a pre-requisite course to Math Foundations 2 where students are able to continue their individual developmental mathematical studies without repetition of previously mastered modules. Students must complete a minimum of four modules in modules 5-11 with 80% mastery to pass the course; however, students have the option of completing as many modules as needed in one semester. Student mastering modules 1-7 will have the equivalent of MATH0460; modules 8-11 is equivalent to MATH0470. If students in Math Foundations choose to register in the traditional developmental math sequence, the completion of module equivalents of a new Accuplacer score (at student cost) will determine their placement. (Prerequisite: MATH0501) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0503 **3 credits**
Math Foundations
This is a self-paced, skill mastery developmental mathematics course. It is an individualized, computer-based learning experience which is an alternate delivery to the traditional developmental math sequence offered at Lake Superior College. The instructor will provide instruction, guidance, and monitor progress. In Math Foundations 3, students are able to finish their individual developmental mathematical studies without repetition of previously mastered modules. Students must complete their remaining modules necessary for their field of student with 80% mastery to pass the course. Students needing to complete 1 module will receive 1 credit; students needing to complete 2 or 3 modules will receive 2 credits. Mastery in modules 1-7 is equivalent to MATH0460 and master in modules 8-11 is equivalent to MATH0470. (Prerequisites: MATH0501 OR MATH0502) (1-2 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0950 **5 credits**
Essentials of Mathematics: Intermediate
This course covers topics in elementary algebra, beginning statistics, problem solving, and geometry. Content consists of ratios and rates, conversions, algebraic expressions, applications using formulas, geometric principles of parallel and perpendicular lines, transversals, triangle angle and side measurement, properties of similar and congruent polygons, circumference and area of circles, perimeter and area of regular and irregular polygons, and volume and surface area of solids. Students achieving a “C” or better in this course may enroll in MATH 0470, MATH 1105, MATH 1115, or MATH 2210. (Prerequisites: A placement score of 250 or above on the NG Reading test or concurrent enrollment READ/ENGL 0950/0955, or passing grade in READ/ENGL 0950/0955, or instructor consent; and placement score of 220-250 on the NG QAS test AND 236-250 on the Arithmetic NG test OR 250-300 on the Arithmetic NG test) (5 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0955 **4 credits**
Essentials of Mathematics: Advanced
This course covers topics in elementary algebra, beginning statistics, problem solving, and geometry. Content consists of ratios and rates, conversions, algebraic expressions, applications using formulas, geometric principles of parallel and perpendicular lines, transversals, triangle angle and side measurement, properties of similar and congruent polygons, circumference and area of circles, perimeter and area of regular and irregular polygons, and volume and surface area of solids. Students achieving a "C" or better in this course may enroll in MATH 0470, MATH 1105, MATH 1115, or MATH 2210. (Prerequisites: A placement score of 250 or above on the NG Reading test or concurrent enrollment

READ/ENGL 0950/0955, or passing grade in READ/ENGL 0950/0955, or instructor consent; and placement score of 236-250 on the NG QAS test AND 250-300 on the NG Arithmetic test OR 270-300 on the Arithmetic NG test) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0970 **3 credits**
Intermediate Algebra
This course covers factoring, operations with radical and rational expressions and equations, quadratic equations, graphing linear and quadratic equations, linear and non-linear inequalities, and operations of functions. (Prerequisites: READ or ENGL 0950/0955, or higher placement (may be taken concurrently); and MATH0460, or MATH 0950 or MATH 0955, with a grade of "C" or higher, or its equivalent, or appropriate placement test score) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0980 **2 credits**
This course is designed to provide developmental mathematics instruction and essential foundational skills for students enrolled concurrently in a linked section of MATH 1105. Topics will parallel topics being studied in MATH 1105. This course emphasizes communication about mathematical ideas, development of critical thinking ability and quantitative literacy through problem-solving, mathematical reasoning, interpreting graphs and data displays, equation-solving, and math success strategies. This is a college readiness course and does not fulfill a Minnesota Transfer Curriculum goal area. (Prerequisites: Must be taken concurrently with MATH 1105. NG QAS score of 237-249 and NG Arithmetic score of 270- 300; or NG QAS score of 250-300 and NG AAF score of 200-236; and NG Reading score of 250-300.) (2 hrs lec/0 hrs lab/0 hrs OJT)

MATH 0982 **2 credits**
Statistics Preparation
This is a course designed to prepare students enrolled concurrently in MATH 2210, General Statistics. It will focus on fundamental math skills needed to analyze statistical data. Course topics will align with topics of MATH 2210 to better prepare students for more complex statistics content. Topics include technology use of statistical functions, basic numeracy of real numbers, principles of counting, linear functions, and translating phrases to algebraic expressions. (Prerequisites: Must be taken concurrently with MATH 2210. NG AAF score of 237-249) (2 hrs lec/0 hrs lab/0 hrs OJT)

MATH 1100 **4 credits**
College Algebra
This MN Transfer course is an extension of Intermediate Algebra. Topics covered include equations, inequalities, radicals, functions and their graphs, polynomial functions, rational functions, logarithmic functions, exponential functions, and systems of equations including matrices. This course is intended for those needing it for their program or degree, as well as those continuing on in Calculus or Finite Mathematics and Survey of Calculus. MTC goal areas: (4) Mathematical/Logical Reasoning (Prerequisites: MATH 0970, with a C or better, or placement score of 250 or higher on AAF test) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 1105 **3 credits**
Mathematical Reasoning
This course is an investigation into the nature of mathematics. Students will apply mathematical principles to varied disciplines including an exploration of social and global issues. Students will experience mathematics as a creative and evolving discipline. Topics will include problem solving strategies; financial applications; growth and decay; probability and statistics; sets and logic. MTC goal areas: (4) Mathematical/Logical Reasoning (Prerequisites: NG QAS score of 250-300 and NG AAF score of 237-300; or NG QAS score of 230-249 and enrollment in MATH 0980; or NG Arithmetic score of 270-300 and enrollment in MATH 0980; or completion of MATH 0460, MATH 0950, or MATH 0955 with a "C" or better; and NG reading score of 250-300) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 1115 **4 credits**
Contemporary Mathematics
This course covers Boolean algebra, logic, measurement, geometry, trigonometry, statistics and algebra involving linear, quadratic and radical functions. MTC goal area: (4) Mathematical/Logical Reasoning. (Prerequisites: READ or ENGL 0950/0955, or higher placement; MATH 0950 or MATH 0955, with a grade of "C" or higher, or its equivalent, or NG placement score 250-300 on QAS and 237-300 on AAF) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 1125 **5 credits**
Finite Mathematics and Survey of Calculus
This course covers functions, matrices, systems of linear equations and inequalities, introduction to linear programming, finance, and an introduction to calculus with a focus on business applications. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH1100 or MATH 1150 (minimum grade 2.0 GPA equivalent); or appropriate placement test score; or instructor consent) (5 hr lec/0 hr lab/0 hr OJT)

MATH 1130 **3 credits**
Trigonometry
This course covers the following topics in mathematics: angles, circular functions, identities, right triangles, Law of Sines, Law of Cosines, trigonometric equations, vectors, DeMoivres theorem, polar form of functions and polar graphs, parametric equations, and vectors. MTC goal areas: (4) Mathematical/Logical Reasoning (Prerequisites: MATH 1100 with a C or better, or equivalent) (3 hours lec/0 hrs lab/0hours OJT)

MATH 1150 **4 credits**
Pre-Calculus
This course covers topics necessary for success in Calculus and beyond. Topics include functions and their graphs, polynomial functions, rational functions, logarithmic functions, exponential functions, analytic trigonometry, and inverse trigonometric functions as well as an introduction to polar coordinates, parametric equations, vectors, and conic sections. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH 0970 with a "C" or better, or placement score of 250 or higher on AAF test) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 2204 **5 credits**
Calculus I
The first course in single variable calculus. Topics include limits, continuity, fundamentals of differentiation, differentiation of trigonometric functions, application of derivatives, indefinite and definite integrals, calculus of exponential and logarithmic functions, calculus of trigonometric and inverse trigonometric functions, and hyperbolic functions. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH1150, with a C or better; or both MATH1100 and MATH 1130, with a C or better; or a score of 100 or higher on the Math portion and 76 or higher on the Elementary Algebra portion of the CPT) (5 hrs lec/0 hrs lab/0 hrs OJT) (5 hrs lec/0 hrs lab/0 hrs OJT)

MATH 2205 **5 credits**
Calculus II
This course covers the following topics: integration, indeterminate forms, improper integral, infinite series, analytic geometry, polar coordinates, and parametric equations. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH2204 or equivalent) (5 hrs lec/0 hrs lab/0 hrs OJT)

MATH 2206 **4 credits**
Calculus III
This course covers Calculus of vector-valued functions of two or more variables. Topics include line integrals, surface integrals, Green's Theorem, Stokes' Theorem and the Divergence Theorems. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH2205, with a "C" or better, or equivalent) (4 hrs lec/0 hrs lab/0 hrs OJT)

MATH 2210 **3 credits**
General Statistics
An introductory course in descriptive and inferential statistics. The following topics will be covered: organizing data; averages and variations around the mean; probability and probability statistics; binomial, normal, and sampling distributions; estimations; hypothesis testing; testing variance; regression and correlation; and chi-square analysis. MTC goal area: (4) Mathematical/Logical Reasoning. (Prerequisites: MATH0470, MATH 0970, MATH 0950, or MATH 0955, with a "C" or better; or NG AAF score of 250 or higher; or NG AAF score of 237-249 if taken concurrently with MATH 0982) (3 hrs lec/0 hrs lab/0 hrs OJT)

MATH 2220 **4 credits**
Differential Equations with Linear Algebra
This course is an introduction to vectors, matrices, eigenvalues and eigenvectors, first and second order differential equations, higher order differential equations, Laplace transforms, systems of differential equations, and mathematical models. MTC goal areas:

(4) Mathematical/Logical Reasoning. (Prerequisites: MATH2205) (4 hrs lec/0 hrs lab/0 hrs OJT)

Media Studies and Production

MCOM 1400 **3 credits**

Introduction to Mass Communication

An introduction to the development, functions, and changing landscape of mass communication and the media. Emphasis is placed on current media structure and operation, technological changes, concentrated ownership and regulations, and the impact on the individual and the culture. Additional focus is placed on building media literacy skills. MTC Goal Areas: (9) Ethical and Civic Responsibility. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

MCOM 1410 **3 credits**

Introduction to Digital Multimedia

This course is an introduction to various digital multimedia concepts and applications. Students will learn to create digital video and audio compositions; basic animations; and proper methods of saving, storing, and presenting of the work. In addition, students will explore multimedia as an art form and as a medium for expression. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: Working knowledge of Windows or Macintosh platform) (3 hrs lec/0 hrs lab/0 hrs OJT)

MCOM 1420 **3 credits**

Digital Video Production

This course will provide an introduction to the technical and aesthetic aspects of digital video production. Students will develop fundamental understanding, skills, and proficiency in camera production. Students will develop fundamental understanding, skills, and proficiency in camera set-up and operation, lighting, basic audio, pre-production, and editing techniques. Students will work individually and as a team to plan, shoot, and edit short projects. Students are encouraged to draw on individual backgrounds, skills, experiences, etc. in their approach to their work. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT, or previous course or experience, can be taken concurrently) (2 hrs lec/2 hrs lab/0 hrs OJT)

MCOM 1422 **3 credits**
Audio for the Media
This course will introduce the students to sound editing for use in video and multimedia projects. Audio software will be used to create loop-based audio, edit pre-made audio, and sync audio and video. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT [or previous course or experience] can be taken concurrently) (2 hrs lec/2 hrs lab/0 hrs OJT)

MCOM 1424 **3 credits**
Digital Video Editing
This course will expand on the skills and concepts introduced in Digital Video Production. Students will explore the principles of advanced computer controlled and non-linear digital editing. Students will work as a team to plan, shoot, and edit short projects. Students will create desktop video with Avid Express and Adobe Premiere software. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

MCOM 1426 **3 credits**
Project Production Management
This course will introduce the students to the process of evaluating clients' needs, preparing written production documents, and completing class-initiated projects. Students will learn script writing techniques for multimedia productions. (Prerequisites: None) (2 hr lec/2 hrs lab/0 hrs OJT)

MCOM 1428 **3 credits**
Interactive Media Production
This course provides students with a comprehensive experience creating interactive media. Students will learn how to author and post multimedia content to web-based applications, as well as author DVDs using Adobe creative software. Experience in digital video production and digital video post-production is extremely helpful. (Prerequisites: MCOM1424 [can be taken concurrently]) (1 hr lec/4 hrs lab/0 hrs OJT)

MCOM 1431 **3 credits**
Writing for the Media
This course covers theory and practice in writing creative material for radio, television, and film. Introduces students to various media writing formats. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

MCOM 1433 **3 credits**
Podcast & Radio Production
This course offers students training in radio and podcast operation and management. Emphasis is placed on audio content creation, formatting, scheduling, copy writing and preparation, and commercial promotions. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

MCOM 1435 **3 credits**
Video Graphics and Animation
This course introduces students to the artistic elements of computer graphics, screen design, and animation principles. Students will work extensively with Adobe and Avid software systems. (Prerequisites: None) (1 hr lec/4 hrs lab/0 hrs OJT)

MCOM 1795 **1 credits**
Portfolio Production
This course will provide an opportunity for the student to assemble and prepare projects that will become part of the student portfolio. Student portfolios will be evaluated by an external source such as an advisory committee. (Prerequisites: MCOM1420, MCOM1422, and MCOM1424 [or previous course or experience] can be taken concurrently) (0 hrs lec/2 hrs lab/0 hrs OJT)

MCOM 1797 **1-3 credits**
Media Studies Internship
A cooperative training program between Lake Superior College and businesses which allows students to apply competencies learned in the program to an employment work experience. (Prerequisites: MCOM1422 and MCOM1424 [or previous course or experience] can be taken concurrently) (0 hrs lec/0 hrs lab/3-9 hrs OJT)

Medical Assisting

MEDA 1405 **3 credits**
Medical Assistant Administrative Procedures I
This course introduces the Medical Assistant student to the administrative skills routinely performed by the medical assistant in an ambulatory care setting including: scheduling appointments, registering patients, basic legal concepts including patient privacy, informed consent and confidentiality. Students will discover their roles and responsibilities

as a member of a healthcare team. Students will understand a variety of ways in which patients may communicate in the medical office. Telecommunication, computer skills, use of the internet and use of office equipment will be covered. Documentation, filing, and paper medical records will be taught. (Prerequisites: ADSC1430, ALTH1410 and BIOL1000; ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT and MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT, all with a "C" or better) (2 hrs lec/2 hrs lab/0 hrs OJT)

MEDA 1406 3 credits
Medical Assistant Administrative Procedures II
Introduces basic concepts of use and maintenance of an Electronic Health Records (EHR) system. Provides exposure to basic navigation of an EHR. Explores issues around privacy, security, government regulations and ethical and legal aspects of the health information technology environment. (Prerequisites: MEDA1405 or instructor consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

MEDA 1410 1 credits
Professionalism and Safety in Healthcare
This course includes basic OSHA safety standards, hazard communication, blood borne pathogens, and the role of regulatory agencies in the ambulatory care and laboratory setting. Also covered is Emergency preparedness, including the identification of community resources. This course prepares students for a career in healthcare in the areas of professionalism, employment, leadership, and career development. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 250 or higher on the reading portion of the NGA) (1 hrs lec/0 hrs lab/0 hrs OJT)

MEDA 1505 2 credits
Medical Assistant Clinical Procedures I
This course introduces MA students to the clinical procedures performed in the medical clinic setting. Students perform basic examining room skills including screening, vital signs, patient history, and patient preparation for routine and specialty exams in the ambulatory care setting. (Prerequisites: All first semester Medical Assistant program planner courses, or instructor consent) (1 hr lec/2 hrs lab/0 hrs OJT)

MEDA 1506 3 credits
Medical Assistant Clinical Procedures II
This course builds upon the knowledge and skills introduced in Medical Assistant Clinical Procedures I. Students will perform clinical procedures including administering medications, assisting with minor surgery, setting up a sterile field, performing an electrocardiogram, assisting with respiratory testing, educating patients/community, and maintaining clinical equipment in an ambulatory care setting. (Prerequisites: All first semester Medical Assistant program planner courses, or instructor consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

MEDA 1510 2 credits
Pharmacology and Math for Medical Assistants
This course will cover concepts and application of pharmacological principles. The class focuses on drug classifications, principles and medication administration, calculation of drug problems and conversions between measurement systems, and patient instructions. (Prerequisites: All first semester Medical Assistant program planner courses, or instructor consent) (2 hr lec/0 hrs lab/0 hrs OJT)

MEDA 2417 4 credits
Medical Assistant Externship
The Medical Assistant Externship is an unpaid practicum, under professional supervision, in an ambulatory healthcare setting. This course provides the opportunity for the student to apply the knowledge, skills, and professional attitudes and behaviors learned throughout the Medical Assistant Program. (Prerequisites: Successful completion of all program academic course work, completed medical history and physical, current immunizations and background check) (0 hrs lec/0 hrs lab/12 hrs OJT)

MEDA 2420 1 credits
Medical Assistant Certification Exam Review
This course is designed as a review tool for the MA student in preparation for credentialing examination. (Prerequisites: Successful completion of all pre-technical and Medical Assistant semester I and II coursework) (1 hr lec/0 hrs lab/0 hrs OJT)

Medical Laboratory Technician

MLTN 1400 2 credits
Introduction to Medical Laboratory Techniques and Instrumentation
This course focuses on basic clinical laboratory procedures and behavior common to all clinical laboratories including but not limited to: laboratory safety, good laboratory practices, regulatory agencies and laboratory organization, microscopy, centrifugation, pipetting, reagent preparation, quality control, basic laboratory instrumentation and procedures, laboratory calculations (math), professional behavior and expectations, and effective communication in the clinical environment. (Prerequisites. Admission to the MLT program or consent of the instructor or program director.) (1 hrs lec/2 hrs lab/0 hrs OJT)

MLTN 1410 3 credits
Immunology and Serology
This course focuses on the basic concepts of immunology combining theoretical principles and serological techniques commonly used in the clinical serology laboratory. Clinical features of selected disorders, their immunological dysfunction, laboratory diagnostic testing principles and procedures are included as an integral part of the course material. Autoimmune disorders, organ transplant rejection, diagnosis of infectious diseases including hepatitis B, C, HIV, and identification of tumor markers are major categories where serological test procedures are employed as diagnostic tools and which are covered in the course. (Prerequisites: Acceptance into the MLT program or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

MLTN 1420 3 credits
Hematology
Basic hematology theory and laboratory skills are covered in this course with the focus placed on normal blood cells (white blood cells, red blood cells, and platelets), their function and recognition of their microscopic characteristics. Basic hematology procedures are practiced during the laboratory sessions; procedures that are performed in the clinical laboratory to assess the function and health of these blood cells. (Prerequisites: Admission to the MLT program and completion of MLTN1400 and MLTN1404 or instructor's consent) (2 hr lec/2 hrs lab/0 hrs OJT)

MLTN 1422 4 credits
Medical Microbiology
This course focuses on isolation and identification of clinically significant bacterial pathogens through the study of their morphology and growth characteristics. Manual as well as automated techniques for identification and susceptibility testing are practiced. New methodologies in medical microbiology are introduced. Heavy emphasis is placed on correlation of specimen source, and clinical signs and symptoms of disease, with pathogen identification, and antibiotic susceptibility as related to virulence factors and acquired resistance genes. Students are trained in safety and quality assurance standards required in the medical microbiology laboratory. (Prerequisites: Admission to the MLT program and successful completion of MLTN1400, MLTN1410, MLTN1424 or consent of instructor or program director.) (2 hrs lec/4 hrs lab/0 OJT)

MLTN 1424 3 credits
Urinalysis and Body Fluids
This course trains students to correlate renal physiology in health and disease with the chemical and microscopic examination of urine. Students will learn proper techniques to identify all elements that may be found in urine during various disease states, as well as proper quality control and reporting formats. This course also includes study of the production and purpose of several other relevant body fluids analyzed in the clinical laboratory. Students will correlate various conditions and disease states with chemical and/or microscopic analysis of these other body fluids. Correlation of clinical presentation with laboratory testing in Inborn Errors of Metabolism is also discussed. Principles and methods of diagnostic testing are correlated with the operation of laboratory instrumentation used in urine and body fluid analysis. (Prerequisites: Concurrent MLTN1400 and MLTN1410) (2 hr lec/2 hrs lab/0 hrs OJT)

MLTN 1426 2 credits
Immunohematology
Applying immunological theory and practice, this course focuses primarily on transfusion of blood.

Major blood groups systems (ABO, Rh) and the laboratory testing required prior to transfusing blood are emphasized heavily in this course. Quality control of equipment and reagents are discussed and practiced during laboratory exercises. Additional fees are associated with this course. (Prerequisites: Admission in the MLT program and completion of MLTN1410 or instructor's consent) (1 hr lec/2 hrs lab/0 hrs OJT)

MLTN 1428 2 credits
Clinical Chemistry
This course will cover the principles and procedures of clinical chemistry including correlation of laboratory results with disease. Specific content covered includes: laboratory automation and informatics, immunoassays, amino acids, proteins, non-protein nitrogen compounds, enzymes, carbohydrates, lipids and lipoproteins, Emphasis will be placed on chemistry methods and techniques employed in the quantitation of the analytes found in each of the above content areas. Quality control procedures will be incorporated into all laboratory testing practiced during the laboratory sessions. (Prerequisites: Completion of CHEM1110 or higher, BIOL1140, BIOL1141, MLTN1400, MLTN1410, MLTN1424, or consent of instructor or program director.) (1 hrs lec/2 hrs lab/0 hrs OJT)

MLTN 1430 1 credits
Molecular Diagnostics
This course will introduce the MLT student to molecular diagnostics int he clinical laboratory. Emphasis will include: the biochemistry of nucleic acids, introduction to genetics, history of molecular diagnostics in the clinical laboratory, specimen collection and processing for molecular diagnostics, introduction to molecular methodologies used int he clinical laboratory for detection of infectious microorganisms and mutations in inherited diseases, and malignancy and quality control in molecular diagnostics. The role of molecular diagnostics in evidence-based medicine will also be covered. (Prerequisite: Good standing in the MLT program and concurrent enrollment in MLTN1428 or consent of instructor or program director) (1 hr lec/0 hrs lab/0 hrs OJT)

MLTN 1518 3 credits
Medical Laboratory Procedures
This course is an introduction to the clinical laboratory and waived laboratory testing performed in hematology, urinalysis, immunology, serology, transfusion services, clinical chemistry, microbiology, and toxicology. Regulatory and safety practices are critical to safe and accurate testing and will be continually practiced during all laboratory sessions. (Prerequisites: Enrollment in the Medical Assistant program) (2 hr lec/2 hrs lab/0 hrs OJT)

MLTN 1574 2 credits
Collection Procedures and Skills for Phlebotomists
This course teaches students about equipment, supplies and skills needed to collect blood from patients. Both dermal puncture and venipuncture techniques are addressed with emphasis on patient empathy and professional communications. (Prerequisites: Enrollment in a LAS healthcare program, or instructor's consent). (1 hrs lec/2 hrs lab/0 hrs OJT)

MLTN 1610 4 credits
Medical Laboratory Assistant Basics
This course focuses on basic laboratory knowledge and functions common to all clinical laboratories including but not limited to: laboratory safety, good laboratory practices, regulatory agencies and laboratory organization, centrifugation, specimen handling and processing, pipetting, reagent preparation, quality control, basic laboratory instrumentation used for Point Of Care (POC) testing and other waived procedures, laboratory calculations (math), professional behavior and expectations, and effective communication in the clinical environment. (Prerequisites: MATH0955 or equivalent with a "C" or better . May not be taken concurrent with program courses; College-level reading) (2 hr lec/4 hrs lab/0 hrs OJT)

MLTN 1620 3 credits
Medical Laboratory Assistant Clinical Practicum
This course focuses on practical clinical laboratory functions required of Medical Laboratory Assistants working in clinical laboratories including but not limited to: laboratory safety, good laboratory practices, regulatory agency requirements, laboratory organization, specimen processing including receipt,

aliquoting, centrifugation, assessment of acceptability, handling, delivery to testing areas and storage. Under preceptor supervision, students will be introduced to the use of laboratory information systems, reagent preparation, quality control, interactions with high-throughput instrumentation, waived testing procedures, clerical responsibilities and be assessed for professional behavior and effective communication in the clinical environment. (Prerequisites: MLTN 1610 with a "C" or better) (0 hr lec/0 hrs lab/120 hrs OJT)

MLTN 2420 **3 credits**
Special Hematology
Medical Laboratory Technician students will learn how to identify both benign and malignant diseases of the hematopoietic system including the anemias and leukemias. Diseases and corresponding screening and confirmatory test procedures and the use of automated cell counters in the measurement of hematological parameters are a primary focus of this course. Coagulation testing and disease correlation are also emphasized. (Prerequisites: Admission to the MLT program and completion of MLTN1420 or instructor's consent) (2 hrs lec/2 hrs lab/0 OJT)

MLTN 2422 **2 credits**
Special Microbiology
Ova and parasites, fungal agents (yeasts and molds), mycobacterial pathogens, and viruses are the infectious groups emphasized in this course. Identification of each pathogen is emphasized and includes selection of specimens to examine, routes of transmission, isolation media, and macroscopic and microscopic characteristics as applicable. Disease correlation and disease prevention are covered as well. (Prerequisites: Admission to the MLT program and completion of MLTN1422 or instructor's consent) (1.5 hrs lec/1 hr lab/0 OJT)

MLTN 2426 **2 credits**
Special Immunohematology
This course focuses on the collection of blood from donors looking at all aspects of that process including: donor assessment, donor unit collection, donor unit processing, and donor unit testing. More involved blood bank procedures are covered as well including: work-up of suspected transfusion reactions, panel interpretation of antibodies, and special procedures. (Prerequisites: Admission to the MLT program and completion of MLTN1426 or instructor's consent) (1 hr lec/2 hrs lab/0 hrs OJT)

MLTN 2428 **2 credits**
Special Clinical Chemistry
This course will cover principles, procedures and condition/disease correlations of clinical chemistry. Special content covered will include: Blood Gases, Endocrinology (hormones), Drug Monitoring, Toxicology, Electrolytes, and Tumor Markers. Emphasis will be placed on understanding the theory of chemistry methods and techniques employed in the quantification of the analytes found in each of the above content areas. (Prerequisites: Completion of MLTN 1428 with a C or better; MATH 0470; READ 0955; or instructor consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

MLTN 2444 **2 credits**
Medical Laboratory Skill Development
This course reinforces the basic skills required for attaining proficiency in performing entry level medical laboratory procedures in Clinical Chemistry, Hematology, Immunohematology, Microbiology, Phlebotomy, and Urinalysis. It is designed to allow repetition and practice of hands-on skill activities and enhance the practical aspects of the MLT laboratories with direct supervision of an instructor. (Prerequisites: Good standing in the MLT program and concurrent enrollment in MLT courses in the third semester or consent of the instructor or program director.) (1 hr lec/2 hrs lab/0 hrs OJT)

MLTN 2480 **1 credits**
Medical Laboratory Skill Refresher
This course is for students enrolled in the Medical Laboratory Technician, Phlebotomy, and or Medical Assistant programs who have stepped out of any of these programs for a short period of time and/or students enrolled in the Med Lab Technician program who have decided to extend the completion of the program from two to three years. The course focuses on refreshing clinical laboratory testing skills prior to an internship at a clinical/medical facility. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT and MATH0470) (0 hrs lec/2 hrs lab/0 hrs OJT)

MLTN 2500 **1 credits**
Medical Laboratory Technician Seminar
MLT seminar is the capstone course for MLT students attending clinical practicum. Students will be expected to research and analyze cases and/or disease states and correlate these with appropriate laboratory data. Students are expected to present an assigned project and will be expected to defend their presentation. Students will engage in professional activity by attending a professional conference for laboratory personnel. The course includes practice for the ASCP Board of Certification exam and exposure to principles of leadership in the clinical laboratory environment. (Prerequisites: Enrollment in the internship portion of the Medical Laboratory Technician program [Semester V] or instructor's consent) (1 hr lec/0 hrs lab/0 hrs OJT)

MLTN 2505 **11 credits**
Medical Laboratory Technician Clinical Practicum
The Clinical Practicum is a cooperative learning experience between the MLT program at LSC and area clinical laboratory facilities. The clinical laboratory rotations included in this practicum are: Phlebotomy, Hematology, Coagulation, Urinalysis, Clinical Chemistry, Transfusion service, Immunology/Serology and Microbiology. (Prerequisites: Admission to the MLT program and completion of all MLT courses for semesters 1 through 3 with a grade of "C" or better ((MLTN1400, 1410, 1420/2420, 1422/2422, 1424, 1426/2426, 1428/2428, 1430, 1572 or 1574, and 2444)). Students are required to take MLTN2500 Medical Laboratory Technician Seminar concurrently with MLTN2505 Medical Laboratory Technician Clinical Practicum) (0 hrs lec/0 hrs lab/33 hrs OJT)

MLTN 2577 **1 credits**
Phlebotomy Internship
The Phlebotomy internship is a cooperative learning experience between the Phlebotomy program at LSC and area clinical laboratory facilities. Students will hone their skills in blood collection and gain an understanding of their role in healthcare. The phlebotomy experience will include patient interaction at clinics, hospitals and/or other facilities. Students will be expected to purchase and wear clean scrubs, present themselves professionally, use good phlebotomy technique, show respect and empathy to patients as well as respect to preceptors and other authority figures. Phlebotomy internships are competitive based on grades and evaluations of professional behavior. (Prerequisites: MEDA 1410, ALTH 1440 and MLTN 1574 with a C or better; and current background studies and immunizations) (0 hrs lec/0 hrs lab/3 hrs OJT)

MLTN 2999 **1-3 credits**
Special Topics in Medical Laboratory Technician
Study of special topics in medical laboratory technician. Special course topics will be announced in the class schedule.

Machine Tool Careers

MTCC 1432 **2 credits**
Quality Methods
This course covers the use of advanced inspection tools used in manufacturing. Also, Statistical Process Control (SPC) is covered and demonstrated. (Prerequisites: INMG1400) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1505 **2 credits**
Surface Grinder I
This course covers surface grinding for squareness, flatness, and other grinding operations. Grinding wheel selection, dressing wheels, set ups, and safety aspect will be covered. (Prerequisites: INMG1400) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1520 **1 credits**
Cylindrical Grinding
This course covers the basic cylindrical grinding principles. Topics included are safety, set up, grinding wheels, and operating the grinder. (Prerequisites: INMG1400) (0 hrs lec/2 hrs lab/0 hrs OJT)

MTCC 1530 **2 credits**
Waterjet Cutting Processes
This course covers the programming, set-up, operation, and safety of CNC Waterjet cutting machines. Students will generate program using the "Flow TM" path software. Students will be able to safely load material and programs in order to execute cutting operations. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, may be taken concurrently, or equivalent, or 78 or higher on the reading comprehension portion of the CPT, or

instructor consent; and 33 or higher on the Elementary Algebra portion of the CPT or completion of MATH 0520, or equivalent transfer course, or instructor consent) (1 cr lec/2 hrs lab/0 hrs OJT)

MTCC 1600 **1 credits**
Engineering Materials
This course covers heat-treating concepts, procedures and methods. Secondary operations like plating, anodizing and other coatings. Machinability, properties and identification methods of both ferrous and non-ferrous materials are also covered. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

MTCC 1603 **2 credits**
Turning
This course covers the advanced principles of engine lathes operation, set-up, selection of tooling, and use of attachments. (Prerequisites: INMG1400) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1604 **2 credits**
Milling
This course covers advanced milling machine operations. Topics included are set-up, selection of tooling, and use of milling attachments. (Prerequisites: INMG1400) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1606 **1 credits**
Horizontal Milling & Indexing
This course covers horizontal milling machine operations. Topics included are safety, set-up, use of milling attachments, and indexing. (Prerequisites: MTCC1604) (0 hrs lec/2 hrs lab/0 hrs OJT)

MTCC 1608 **3 credits**
Toolroom Machining I
This course covers advanced building of jigs and fixtures to aid in manufacturing of items. (Prerequisites: MTCC1614) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 1614 **2 credits**
Milling II
This course covers advanced milling machine for production. Topics included are set-up, selection of tooling, and use of milling attachments. (Prerequisites: MTCC1604) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1616 **2 credits**
Turning II
This course covers the advanced principles of engine lathes for production. Topics include lathe set-up, selection of tooling, and use of attachments. (Prerequisites: MTCC1603) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 1618 **3 credits**
Toolroom Machining II
This course covers the machining of repair type parts like long shafts with multiple machining operations. (Prerequisites: MTCC1608) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 1620 **2 credits**
CNC Basic Programming
This course focuses on both turning and machining center programming for Computer Numerical Control (CNCs). Basic CNC concepts will be covered in depth. (Prerequisites: None) (2 hrs lec/0 hrs lab/0 hrs OJT)

MTCC 1622 **3 credits**
Maintenance Machining
This course covers the maintenances required to keep a machine running. Making of parts for machines, installation, and adjustments will also be covered. (Prerequisites: MTCC1614 and MTCC1616; ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2460 **1 credits**
Tool & Cutter Grinding
This course covers tool and cutter grinding operations in a laboratory setting. Sharpening of two and four flute, end mills, horizontal cutters, carbide cutters, ball and radius cutters will be covered. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

MTCC 2480 **1 credits**
NIMS Certification Level I
This course covers the preparation for both the written and performance levels for the certification of

the Level I NIMS course. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

MTCC 2500 2 credits
CNC Mill Conversational
This course covers basic CNC milling operations and programming in a lab setting. Topics covered include Conversational programming techniques. (Prerequisites: MTCC1620) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 2501 3 credits
CNC 2 Axis Turning Operations
This course covers 2 axis CNC turning setup and operations in a lab setting. Topics covered include setup and production techniques. (Prerequisite: MTCC1620) (1 hr lec/4 hrs lab/0 hrs OJT)

MTCC 2502 3 credits
CNC Turning
This course covers CNC turning operations and programming in a lab setting. Topics covered include G & M code programming techniques. (Prerequisites: MTCC1620) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2504 3 credits
CAD CAM
This course covers Computer Aided Design & Computer Aided Manufacturing, (CAD CAM) operation and programming. (Prerequisites: CADE1468) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2506 2 credits
Advanced CAM
This course covers advanced Computer Aided Design & Computer Aided Manufacturing, (CAD CAM) operation and programming. Solids and 4 and 5 axis programming will take place. (Prerequisites: MTCC2504) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 2540 3 credits
CNC Machining Center (3 Axis)
This course covers CNC milling operations and programming in a lab setting. Topics covered include setup and programming of fixtures and parts. (Prerequisites: MTCC1620)(0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2541 3 credits
CNC 3 Axis Milling Operations
This course covers advanced CNC milling setup and operations in a lab setting. Topics covered include setup and production techniques. (Prerequisite: MTCC1620) (1 hr lec/4 hrs lab/0 hrs OJT)

MTCC 2560 3 credits
Advanced CNC Mill (4th Axis)
This course covers advanced CNC milling operations and programming in a lab setting. Topics covered include advanced programming techniques. (Prerequisites: MTCC2540 or concurrent) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2561 3 credits
CNC Multi-Axis Milling Operations
This course covers advanced CNC multi-axis milling setup and operations in a lab setting. Topics covered include advanced setup and production techniques. (Prerequisite: MTCC1620) (1 hr lec/4 hrs lab/0 hrs OJT)

MTCC 2562 3 credits
CNC Mill Turn, Live Tooling
This course covers the advanced programming of a turning center. Mill/turn machining will be covered using live tooling to mill and turn the complete part. Also, programming of a bar feeder and sub spindle to machine both ends of the part will be covered. (Prerequisites: MTCC2502) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2563 3 credits
CNC Multi-Axis Turning Operations
This course covers CNC multi-axis turning setup and operations in a lab setting. Topics covered include advanced setup and production techniques. (Prerequisite: MTCC1620) (1 hr lec/4 hrs lab/0 hrs OJT)

MTCC 2564 3 credits
CNC Horizontal 4 Axis
This course covers the advanced running and programming of 4 axis horizontal machining center with a pallet changer. Set-up of tombstones on the pallets will be covered with multiple parts programmed at once.

(Prerequisites: MTCC2560) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2570 **2 credits**
Wire EDM
This course covers set-up and operation the 4 axis Wire EDM. and Hole Popper. Programming will take place on Esprit software and on the Wire EDM. (Prerequisites: None) (0 hrs lec/4 hrs lab/0 hrs OJT)

MTCC 2572 **3 credits**
Swiss Automatic
This course covers advanced live tooling on a Swiss style turning center. The set up and operations to make multiple parts with close tolerances will also be covered. (Prerequisites: Concurrent with MTCC2562) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2600 **1 credits**
CNC Automation Programming
This course focuses on both turning and machining center programming for Computer Numerical Control (CNCs) with automation. (Prerequisites: Completion of an AAS or Diploma degree in the Machine Technology program and/or instructor's consent) (1 hr lec/0 hrs lab/0 hrs OJT)

MTCC 2602 **3 credits**
Swiss Automation
This course covers advanced live tooling on a Swiss style turning center. Programming of multiple parts with close tolerances will be emphasized. (Prerequisites: Completion of an AAS or Diploma degree in the Machine Technology program and/or instructor's consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

MTCC 2604 **4 credits**
CNC Mill/Turn Automation
This course covers the advanced programming of a turning center. Mill/turn machining will be covered using live tooling to mill and turn the complete part. The Automatic Parts Loader will be used to complete the automated manufacturing center. (Prerequisites: Completion of an AAS or Diploma degree in the Machine Technology program and/or instructor's consent) (0 hrs lec/8 hrs lab/0 hrs OJT)

MTCC 2606 **4 credits**
CNC 4 Axis Horizontal Automation
This course covers the advanced running and programming of 4 axis horizontal machining center with a pallet changer with automation. Set-up of tombstones on the pallets will be covered with multiple parts programmed at once. (Prerequisites: Completion of an AAS or Diploma degree in the Machine Technology program and/or instructor's consent) (0 hrs lec/8 hrs lab/0 hrs OJT)

MTCC 2999 **1-3 credits**
Special Topics in Machine Tool Technology
Study of special topics in machine tool careers. Special course topics will be announced in the class schedule.

Machine Tool Mold

MTCM 2400 **1 credits**
Mold Construction
This course presents the process required to design and building a complete mold in a classroom setting. Plastic types and characteristics, metal alloy casting types and characteristics, design principles, and molding methods are covered. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

MTCM 2999 **1-3 credits**
Special Topics in Machine Tool Mold
Study of special topics in machine tool mold building. Special course topics will be announced in the class schedule.

Massage Therapist

MTP 1004 **3 credits**
Massage Therapy Pathology
This course covers the pathophysiology of the major body systems and organs in-depth as they apply to massage therapy. Mental health is also discussed in relationship to appropriate care by the massage therapist. Universal precautions are covered. The role of a massage therapist involved with the care of clients who may have common diseases are covered. Systemic contraindications, local contraindications and cautions that influence massage are covered. This course prepares students for occupational exams. (Prerequisites: College level reading. Acceptance into Massage Therapist program) (3 hrs lec/0 hrs lab/0 hrs OJT)

MTP 1026 **4 credits**
Basic Therapeutic Massage
This course covers the skills and techniques required to provide basic therapeutic massage, also known as general relaxation massage. Proper body and hand mechanics, draping procedures, hygiene, and equipment set up and care are included along with the history, basic techniques, and benefits of massage. Both the principles and five classic strokes of Swedish Massage are used as an introduction to massage technique. Students learn to create their own massage sequences for each client with respect to focus areas, bolstering modifications, and options for various states of dress on the part of the client. (Prerequisites: Acceptance into Massage Therapist program, or instructor approval; College-level reading) (2 hrs lec/4 hrs lab/0 hrs OJT)

MTP 1028 **1.5 credits**
Massage Therapy Clinical Preparation
This course provides students with the hands-on skills required to participate in Massage Therapy Student Clinic. Professional best practices and procedures are taught, including charting, professional communication, culturally sensitive professional practices, trauma informed care, creation of treatment plans, and intake and exit interviews. Students will complete Simulation Lab sessions seeing clients from the public in the student clinic as a massage therapist, with opportunities to participate in outreach activities, as well as learning skills needed to serve as clinical assistant. (Prerequisites: MTP 1026 (concurrent); College-level reading) (0.5 hrs lec/2 hrs lab/0 hrs OJT)

MTP 1030 **3 credits**
Massage Therapy Anatomy I, Physiology, and Kinesiology
This course is a study of the structure and function of the human organ systems as they apply to massage therapy. All organ systems are covered with special emphasis on the muscular, skeletal, lymphatic and integumentary systems. This course also covers the basic structure and function of the joints, muscles, nerves and other connective tissues that cause movement and control posture in the human body as

they apply to massage therapy. The interactions of the muscle/bone connections and the levering forces needed to produce movement are taught. (Prerequisites: Acceptance into the Massage Therapist program, or instructor permission) (3 hrs lec/0 hrs lab/0 hrs OJT)

MTP 1032 1 credits
Introduction to Massage and Swedish Massage
This course covers proper body and hand mechanics, draping, equipment set up, and care. Basic principles and benefits of massage are covered. Swedish Massage principles and the five classic Swedish strokes are practiced. (Prerequisites: Acceptance into the Massage Therapy Program. (.5 hr lec/1 hr lab/0 hrs OJT)

MTP 1035 1.5 credits
Ethics, Communication and Professionalism in Massage Therapy
This course covers professional and ethical behavior and standards, as well as scope of legal practice as it applies to massage therapy. Course topics covered include professional norms and ethical codes of conduct within massage as a touch-based helping profession; client communication and relationship management; the role of professional organizations within the practice of massage therapy; cultural and demographical diversity topics related to massage; and issues regarding sexual misconduct related to the profession.(Prerequisites: Acceptance into the Massage Therapist program or instructor approval; College-level reading) (1.5 hr lec/0 hr lab/0 hrs OJT)

MTP 1037 2 credits
Adjunctive Therapies of the Massage Profession
This course covers basic skills, techniques, and therapies that are integrated with the massage profession, but distinct from massage itself. Students learn the safe applications of hydrotherapy, cryotherapy, contrast therapy, aromatherapy, and chair massage. This course also requires the completion of a research project on an approved therapeutic modality not otherwise covered in class. (Prerequisites: Acceptance into the Massage Therapist program, or instructor approval; College-level reading) (1 hr lec/2 hrs lab/0 hrs OJT)

MTP 1038 1 credits
Massage Therapy Deep Tissue I
The principles, protocol therapy, techniques and body mechanics of Deep Tissue are introduced and practiced. How the tissues experience pain, tissue healing, and tissue textures are learned. In depth client histories and charting are practiced. (Prerequisites: Acceptance into the Massage Therapy Program.) (.5 hr lec/1 hr lab/0 hrs OJT)

MTP 1039 1 credits
Massage Therapy Awareness and Injury Prevention I
This course teaches the importance of self-awareness and self-care in preparation for a career in massage therapy with an emphasis on ergonomic movement. Stretches and exercises aimed at increasing personal body awareness and preventing physical injury are practiced. Topics related to burn-out in the profession, the role of continuing education, and developing personal resiliency are discussed. This course aims to develop student maturity and self-understanding in a safe classroom environment where confidentiality is respected. (Prerequisites: Acceptance into the Massage Therapist program, or instructor approval; College-level reading) (0 hr lec/2 hrs lab/0 hrs OJT)

MTP 1040 4 credits
Full Body Massage and Chair Massage
Massage techniques are applied sequentially t the back, neck and head, posterior legs/pelvis, anterior torso, face, arms and anterior legs. Pathology of each area is discussed including: function, positioning, appropriate strokes, ethical situations, and the appropriate draping. Concurrently the students are gradually led to the application of professionalism, legal issues, and documentation a they apply to stress reduction massage. The learned sequence is performed on the public in open clinics. On-site chair massage is taught and practiced in lab. Upon mastery, on-site chair massage is offered to the public and the community. (Prerequisites: Acceptance into the Massage Therapy Program.) (2 hr lec/4 hrs lab/0 hrs OJT)

MTP 1042 **1 credits**
Massage Therapy Somatic Muscle Release and Postural Normalization
The relationship of the mind's control of muscles and the resulting posture are taught. Instructions in somatic releases for each body section are practiced. The importance of client education is stressed with the responsibility of the client to participate in their well-being. Postural analysis is taught. Students learn definitions, identification and therapeutic interventions of the three major muscular reflexes at stress in humans as described by Dr. Thomas Hanna. Distinguishing chronic muscular pain and postural distortions as caused by structural imbalances vs. functional imbalances is explored. (Prerequisites: Acceptance into the Massage Therapy Program.) (1 hr lec/0 hrs lab/0 hrs OJT)

MTP 1045 **4 credits**
Advanced Therapeutic Massage
The theory, techniques, and applications of advanced therapeutic massage are taught including anatomically specific work on the muscles and fascia in each area of the body. Techniques taught include Trigger Point Therapy, cross fiber friction, and myofascial lengthening. Expanded and more detailed interview and assessment techniques are learned and practiced, including using orthopedic metrics to assess postural distortion. Development of treatment plans are taught, and how and when to make a referral. (Prerequisites: Successful completion of first semester courses, or instructor approval; College-level reading) (2 hr lec/4 hrs lab/0 hrs OJT)

MTP 1044 **3 credits**
Massage Therapy Anatomy II
This course covers the human musculoskeletal system, to deepen anatomical knowledge needed for mastery of advanced therapeutic massage techniques. All bones in the body and bony landmarks palpable during massage therapy are covered. Skeletal muscles palpable during massage therapy are covered with action, origin and insertion. The basic single plane movements at each joint in the body are taught. (Prerequisites: MTP 1030, College-level reading) (3 hr lec/0 hrs lab/0 hrs OJT)

MTP 1048 **1 credits**
Pregnancy and Infant Massage
This course covers positioning and cautions for massage of pregnant clients. Each trimester is presented. Massage during labor is presented also. Massage for newborns and infants is learned and practiced. Special massage skills involving positioning, strokes, pathology, documentation, and contraindications and cautions are included. (Prerequisites: Successful completion of first semester.) (.5 hr lec/1 hr lab/0 hrs OJT)

MTP 1047 **2 credits**
Special Populations and Massage Therapy
This course teaches the modifications and considerations needed to apply massage therapy appropriately with clients who fall into a variety of physiologic populations. Material covers pregnancy massage, infant and pediatric massage, sports massage, geriatric massage, and oncology massage. Specific health concerns related to each population are covered. This course includes delivering massage to clients belonging to special populations in a student clinic or out-reach setting. (Prerequisites: Successful completion of first semester courses, or instructor approval; College-level reading) (1 hr lec/2 hrs lab/0 hrs OJT)

MTP 1049 **2.5 credits**
Modalities in the Massage Profession
This course covers the skills and techniques required to complete sessions in specialized modalities currently relevant in the field of massage. Students will learn Hot Stone massage, lymphatic facilitation, reflexology, and basic neuromuscular retraining. This course includes seeing clients in the student clinic. (Prerequisites: Successful completion of first semester courses, or instructor approval; College-level reading) (1.5 hr lec/2 hrs lab/0 hrs OJT)

MTP 1050 **2 credits**
Lymphatic and Senior Massage
This course covers the protocol and techniques for a full body one-hour lymphatic drainage massage. The anatomy and physiology of the lymph system is learned. Senior massage on the medically fragile older client is learned and practiced. (Prerequisites: Successful completion of first semester.) (1 hr lec/2 hrs lab/0 hrs OJT)

MTP 1051 **4 credits**
Specialty Sessions in Massage Therapy
This course covers the skills and techniques required to complete specialized sessions currently relevant in the field of massage. Students will also learn the modifications and considerations needed to apply massage therapy appropriately with clients who have a variety of specific physiological needs or medical fragility. This course may include delivering specialty massage to clients in a student clinic or out-reach setting. (Prerequisites: Successful completion of first semester courses, or instructor approval; College-level reading) (2 hr lec/4 hrs lab/0 hrs OJT)

MTP 1052 **2 credits**
Sports and Stone Massage
This course teaches the special needs of athletes. Pre-event and post-event massage is covered. Common training injuries are discussed along with appropriate massage interventions. Hot Stone massage is presented and practiced. Protocol and cautions are learned. (Prerequisites: Successful completion of first semester.) (1 hr lec/2 hrs lab/0 hrs OJT)

MTP 1053 **2 credits**
Massage Therapy Student Clinic
This class entails seeing clients from the public in the student clinic as a massage therapist, participating in outreach activities, as well as completing shifts as a clinical assistant in support of the smooth functioning of our clinic. Professional behavior, adherence to clinical procedure, and the creation and execution of massage therapy treatment plans are included as grade items. (Prerequisites: MTP 1026 and MTP 1037; College-level reading) (0 hr lec/4 hrs lab/0 hrs OJT)

MTP 1054 **1 credits**
Eastern Healing and Modality Overview
This course covers the history and philosophical approach of the Eastern healing models that impact the massage profession. Systems covered include traditional Chinese medicine as relates to bodywork, Ayurvedic traditions and their influence on the western wellness industry, and the basic principles of Thai massage. Prerequisites: Successful completion of first semester, or instructor approval; College-level reading) (1 hr lec/0 hrs lab/0 hrs OJT)

MTP 1059 **1 credits**
Massage Therapy Awareness and Injury Prevention II
This course continues teaching the importance of self-awareness and self-care for the massage therapist. Skills addressing personal injury prevention, burn-out prevention, stress management, and personal resiliency are expanded. This course also covers how to appropriately use the included techniques as recommendations for client self-care and self-maintenance following treatment sessions. (Prerequisites: MTP 1039; College-level reading.) (0 hr lec/2 hrs lab/0 hrs OJT)

MTP 1060 **3 credits**
Successful Career Development for Massage Practitioners
This course covers the principles of massage therapy as a business. Topics include strategic business planning, time management, barriers to success, and marketing, including client retention. Development of a business plan and marketing material, such as a logo, are included. Ethics relating to running a business, keeping records, professional referrals, and common non-compete practices are discussed. The statistics of small business success are taught. Differences between contract working, being an employee, and business ownership are covered. The student produces a comprehensive business plan. Public speaking is studied and practiced in class. (Prerequisites: Successful completion of first semester courses, or instructor approval; College-level reading) (3 hr lec/0 hrs lab/0 hrs OJT)

Music

MUSC 1108 **3 credits**
History of Rock and Roll
This survey course is a comprehensive study of the multicultural roots of American popular music from its origins to Elvis Presley, to the music of today. This course examines a variety of musical styles from their cultural roots in the music traditions of immigrant groups to their development into unique new American musical genres. Emphasis is placed on the impact of African-American men and women on the development of the distinctive characteristics of Rock and Roll music. MTC Goal Area: (6) Humanities & Fine Arts (Prerequisites: None) (3 hrs lec/0 hrs lab/ 0 hrs OJT)

MUSC 1110 **3 credits**
Appreciation of Music
This course deals with the techniques of listening and of understanding serious music through the study of over 400 years of classical music. It includes the styles of various eras, their composers, and cultural background. This survey course is designed as a fine arts offering and does not require a background in music. Students are expected to attend one music event. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

MUSC 1120 **3 credits**
Fundamentals of Music
This course is directed toward anyone interested in learning how to read music. Topics for study will include the musical staff, melody writing, major and minor scale construction, intervals and basic chords, rhythmic notation, elementary keyboard skills, and development of aural skills and abilities. MTC goal area: (6) Humanities and Fine Arts. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

MUSC 1130 **3 credits**
Introduction to World Music
This course is designed to provide a broader understanding of music and its influence as a worldwide phenomenon through the study of selected musical traditions, and cultures of the world. This course will concentrate on the music of each region in a social, historical and cultural context, including typical instruments, performance traditions, and well-known musicians. (Prerequisite: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (3 hrs lec/0 hrs lab/0 hrs OJT)

MUSC 1160 **1 credits**
Applied Music
Applied Music courses provide students with private lessons on a musical instrument for thirty minutes each week. Students develop their knowledge of the instrument, their ability to read music, and their attention to technique. (Prerequisites: None) (.5 hr lec/0 hrs lab/0 hrs OJT)

MUSC 1170 **2 credits**
Applied Music-Intensive Study
Applied Music courses provide students with private lessons on a musical instrument for sixty minutes each week. Students develop their knowledge of the instrument, their ability to read music, and their attention to technique. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

MUSC 1200 **1 credits**
Concert Choir
This group is a non-auditioned choir designed to be a creative musical opportunity. The choir performs publicly at least once each semester, preparing music that spans a wide range of styles from Classical to World Music. Concert Choir is open to all who enjoy singing and working to create art as part of a group. Choir may be repeated for credit. MTC goal area: (6) Humanities and Fine Arts - up to two credits may count for this goal area. (Prerequisites: None) (0 hrs lec/2 hrs lab/0 hrs OJT)

MUSC 1210 **1 credits**
Chamber Singers
This course is a select, auditioned group of singers that will study and perform choral literature for chamber ensemble from early madrigals to vocal jazz. Auditions are held early in the semester. (Prerequisite: Instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

Nursing Assistant

NUNA 1400 **3 credits**
Nursing Assistant
This course introduces concepts of basic human needs, health/illness continuum and basic nursing skills. It is designed to prepare the student for entry level as a Nursing Assistant and serves as an introduction to the nursing sequence for students who choose to advance in the nursing profession. This course meets the Federal OBRA and Minnesota Department of Health requirements. Successful completion of this course prepares students to take the Minnesota Nursing Assistant Test Out. Minnesota requires that students be 16 years of age or older to take this course. Minnesota NATCEP programs are taught in English and exams are in English.

(Prerequisites: None) (1.25 hr lec/1.75 hrs lab/0 hrs OJT)

Practical Nursing

NUPN 1410 **4 credits**
Adult Nursing I
The course provides students with foundational knowledge necessary to care for adult patients with chronic medical conditions and common surgical procedures. This course offers a holistic approach to nursing care, emphasizing evidence-based practice, clinical judgment, and effective communication in the healthcare setting. (Prerequisites: Acceptance into the Practical Nursing Program. Concurrent enrollment with other first semester practical nursing courses.) (4 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1420 **3 credits**
PN Technical Skills I
This course covers theory, nursing process, and nursing interventions that focus on basic medical-surgical nursing care. (Prerequisites: Acceptance into the Practical Nursing Program by successfully completing all prerequisites. FYE 1000, BIOL 1000 or, BIOL 1005 and BIOL 1140 AND BIOL 1141, ENGL 1106, current CNA registration, current CPR/AED for the professional rescuer and First Aid. Concurrent enrollment with NUPN 1410, NUPN 1430 NUPN 1440, NUPN 1458 and NUPN 1468) (1.5 hrs lec/3 hrs lab/0 hrs OJT)

NUPN 1430 **3 credits**
Medication Concepts
This course covers theory and techniques of interpreting medication orders, medication reference materials and the administration of medications. Drug calculations are emphasized. (Prerequisites: Acceptance into the Practical Nursing Program by successfully completing all prerequisites. FYE 1000, BIOL 1000 or BIOL 1005 and BIOL 1140 and BIOL 1141, ENGL 1106, current CNA registration, current CPR/AED for the professional rescuer and First Aid. Concurrent enrollment with NUPN 1410, NUPN 1420, NUPN 1440, NUPN 1458 and NUPN 1468) (1.5 hrs lec/3 hrs lab/0 hrs OJT)

NUPN 1440 **2 credits**
Psychosocial Nursing
This course covers common behavioral disorders with correlated pharmacology, nursing actions, and medical treatment. (Prerequisites: Acceptance into the Practical Nursing Program by successfully completing all prerequisites: FYE 1000, BIOL 1000 or BIOL 1005 and BIOL 1140 and BIOL 1141, ENGL 1106, current CNA registration, current CPR/AED for the professional rescuer and First Aid. Concurrent enrollment with NUPN 1410, NUPN 1420 NUPN 1430, NUPN 1458 and NUPN 1468.) (2 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1458 **1 credits**
Practical Nursing Clinical I
This clinical course covers clinical application of nursing care principles for the beginning student making the transition from nursing assistant to the practical nurse role. Efficiency and organizational skills are introduced. The course focuses on care and skills learned in theory and lab courses. The nursing process will be used in caring for stable client with chronic health conditions. (Prerequisites: Acceptance into the Practical Nursing Program by successfully completing all prerequisites. FYE 1000, BIOL 1000 or, BIOL 1005 and BIOL 1140 and BIOL 1141, ENGL 1106, current CNA registration, current CPR/AED for the professional rescuer and First Aid. Concurrent enrollment with NUPN 1410, NUPN 1420 NUPN 1430, NUPN 1440 and NUPN 1468.) 0 hrs lec/2 hrs lab/0 hrs OJT)

NUPN 1468 **3 credits**
Practical Nursing Clinical II
This clinical course focuses on time management and organizational skills in delivering nursing care. Safety, professionalism, and dependability are emphasized. The nursing process will be used in caring for stable patients with acute and chronic health needs. (Prerequisites: Acceptance into the Practical Nursing Program by successfully completing all prerequisites. FYE 1000, BIOL 1000 or, BIOL 1005 and BIOL 1140 and BIOL 1141, ENGL 1106, current CNA registration, current CPR/AED for the professional rescuer and First Aid. Concurrent enrollment with NUPN 1410, NUPN 1420 NUPN 1430, NUPN 1440 and NUPN 1458) (0 hrs lec/6 hrs lab/0 hrs OJT)

NUPN 1500 **1 credits**
Nursing Trends
This course emphasizes the history of nursing, health care systems, professional boundaries, legal and ethical issues, and standards of care. The Nurse

Practice Act will be reviewed as related to the role of the practical nurse. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (1 hr lec/0 hrs lab/0 hrs OJT)

NUPN 1505 6 credits
Comprehensive Adult Nursing
Designed to bridge previously gained healthcare knowledge, skills, and abilities of the Military Medic Veteran or Emergency Medical Technician/Paramedic to the role of the practical nurse. This course will also be made available to the licensed LPN who desires a refresher course for renewing licensure. This course provides a practical conceptual based approach to medical surgical nursing. Health promotion, nutrition, pharmacology, interdisciplinary care, and communication concepts are threaded throughout the course content. (Prerequisites: successful completion of all pre-program requirements and concurrent enrollment in semester I courses) (6 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1508 2 credits
Comprehensive Adult Nursing Lab
This is an integrated nursing skills and simulation course. It incorporates psychomotor demonstration of nursing skills associated with common disease processes. The emphasis is on the scope of practice and role of the Practical Nurse as it applies to nursing care throughout the lifespan. Integrated pharmacological and non-pharmacological interventions as they relate to medical and/or surgical health needs of a variety of patient populations are also discussed. The student will apply principles of clinical reasoning, prioritization, nursing process, and evidence-based practice to a variety of patients with diverse health needs. (Prerequisites: successful completion of all pre-program requirements and concurrent enrollment in semester I courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

NUPN 1510 4 credits
Adult Nursing II
This course builds on principles taught in the first semester and provides students with a foundation in acute medical conditions and more complex surgical procedures. The holistic approach to nursing care, evidence-based practice, clinical judgment, social determinants of health, and effective communication are interwoven into the curriculum. This course aims to further develop clinical judgment skills and foster the student nurse's ability to provide high-quality, patient-centered care in a dynamic healthcare environment. Prerequisite: completion of all first semester practical nursing courses. Concurrent enrollment with other second semester practical nursing courses. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (4 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1520 1 credits
Practical Nursing Technical Skills II
This course develops a higher level of clinical judgment through application of theory, nursing process, and nursing interventions that focus on complex medical-surgical nursing skills. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses.) (0 hrs lec/2 hrs lab/0 hrs OJT)

NUPN 1531 2 credits
Maternal Child Nursing
This course provides an introduction to maternal and pediatric nursing. The focus is family-centered care that focuses on growth and development, and common obstetric/pediatric disorders. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses.) (2 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1538 1 credits
Maternal Child Clinical
This clinical course provides a clinical experience with obstetric, newborn, and pediatric patient populations. (Prerequisites: successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (0 hrs lec/2 hrs lab/0 hrs OJT)

NUPN 1540 2 credits
Gerontology in Nursing
This course is designed to present nursing students with information and learning tools that adapt nursing skills to the aging population receiving health care in a variety of settings. Leadership skills are introduced to assist caregivers in long term care facilities at the practical nursing level. (Prerequisites:

Successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (2 hrs lec/0 hrs lab/0 hrs OJT)

NUPN 1558 **2 credits**
Practical Nursing Clinical III
This clinical course covers increased complexity of common health disorders for the adult patient using the nursing process. Nursing care will be delivered with improved efficiency while organizing and prioritizing care for multiple clients. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (0 hrs lec/ 4 hrs lab/0 hrs OJT)

NUPN 1568 **2 credits**
Practical Nursing Clinical IV
This clinical course provides experience to clinically apply the knowledge, skills, and attitudes learned throughout the program. The student will demonstrate the ability to function as an entry-level graduate Practical Nurse. Concepts such as polypharmacy, co-morbidities, organizing care of multiple clients, and reflection of the role of the practical nurse are emphasized throughout this course. (Prerequisites: Successful completion of first semester PN courses, and concurrent enrollment in semester II courses) (0 hrs lec/4 hrs lab/0 hrs OJT)

Philosophy

PHIL 1120 **3 credits**
Intro to Philosophy
This course will survey some of the major questions that have concerned philosophers throughout history. Included will be a presentation of basic philosophical concepts and vocabulary necessary to understand these concepts. The course will include a discussion of such topics as the existence of God, causality, freewill and determinism, the mind-body problem, and theories of knowledge and reality. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PHIL 1125 **3 credits**
Logic
An introduction to Aristotelian logic and modern symbolic logic. Include formal predicate and sentential logic, induction, and methods of translation. MTC goal areas: (4) Mathematical/Logical Reasoning. (Prerequisites: College-level reading and writing and MATH0460, or equivalent, or 71 or higher

on the Elementary Algebra portion of the CPT) (3 hrs lec/0 hrs lab/0 hrs OJT

PHIL 1130 3 credits
Ethics
Important ethical theories of right and wrong, good and bad. Includes egoism, divine command theory, natural law theory, utilitarianism, duty-based ethics, social contract theory, and virtue theory. The course will emphasize the use of reason in decision making. MTC goal areas: (6) Humanities and Fine Arts, and (9) Ethic and Civic Responsibility. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PHIL 1140 3 credits
Critical Thinking
This course develops the habits and skills of disciplined and independent thinkers. Students will learn how to gather reliable information, look at problems from different points of view, apply rules and procedures to analyze problems, and determine the values that influence thinking. Through study of real life issues and examples, students will learn thinking skills that can be applied to both their personal and academic lives. MTC Goal area: (2) Critical Thinking. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PHIL 2140 3 credits
Philosophy of Religion
An examination of ideas central to religious philosophy. Includes discussion of religious experience, the origins of religion, analysis of religious claims, and ideas of the holy. MTC goal areas: (6) Humanities and Fine Arts. (Prerequisites: ENGL1106 with a grade of "C" or better or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

PHIL 2150 3 credits
Political Philosophy
A survey of political concepts from ancient to modern times. Includes discussion of ideologies such as dictatorship, democracy, socialism and anarchism, as well as, concepts such as right, equality, justice, liberty, and political obligation. MTC goal areas: (6) Humanities and Fine Arts, and (9) Ethic and Civic Responsibility. (Prerequisites: ENGL1106 with a grade of "C" or better) (3 hrs lec/0 hrs lab/0 hrs OJT)

PHIL 2999 1-3 credits
Special Topics
Study of special topics in philosophy. Special course topics will be announced in the class schedule.

Physics

PHYS 1001 4 credits
Fundamental Concepts of Physics
This is a laboratory oriented course covering the basic concepts of Physics. Conceptual understanding will be stressed. Some simple Algebra may also be used. Designed for middle grade education, liberal arts, radiological technology or other health, technical fields, or as satisfying AA requirements as a natural science course. MTC goal areas: (2) Critical Thinking, and (3) Natural Sciences. (Prerequisites: College level reading and writing) (3 hrs lec/2 hrs lab/0 hrs OJT)

PHYS 1201 5 credits
Intro to Physics I
This is the first course in a sequence in introductory physics. The course will focus on the study of the mechanics of particles and rigid bodies including kinematics, dynamics, conservation laws, linear and angular momentum, work and energy, fluids, and sound. This course will provide preparation for students considering pre-professional and applied science careers as well as satisfying requirements for transfer curriculum. Not intended for engineering majors. MTC Goal Area 3: Natural Science. (Prerequisites: Accuplacer score 250 or greater in reading or Read/English 0950 or 0955 with a C or higher, and MATH0470 with a C or higher or Accuplacer score 250 or higher AAF) (4 hrs lec/2 hrs lab/0 hrs OJT)

PHYS 1202 5 credits
Intro to Physics II
This is the second course in a sequence in introductory physics. This course focuses on the study of thermodynamics, electrostatics, electricity, magnetism, and optics. This course will satisfy requirements for the transfer curriculum in general education as well as providing preparation for students considering pre-professional and applied science careers. MTC goal areas: (3) Natural Sciences. (Prerequisite: PHYS 1201 or equivalent) (4 hrs lec/2 hrs lab/0 hrs OJT)

PHYS 2201 **5 credits**
General Physics
This calculus-based physics course focuses on the study of mechanics of particles and rigid bodies including kinematics, dynamics, conservation laws, linear and angular momentum, the behavior of fluids at rest and in motion, and general wave motion and sound. MTC Goal Area 3: Natural Sciences. (Prerequisites: MATH 2204 or equivalent, or concurrent enrollment in Math 2204 or instructor's consent) (4 hrs lec/2 hrs lab/0 hrs OJT)

PHYS 2202 **5 credits**
General Physics II
This is the second course in the calculus-based physics sequence. It focuses on the study of thermodynamics, electric field and forces, electric energy, circuits, magnetism, and optics. MTC Goal Area 3: Natural Sciences. (Prerequisites: PHYS 2201 or equivalent or instructor's consent) (4 hrs lec/2 hrs lab/0 hrs OJT)

PHYS 2999 **1-3 credits**
Special Topics in Physics
Study of special topics in physics. Special course topics will be announced in the class schedule.

Political Science

PSCI 1110 **3 credits**
American Government and Politics
This course is an overview of political theory, party politics, constitutional foundations, and the structure, functions, branches, and operations of the American national (federal) government, including Congress, the Presidency, the judiciary, and other federal agencies. MTC goal areas: (5) History & the Social and Behavioral Sciences, and (9) Ethic and Civic Responsibility. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSCI 1120 **3 credits**
Introduction to Political Science
This course is an introduction to the essential concepts of political science with an investigation of factors universal to the governing process. The course will examine such topics as power, conflict, part politics, the media, ideology, nationalism, governmental structures, policymaking, and political change. The course will also conduct a comparative study of selected political systems, public policy issues, and ideologies. MTC goal areas: (2) Critical Thinking, (5) History and the Social and Behavioral Sciences, and (9) Ethic and Civic Responsibility. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSCI 1140 **3 credits**
International Relations and Global Issues
This course offers an introduction to international relations, the role of global institutions, and current global issues. It will address the globalization of trade, population demographics, north-south division of wealth and poverty, global climate change, sovereignty and interdependence, armed conflict, and conflict resolution. It will also compare and contrast international political and governmental systems, movements, and ideologies across regions and cultures. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (8) Global Perspective. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSCI 1999 **1-3 credits**
Special Topics in Political Science
Special course topics will be announced in the class schedule.

Psychology

PSYC 1015 **3 credits**
Mind Matters
This course is designed to help discover new ways to look at college learning and thinking. Theories on motivation, self attributions and beliefs, memory, intelligence, and cognitive styles are examined to help students discover their strengths. Thinking and questioning are explored to make intellectual work and deep learning more manageable, practical, and enjoyable. MTC goal area: (5) History and Social and Behavioral Sciences. (Prerequisites None) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 1060 **2 credits**
Career and Life Planning
This course uses a personal approach to the process of matching individual interests, values, personality type, and skills to career options. Students are empowered with career decision-making skills they

can use throughout their lives when deciding on a first career, changing careers, or in general career/life planning. This course requires the ability to navigate internet websites. (Prerequisites: 56 or higher on the reading comprehension portion of the CPT, or equivalent course) (2 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 1120 3 credits
General Psychology
A general education course which will familiarize the student with the basic principles of psychology, present a practical application of these principles, show how psychologists employ the scientific method, and equip the beginning student of psychology with a working vocabulary of psychological terminology and critical thinking skills. Areas to be covered include research, theoretical perspectives, the nervous system, learning, personality, memory, psychological disorders, and therapy. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 1135 3 credits
Lifespan Developmental Psychology
A scientific, theoretical, and personal examination of physical, cognitive, emotional, and social development across the life span. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: PSYC1120 highly recommended; college-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 1140 3 credits
Abnormal Psychology
Abnormal Psychology is the study of mental and behavioral disorders: theoretical perspectives, classification, description, assessment, and intervention methods. Diagnostic, treatment and research methods of anxiety disorders, mood disorders, personality disorders, schizophrenia, eating disorders, and organic disorders will be covered. MTC goal areas: (5) History and the Social and Behavioral Sciences and (7) Human Diversity (Prerequisites: College level Reading; PSYC1120 recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 1145 3 credits
Health Psychology
This course provides an introduction to the field of health psychology, examining the roles of behavior, psychology, and social/cultural factors on health, wellness, illness, and chronic disease. Topics include: 1) attitudes, behavior, and lifestyle factors impacting health and disease prevention; 2) stress and illness; 3) social and psychological implications of chronic illness (e.g., heart disease, cancer); and 4) theories and methods used by psychologists to understand these topics. MTC goal areas: (5) History and the Social and Behavioral Sciences and (7) Human Diversity (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 2135 3 credits
Child Psychology
A study of human development from conception through adolescence. Topics include physical, cognitive, moral, social, and sexual development as well as parenting, health, and high-risk youth. MTC goal areas: (2) Critical Thinking and (5) History and the Social and Behavioral Sciences (Prerequisites: PSYC1120 or instructor consent; College level reading and writing; READ1450 highly recommended) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 2145 3 credits
Social Psychology
A general education course that explores the history, methods and applications of social psychology as a scientific discipline. Topics include research, social beliefs and judgments, attribution theories, culture and gender, persuasion, group influences, obedience to authority, prejudice, aggression, altruism, interpersonal attraction, and conflict and peacekeeping. This course is cross-listed in both psychology and sociology. MTC goal areas: (5) History and the Social and Behavioral Sciences and (7) Human Diversity (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 2155 3 credits
Forensic Psychology
This course will review the intersection between criminal justice and psychology in the creation and implementation of laws. The course will focus on the historical conceptualization of the U.S. justice system,

the implications of prison systems on individuals' mental health, and how improvements could be made based on psychological research. Psychological concepts are used to consider the ethical implications of the U.S. justice system including: juvenile behavior; social developmental influences; differences in law enforcement treatment due to race, gender, and ethnicity; court systems; police psychology; eye-witness testimony; false confessions; violent and non-violent crimes; and rehabilitation. MTC goal areas: (5) History and the Social and Behavioral Sciences and (9) Ethical and Civic Responsibility (Prerequisites: College-level reading; and PSYC 1120 or PSYC 1135 or PSYC 1135) (3 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 2165 **4 credits**
Statistics for Psychology
Students use basic mathematical and computerized procedures to analyze data in the behavioral sciences. Use statistical software (e.g., SPSS, "R," "PSPP") to conduct descriptive and inferential data analyses. Students choose and apply statistical procedures to help to answer psychological and behavioral scientific research questions. Students read, interpret, and write APA-style Results sections for behavioral science research. MTC goal area: (5) History and the Social and Behavioral Sciences (Prerequisite: PSYC 1120 (with a "C" or better); MATH 1100 or higher or MATH 2210; College-level reading) (4 hrs lec/0 hrs lab/0 hrs OJT)

PSYC 2999 **1-3 credits**
Special Topics in Psychology
Study of special topics in psychology. Special course topics will be announced in the class schedule.

Physical Therapist Assistant

PTA 1000 **1 credits**
Intro to Health and Medical Literature
This course provides a basic introduction to scientific and health-related literature, with a focus on printed and on-line journals. Students will learn how to efficiently find and obtain journal articles relevant to a particular health care field of study to help answer clinical questions. The course also covers information literacy, evidence-based practice and guidelines for citing references for written papers. (Prerequisites: ENGL1106, MATH 0520) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 1400 **1 credits**
Documentation for PTAs
This course covers the legal and reimbursement documentation guidelines, physical therapist/physical therapist assistant documentation responsibilities, and competent completion of physical therapy documentation. (Prerequisites: BIOL1140, ALTH1410, ENGL1106, Clinical Observation Form) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 1410 **2 credits**
Introduction to Physical Therapist Assisting
This course introduces the role of the physical therapist assistant and the skills used daily as a physical therapist assistant. Emphasis is on professional behaviors and patient care skills including: lifting methods, basic wheelchair operations, body mechanics, vital signs, standard precautions, patient positioning and draping, and gait training with ambulation aids. (Prerequisites: ALTH1410, BIOL1005, BIOL1140, ENGL1106, FYE1000, and acceptance to the PTA program) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1411 **2 credits**
Procedures for PTA's I
This course covers basic physical therapy skills with emphasis on thermotherapy, cryotherapy, light agents, and compression techniques. Integration of concurrent patient care skills is combined with the modality techniques. Student awareness of evidence-based practice is emphasized. (Prerequisites: ALTH1410, BIOL1005, BIOL1140, ENGL1106, and Clinical Observation Form) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1417 **2 credits**
Clinical Experience I
This course involves working in an outpatient physical therapy clinic in which first year PTA students will work in partnership with second year students to provide physical therapy services to patients. Skills will begin with those of a physical therapy aide and progress to applying simple physical therapy interventions and data collection techniques under the supervision of a physical therapist. The student will be introduced to legal and ethical practice guidelines, professional behaviors, and therapeutic communication skills. (Prerequisites: Concurrent

enrollment in PTA1411 or instructor's consent, liability insurance, evidence of recent Mantoux test, and evidence of current CPR certification (ALTH1430 or equivalent satisfies this requirement)) (0 hrs lec/4 hrs lab/0 hrs OJT)

PTA 1421 **1 credits**
Pathophysiology for PTAs I
This course provides an introduction to pathophysiology of the musculoskeletal, endocrine, and circulatory systems. The roles of health care professionals involved in the care of persons with disease will also be discussed. A variety of conditions are studied which include arthritis, spine disorders, inflammatory conditions, common orthopedic conditions, nutritional disorders, diabetes, and disorders of the circulatory system. (Prerequisites: BIOL1140, ALTH1410, ENGL1106, MATH0520 and have taken or enrolled in PTA1460, or consent of course instructor) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 1431 **2 credits**
Therapeutic Exercise I
This course presents theoretical information and instructions for performing range of motion exercises, goniometric measurements of joint range of motion, manual muscle strength testing, and passive stretching techniques. Patient handling skills that are being concurrently learned are integrated into this course. (Prerequisites: ALTH1410, BIOL1140, ENGL1106, and concurrently enrolled in PTA1460) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1460 **2 credits**
Functional Kinesiology I
Students study the human musculoskeletal system and principles that influence movement. The course includes studying the location and function of bones and muscles. Students are introduced to palpation skills and observation skills through the analysis of functional movement. (Prerequisites: BIOL1140 or BIOL1150 and ALTH1410) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1476 **1 credits**
Clinical Skills Review
This elective course is a supervised, structured open lab for physical therapist assistant students who desire additional skills practice time beyond that available in class and other designated open lab hours. Students work in small groups to review and practice skills taught in required program lab courses. No new content is taught within the course, and skills are not formally assessed by the instructor within this course. The course may be taken for a variety of reasons: review of previous course skills; review/practice of new/concurrent course skills; enhancement and application of clinical skills. The course may also be taken to meet necessary program criteria, including program re-entry or conditions of program probation. (Prerequisites: Currently enrolled in PTA courses or consent of course instructor) (0 hrs lec/2 hrs lab/0 hrs OJT)

PTA 1512 **2 credits**
Procedures for PTA's II
This course covers the theory and application of procedural interventions including ultrasound, spinal traction, biofeedback, continuous passive motion, hydrotherapy, aseptic technique, and taping. Principles of wound etiology, healing, and management are also covered. (Prerequisites: PTA 1410, PTA 1460, PTA 1411, and PTA 1421) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1522 **1 credits**
Pathophysiology for PTAs II
This course covers organ transplants, eye and ear disorders, mental health conditions, infectious disease, integumentary system disorders, selected circulatory and cardiac conditions, and the role of physical therapy in treating these conditions. Also included are principles related to pharmacology and diagnostic imaging. (Prerequisites: PTA1411, PTA1410 or consent of course instructor, PTA1421, PTA1431, PTA1460) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 1527 **2 credits**
Clinical Experience II
This course involves working in an outpatient physical therapy clinic in which first year students treat patients under the supervision of physical therapists. The student will follow the physical therapist's treatment plan and provide physical therapy services learned during concurrent and previous courses. Skills will begin with those practiced during PTA1417 and progress to applying physical therapy interventions and data collection skills as they are learned during the second semester. Students will gain experience

working with various types of patient-related equipment. (Prerequisites: PTA1417, concurrent enrollment in PTA1512 or instructor's consent, evidence of current CPR certification and liability insurance) (0 hrs lec/4 hrs lab/0 hrs OJT)

PTA 1532 **4 credits**
Therapeutic Exercise II
This course covers muscle structure and function, along with knowledge and application of various forms of therapeutic exercise including; stretching, muscle strengthening and endurance, aerobic conditioning, coordination, balance, proprioception, PNF diagonals, post-operative joint replacement protocols, and exercise for the spine. Normal and abnormal postures are identified. (Prerequisites: PTA1410, PTA1411, PTA1421, PTA1431, PTA1460, or instructor's consent) (2 hrs lec/4 hrs lab/0 hrs OJT)

PTA 1541 **1 credits**
Issues in Physical Therapy Practice I
This course covers issues and situations the PTA may experience in the work setting. Emphasis is on professional values and behaviors, ethical and legal practice, professional communication, and patient respect issues. (Prerequisites: PTA1410, PTA1411, PTA1421, PTA1431, and PTA1460) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 1562 **3 credits**
Functional Kinesiology II
This course covers the structure and function of joints and the spinal nerves. Students build on knowledge from Functional Kinesiology I in analyzing human movement. The course includes data collection and treatment interventions related to dysfunction of the joints and musculoskeletal system, including a unit on acute rehabilitation for conditions that require orthopedic surgery. PTA skills are integrated with therapeutic exercise and modality knowledge. Students learn to observe and describe normal gait and common abnormal gait patterns. (Prerequisites: PTA1411, PTA1410, PTA1431, PTA1421, PTA1460; concurrent enrollment in PTA1564, or consent of instructor) (2 hrs lec/2 hrs lab/0 hrs OJT)

PTA 1564 **2 credits**
Manual Therapy Techniques
This course covers principles of manual therapy with which the physical therapist assistant may assist the physical therapist. Topics include therapeutic massage and other soft tissue mobilization techniques, as well as an introduction to principles of joint mobilization and muscle energy techniques. Current legal and ethical guidelines regarding manual therapy techniques is emphasized. (Prerequisites: Concurrent enrollment in PTA 1562 or consent of instructor) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 1576 **1 credits**
Clinical Skills Review
This elective course is a supervised, structured open lab for physical therapist assistant students who desire additional skills practice time beyond that available in class and other designated open lab hours. Students work in small groups to review and practice skills taught in required program lab courses. No new content is taught within the course, and skills are not formally assessed by the instructor within this course. The course may be taken for a variety of reasons: review of previous course skills; review/practice of new/concurrent course skills; enhancement and application of clinical skills. The course may also be taken to meet necessary program criteria, including program re-entry or conditions of program probation. (Prerequisites: Currently enrolled in PTA courses) (0 hrs lec/2 hrs lab/0 hrs OJT)

PTA 1580 **1 credits**
Sports Medicine Topics For PTA's
This course covers sports medicine related topics and treatment protocols with which the PTA will assist the physical therapist. These include ACL repair and rehabilitation, the impact of nutrition on performance and rehabilitation, concussion management, and kinesiotaping. This elective course will expand on the degree with which these topics are covered in the required program curriculum, and provide students an additional opportunity to apply treatment techniques and education specific to athletic performance and rehabilitation. (Prerequisites: Currently enrolled in LSC PTA program or instructor consent) (1 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2613 **2 credits**
Procedures for PTA's III
This course covers the basic principles of electrical currents along with the theory and application of electrical stimulation procedural interventions, including high-voltage pulsed current, neuromuscular electrical stimulation, functional electrical stimulation, microcurrent, transcutaneous electrical stimulation, interferential current, and iontophoresis. Electrical stimulation for denervated muscle is also included. (Prerequisites: All first year PTA courses and pre-requisites) (1 hr lec/2 hrs lab/0 hrs OJT)

PTA 2623 **2 credits**
Pathophysiology for PTAs III
This course provides a continuation of concepts related to pathophysiology of various systems of the body. Orthopedic conditions and their rehabilitation are covered in greater depth than in previous courses. In addition, women's health issues; gastrointestinal conditions; cancer; selected disorders of the nervous, respiratory, renal, and genitourinary systems; and selected developmental conditions are covered. This course reinforces that conditions may affect multiple systems of the body and have psychosocial effects for the client. (Prerequisites: PTA1522 or consent of course instructor) (2 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2637 **2 credits**
Clinical Experience III
This course involves working in an outpatient physical therapy clinic in which second year PTA students work in partnership with first year students to provide physical therapy services to patients under the supervision of a physical therapist. The student will continue to apply physical therapy skills learned during the first year in the program and add new skills as learned in the second year. The student will mentor first year students regarding legal and ethical practice, role of the PTA, interviewing, therapeutic communication, basic physical therapy interventions, and data collection skills. (Prerequisites: PTA1527, concurrent enrollment in PTA2613 or instructor's consent, evidence of current CPR certification [ALTH1430 or equivalent satisfies this requirement], evidence of recent Mantoux test, and liability insurance) (0 hrs lec/4 hrs lab/0 hrs OJT)

PTA 2642 **1 credits**
Issues in Physical Therapy Practice II
This course covers legal and ethical issues the PTA will be exposed to or involved with in the physical therapy profession. Emphasis is on issues such as sexuality and disability, intercultural competence, reimbursement, mandatory reporting, quality assurance/risk management, legal and ethical issues related to long-term care, and death and dying. Students will begin the job-seeking process this semester through development of a resume. (Prerequisite: PTA1541)(1 hr lec/0 hrs lab/0 hrs OJT)

PTA 2650 **4 credits**
Rehabilitation and Functional Therapy
This course covers movement theories and therapeutic exercise techniques to meet the needs of adult and pediatric patients with neurological impairments in order to return to a functional lifestyle. Content includes adaptive equipment, wheelchair seating and mobility, facilitation and inhibition techniques to manage abnormal tone and promote motor control, adult and pediatric positioning and handling, introduction to vestibular rehabilitation, and motor development, motor control and motor learning theories. Conditions covered in depth include: myelomeningocele, cerebral palsy, traumatic brain injury, multiple sclerosis, Parkinsons disease, cerebrovascular accidents and spinal cord injuries. Previously learned patient handling skills are integrated. (Prerequisites: All first year PTA courses) (2 hrs lec/4 hrs lab/0 hrs OJT)

PTA 2651 **3 credits**
Advanced Physical Therapy Techniques
This course covers special techniques and treatment protocols with which the PTA will assist the physical therapist. These include cardiac rehab, pulmonary rehabilitation, care of geriatric clients, aquatic therapy, care of the patient with an amputation, health promotion and wellness, complementary and alternative medicine interventions, relaxation/breathing techniques, and the components of industrial medicine. The use of splints, orthotics and prosthetics is also covered. Previously learned skills are integrated. (Prerequisites: All first year PTA courses or consent of course instructor) (2 hrs lec/2 hrs lab/0 hrs OJT)

PTA 2672 **2 credits**
The Role of Physical Therapy in Injury Prevention
Students will discuss evidenced based methods for injury prevention, the roles physical therapists and physical therapist assistants can play in injury prevention, and barriers to injury prevention strategies within the realm of physical therapy. Students will be involved in the design of an injury prevention program. (Prerequisites: Current PTA program student, graduate of accredited PTA program, or consent of instructor) (2 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2674 **2 credits**
Musculoskeletal Review for PTAs
This course provides a condensed review of concepts important for the care of patients with musculoskeletal conditions, especially those in the outpatient or home health setting. Students will complete activities to help recall and apply important information about the structure and function of major muscles and joints. The course will review common orthopedic injuries and conditions of the spine and extremities. Focus will be on evidence-based treatment of the conditions covered, goals for orthopedic rehabilitation, and the role of the PTA in orthopedic physical therapy. (Prerequisites: Current PTA program student, graduate of accredited PTA program, or consent of instructor) (2 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2676 **1 credits**
Pharmacology for PTAs
This course reviews basic pharmacology principles and commonly-used medications, as well as the impact of medications on physical therapy treatments and outcomes. The use of opioid and non-opioid pain medications will also be discussed. (Prerequisites: Current PTA program student, graduate of accredited PTA program, or consent of instructor) (1 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2680 **3 credits**
Physical Therapy for Special Populations
This course provides detail regarding physical therapy treatment for a variety of special populations, including pediatrics, geriatrics, bariatrics, women's health, acute care, bone disease, industrial medicine, and selected orthopedic and neurological conditions. The course also includes discussion of medical treatment and physical therapy implications for patients with psychiatric illness, sensory disorders, skin conditions, infectious disease, gastrointestinal conditions, organ failure, and blood/circulatory disease. Prerequisites: College-level reading, writing and math. Graduate of an accredited PTA program, concurrent enrollment in an accredited PTA program, or consent of instructor. (3 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2682 **2 credits**
Legal and Ethical Aspects of Physical Therapy Practice
This course includes ethical and legal issues facing the physical therapist assistant. Concepts covered include billing and reimbursement, abuse/neglect, mandatory reporting, quality assurance/risk management, physical therapy in long-term care settings, conflict resolution, confidentiality, disability, and guiding APTA documents. Students will discuss legal aspects of job seeking and develop a resume. (Prerequisites: College level-reading, writing and math. Graduate of an accredited PTA program, concurrent enrollment in an accredited PTA program, or consent of instructor.) (2 hr lec/0 hrs lab/0 hrs OJT)

PTA 2750 **1 credits**
Specialty Clinical Experience
This course provides the physical therapist assistant student with exposure to and experience in specialty areas of physical therapy. Specialty areas will vary by semester and may include but are not limited to pediatrics, sports medicine, and acute care, with the student providing patient care in the designated specialty area under the supervision of a physical therapist and/or physical therapy assistant. Specialty areas will be announced in the course schedule. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT and MATH0460, or equivalent, or 71 or higher on the Elementary Algebra portion of the CPT) (0 hrs lec/2 hrs lab/0 hrs OJT)

PTA 2752 **1 credits**
Selected Project
This is a course in which the student independently studies and explores in detail a physical therapy topic of interest which has been presented in previous

courses. The student will give a presentation on the selected topic. (1 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2780 2 credits
Physical Therapist Assistant Basic Refresher
This course is designed to assist physical therapist assistants in reviewing and/or updating concepts fundamental to physical therapy as well as new theories about practice. It will also be helpful to those preparing to take the national licensure exam and those who have not actively practiced physical therapy in the recent past. (Prerequisites: Graduate of CAPTE accredited physical therapist assistant program, enrolled in final semester of PTA Military Bridge program, or consent of instructor) (2 hrs lec/0 hrs lab/0 hrs OJT)

PTA 2790 6 credits
Clinical Internship I
This course is the student's first full-time clinical internship in a physical therapy facility. The student will function as a second-year PTA student in the facility for seven weeks and will be involved in patient care compatible to the role of the PTA and skills learned. (Prerequisites: PTA2613, PTA2623, PTA2637, PTA2642, PTA2650, PTA2651, CPR Certification, and liability insurance) (0 hrs lec/0 hrs lab/18 hrs OJT)

PTA 2792 6 credits
Clinical Internship II
This course is the student's final full-time clinical internship in a physical therapy facility. The student will function as a second-year PTA student in the facility for seven weeks and will be involved in patient care compatible to the role of the PTA and skills learned. (Prerequisites: PTA2790, CPR certification, and liability insurance) (0 hrs lec/0 hrs lab/18 hrs OJT)

PTA 2840 1 credits
Professional Integration
This capstone course is designed to help PTA students transition from full-time clinical experiences to post-graduation practice. Students will review major concepts taught throughout the program and during full-time clinical experiences. Students will take a comprehensive written examination which will help prepare them to take the national licensing exam. The course also emphasizes job-seeking skills necessary for finding employment as a PTA. (Prerequisites: Concurrent enrollment in PTA 2790 and PTA 2792) (1 hr lec/0 hrs lab/0 hrs OJT)

PTA 2999 1-3 credits
Special Topics in Physical Therapist Assistant
Study of special topics in physical therapist assistant. Special course topics will be announced in the class schedule.

Radiologic Thechnology

RADT 1402 1 credits
Introduction to Medical Imaging
This introductory course is designed for students who are interested in a career in Radiologic Technology and students accepted in the Radiologic Technology program. Medical Imaging serves a unique niche in health care today. Students will have an opportunity to explore the job duties, professional requirements and career advancement opportunities in Medical Imaging. Students are introduced to the RADT curriculum with emphasis on the physical science involved with x-ray equipment and x-ray production. (Prerequisites: ALTH1410, ALTH1440 or concurrent enrollment; BIOL1005 or concurrent enrollment; College-level reading and writing) (1 hrs lec/0 hrs lab/0 hrs OJT)

RADT 1404 1 credits
Patient Care in Medical Imaging
This core Radiologic Technology course will cover basic concepts of patient care, physical and psychological needs of the patient, and routine and emergency patient care. Patient assessment, infection control procedures, emergency and safety procedures, communication and patient interaction skills, and basic pharmacology are included. Standards of ethical performance and patient's rights will be studied. (Prerequisites: Admission to the Radiologic Technology program; RADT 1402 or concurrent enrollment) (1 hrs lec/0 hrs lab/0 hrs OJT)

RADT 1453 3 credits
Radiographic Procedures I
This course reviews the architectural plan of the body with emphasis on the structure and function of the skeleton. The student will learn the basics of positioning to obtain radiographs of the chest, thoracic cage, abdomen and upper extremities

including shoulder girdle. The lab component will stress patient positioning and radiographic evaluation. (Prerequisites: Admission to the Radiologic Technology program or instructor consent) (2 hr lec/2 hrs lab/0 hrs OJT)

RADT 1455 1 credits
Concepts of Image Production I
Explore the creation and physical properties of x-radiation along with the specialized equipment that produces this form of electromagnetic radiation. This course is the first in a three-part series and serves as an introduction to x-ray equipment and the physical science involved in medical imaging. Students will study the components of, and the physics behind, the x-ray machine and accessories used for image production. Content include: history, essential concepts of radiologic science, structure of matter as it relates to medical imaging, and the study of various forms of energy including electromagnetic energy. Students will perform math and algebraic calculations that control the radiographic exposure. (Prerequisites: MATH0460 and college-level reading. Admission to the Radiologic Technology Program or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

RADT 1463 4 credits
Radiographic Procedures II
A continuation of RADT1453 and a study of the anatomy and positioning of the lower extremities, hip, pelvis, spine and contrast studies of the GI and GU systems. (Prerequisites: RADT1453 concurrent with RADT1568) (3 hrs lec/2 hrs lab/0 hrs OJT)

RADT 1480 2 credits
Radiation Biology & Protection
The study of radiation and the effects of radiation exposure on the human body. Acute and chronic responses will be discussed in regard to molecules, cells, tissues, and organs. The principles of radiation protection including the responsibility of the technologist to the patient, personnel, and public will be addressed. The regulations and regulatory commissions governing exposure of ionizing radiation to humans will also be examined. (Prerequisites: Entrance into the Radiologic Technology Program or instructor's consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

RADT 1508 1–3 credits
Radiography Refresher
Designed to assist Radiologic Technology students in reviewing and/or updating concepts fundamental to clinical radiography. Students who are readmitted into the Radiologic Technology program, after a stop-out, will be required to meet with the program director to develop a contract for successful completion. (Prerequisites: Program director's consent) (0 hrs lec/0 hrs lab/3-9 OJT)

RADT 1538 2.5 credits
LXMO Clinical Radiography I
Students receive an initial orientation to the radiographic equipment, supplies, and office procedures. Emphasis is placed on patient care, patient transport, protocols in a medical imaging department and clinic facilities. Students observe and actively participate in radiographic procedures, patient care/communication under the direct supervision of a registered radiologic technologist. (Prerequisite: Acceptance into the LXMO Program.) (0 hrs lec/0 hrs lab/7.5 hrs OJT)

RADT 1548 2.5 credits
LXMO Clinical Radiography II
This course provides continued internship in the clinic environment. Supervised application of concepts presented in the classroom to build efficiency in general radiographic procedures with exposure to radiography, and basic positioning for exams and/or procedures will be demonstrated and evaluated. Students will be directly supervised by certified Radiologic Technologists. (Prerequisite: Acceptance into the LXMO Program.) (0 hrs lec/0 hrs lab/16.5 hrs OJT)

RADT 1558 4.5 credits
Clinical Radiography I
This course runs concurrent with RADT1559. To acquaint the student with a hospital or clinic environment through supervised participation of theories presented in the classroom. . Emphasis on patient environment through supervised participation of theories presented in the classroom. Emphasis on patient care, patient transport, protocol in a hospital or clinic radiology department; identification of radiographic equipment and supplies. Students will observe and participate in patient radiographic

procedures. (Prerequisites: Entry into the Radiologic Technology program. Current mantoux and current CPR certification) (0 hrs lec/0 hrs lab/13.5 hrs OJT)

RADT 1559 0.5 credits
Clinical Radiography Theory I
This course runs concurrent with RADT1558. It is a structured film critique/review of the chest and abdomen. (Prerequisites: Entry into the Radiologic Technology program. Current mantoux and current CPR certification.) (0 hrs lec/1 hr lab/0 hrs OJT)

RADT 1560 3 credits
Concepts of Image Production II
This is the second component of the three-part Image Production series. This course requires an integration of all exposure and technical factors previously learned while focusing on the structure, function and operation of imaging equipment. Discussion topics cover concepts of electricity and magnetism, physical components required to convert kinetic energy into x-ray photons, x-ray emissions and identifying the classic interactions between x-rays and matter. As the student progresses in the course, the focus will switch from x-ray creation to image detail, quality and evaluation. The student will perform math and algebraic calculations that control the radiographic quality and exposure. (Prerequisites: RADT1455) (3 hrs lec/0 hrs lab/0 hrs OJT)

RADT 1568 7.5 credits
Clinical Radiography II
This course provides the student with the opportunity to operate more independently in all areas of basic radiography. Competency testing begins as well as weekend, surgical, and evening clinical experience. Clinical objectives, specific to each rotation, are found in the clinical portfolio. Course runs concurrent with RADT1569. (Prerequisites: RADT1558 and RADT1559) (0 hrs lec/1 hrs lab/21 hrs OJT)

RADT 1569 0.5 credits
Clinical Radiography Theory II
This course runs concurrent with RADT1568. It is a structured film critique/review of the upper extremity and shoulder girdle. (Prerequisites: RADT1558 and RADT1559) (0 hrs lec/1 hr lab/0 hrs OJT)

RADT 1578 2.5 credits
Clinical Radiography III
A continuation of Clinical Radiography II, this course provides the student with the opportunity to operate more independently in all areas of general radiography. Competency testing continues as well as weekend and evening clinical rotations. (Prerequisites: RADT1558, RADT1559, RADT1568 & RADT1569) (0 hrs lec/0 hrs lab/7.5 hrs OJT)

RADT 1579 0.5 credits
Clinical Radiography Theory III
This course runs concurrent with RADT1578. It is a structured film critique/review of the lower extremities and pelvic girdle. (Prerequisites: RADT1558, RADT 1559, RADT1568 and RADT1569) (0 hrs lec/1 hr lab/0 hrs OJT)

RADT 1588 2.5 credits
Clinical Radiography IV
This course provides the student with the opportunity to operate more independently in all areas of general radiography. Competency testing continues as well as weekend and evening clinical rotations. Exposure is given to specialized modalities in medical imaging. (Prerequisites: RADT1568) (0 hrs lec/0 hrs lab/7.5 hrs OJT)

RADT 1589 0.5 credits
Clinical Radiography Theory VI
A companion to Clinical Radiography IV. This course provides the student with the opportunity to operate more independently in all areas of general radiography. Competency testing continues as well as weekend and evening clinical rotations. Exposure is given to specialized modalities in medical imaging. It is a structured Image critique/review/activities of all body systems. (Prerequisites: RADT1568) (0 hrs lec/1 hr lab/0 hrs OJT)

RADT 2453 4 credits
Radiographic Procedures III
This course provides a structured methodology of problem solving clinical scenarios for mobile, surgical, and trauma situations as well as special considerations for pediatric and geriatric imaging. Students will build upon their radiographic knowledge by developing an organized, systematic approach for image analysis. The course includes a lab covering sterile technique, pediatric, and skull imaging.

(Prerequisites: RADT1463) (3.5 hrs lec/1 hr lab/0 hrs OJT)

RADT 2455 **1 credits**
Radiologic Pathology
This study of the disease as it relates to radiographic studies. Pathological conditions of each body system will be demonstrated using general radiology and advanced imaging modalities. Comparisons will be made between normal and abnormal anatomy due to the presence of pathology. (Prerequisites: RADT1463) (1 hr lec/0 hrs lab/0 hrs OJT)

RADT 2552 **2 credits**
Advanced Medical Imaging
An introduction to computed tomography (CT) will include fundamentals of the equipment components, image creation, and manipulation. This course will also prepare students to identify anatomical structures on sectional images. (Prerequisites: RADT2453 or current ARRT certification) (2 hrs lec/0 hrs lab/0 hrs OJT)

RADT 2555 **3 credits**
Concepts of Image Production III
This is the third and final component of the Image Production series. This course is designed as a comprehensive analysis of factors affecting image quality by integration of all exposure and technical factors previously learned. Students will compare/contrast imaging systems (Film/Screen, Computed Radiography and Direct Digital Radiography) and become familiar with the Quality Control requirements of those systems. Content also includes components, principles and operation of digital imaging systems, factors that impact image acquisition, display and archival, and digital communications in medicine. This course will also identify the specialized components of fluoroscopic and tomographic radiography equipment. (Prerequisites: RADT 1560) (3 hrs lec/0 hrs lab/0 hrs OJT)

RADT 2558 **7.5 credits**
Clinical Radiography V
This course provides the students with the opportunity to operate more independently in all areas of basic radiography. Competency testing continues as well as weekend and evening clinical assignments. Exposure is given to specialized modalities in medical imaging. Clinical objectives, specific to each rotation, are found in the program portfolio. (Prerequisites: RADT1588) (0 hrs lec/1 hrs lab/21 hrs OJT)

RADT 2559 **0.5 credits**
Clinical Radiography Theory V
A companion to Clinical Radiography V, this course provides the student with the opportunity to operate more independently in all areas of general radiography. Competency testing continues as well as weekend and evening clinical rotations. Exposure is given to specialized modalities in medical imaging. It is a structured Image critique/review/activities of all body systems. (Prerequisites: RADT1568) (0 hrs lec/1 hr lab/0 hrs OJT)

RADT 2568 **7.5 credits**
Clinical Radiography VI
This course provides the students with the opportunity to operate more independently in all areas of basic radiography. Competency testing continues as well as weekend and evening clinical assignments. Exposure is given to specialized modalities in medical imaging. Clinical objectives, specific to each rotation, are found in the program portfolio. (Prerequisites: RADT2558) (0 hrs lec/1 hrs lab/14 hrs OJT)

RADT 2569 **0.5 credits**
Clinical Radiography Theory VI
A companion to Clinical Radiography VI. It is a structured Image critique/review of all body systems with concentration on contrast studies to include GI, Urinary, and Biliary system. (Prerequisites: RADT1568) (0 lec hours/1 lab hour/0 hours OJT)

RADT 2572 **1 credits**
Directed Studies in Radiologic Technology
This course will help prepare the student for the American Registry of Radiologic Technology exam by assisting with a long term study plan, developing testing strategies, review of calculations and formulas, and mock testing. In addition, a workshop will be held to prepare the student for entry in the radiology job market. (Prerequisites: RADT2550) (1 hr lec/0 hrs lab/0 hrs OJT)

RADT 2999 **1-3 credits**
Special Topics in Radiologic Technology
Study of special topics in radiologic technology. Special course topics will be announced in the class schedule.

Reading

READ 0950 **5 credits**
Read/Write College Prep: Intermediate
This course provides comprehensive practice in reading and writing skills necessary for success in college-level courses. Students need a "C" or better in this course to enroll in ENGL1106, Composition I. (Prerequisites: none) (5 hrs lec/0 hrs lab/0 hrs OJT)

READ 0955 **4 credits**
Read/Write College Prep: Advanced
This course provides comprehensive practice in reading and writing skills necessary for success in college-level courses. Students need a "C" or better in this course to enroll in ENGL1106, College Composition I. (Prerequisites: 56-77 on the Reading

portion of the Accuplacer or 236-249 on the Next-Generation Accuplacer or a "D" in ENGL0950 or READ0950) (4 hrs lec/0 hrs lab/0 hrs OJT).

READ 1102 1 credits
Critical Reading for Academics
This course is designed to sharpen the critical reading and thinking skills necessary for academic study. Students will learn reading strategies to comprehend, analyze, and interpret college level material leading to effectiveness and confidence in engaging with academic texts. MTC goal area: (2) Critical Thinking. (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955 with a "C" or better; or 250 on the Next-Generation Accuplacer; or placement at college level reading) (1 hrs lec/0 hrs lab/0 hrs OJT)

Respiratory Therapy

RESP 1405 1 credits
Introduction to Respiratory Therapy Clinical
This course will prepare the respiratory student for direct patient care. (Prerequisites: Concurrent enrollment in, or completion of, all semester one courses on the RT planner, or instructor consent.) (1 hr lec/0 hr lab/0 hrs OJT)

RESP 1410 4 credits
Cardiopulmonary Anatomy and Physiology
This course focuses on cardiopulmonary anatomy and physiology topics pertinent to the respiratory therapy. (Prerequisites: Concurrent enrollment in semester one RT courses or instructor's consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

RESP 1420 4 credits
Principles and Practice of Respiratory Therapy I
This course explores respiratory equipment and theory pertaining to medical gas therapy, bland aerosol and aerosol medication therapy, lung expansion therapy, and airway clearance therapy. Respiratory procedures will be performed in the lab setting to confirm competence and prepare the student for direct patient care. (Prerequisites: Concurrent enrollment or completion of all semester I courses on the RCP planner or instructor's consent) (3 hrs lec/2 hrs lab/0 hrs OJT)

RESP 1430 3 credits
Assessment of the Pulmonary Patient
This course covers assessment of the cardiopulmonary patient including vital signs, physical assessment, symptoms, and basic lab values. There will be a focus on integrating the assessed outcomes to determine causes. (Prerequisite: Concurrent enrollment in, or completion of, all semester one courses on the RT planner, or instructor consent.) (3 hrs lec/0 hrs lab/0 hrs OJT)

RESP 1520 4 credits
Principles and Practice of Respiratory Therapy II
This course explores respiratory equipment and theory pertaining to airway management, introduction to non-invasive and invasive mechanical ventilation, and arterial blood gas sampling. Respiratory procedures will be performed in the lab setting to confirm competence and prepare the student for direct patient care in the critical care setting. (Prerequisites: Completion of all prior semesters' courses on the RT planner or instructor's consent) (3 hrs lec/2 hrs lab/0 hrs OJT)

RESP 1530 4 credits
Pathophysiology for Respiratory Therapy
This course covers respiratory diseases with an emphasis on physical assessment. In addition, the course will cover some common non-respiratory conditions. (Prerequisites: Completion of all prior semesters' courses on the RT planner, or instructor consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

RESP 1560 4 credits
Respiratory Therapy Clinical I
This course will provide the student an opportunity to integrate and practice respiratory therapy theory and laboratory applications in a clinical environment. (Prerequisites: College-level reading, writing, and math and completion of all Semester I courses on the RT planner or instructor's consent) (0 hrs lec/8 hrs lab/0 hrs OJT)

RESP 1578 1 credits
Respiratory Therapy Refresher Clinical I
This course will provide the student an opportunity to integrate and practice first year respiratory therapy theory and laboratory applications in a clinical environment. This course is intended for students

who have stopped out of the RT program after having completed one semester or more of clinical courses. Before the student reenters the clinical courses on the RT planner, they need to review and practice clinical procedures. (Prerequisites: Completion of one or more RT clinical courses and current CPR certification) (0 hrs lec/2 hrs lab/0 hrs OJT)

RESP 1620 3 credits
Pharmacology for Respiratory Therapy
This course covers general pharmacology principles, dose calculations, and methods of administration for drugs commonly given by the respiratory therapist. This course will also cover drugs commonly given to the respiratory patient such as antibiotics, analgesics, cardiovascular agents, and others. (Prerequisites: Completion of all semesters courses on the RT planner, or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

RESP 1660 2 credits
Respiratory Therapy Clinical II
This course will provide the student an opportunity to integrate and practice respiratory care theory and laboratory applications in a clinical environment. (Prerequisites: Completion of all semester one and two courses on the RCP planner, or instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

RESP 2410 5 credits
Mechanical Ventilation
This course will cover mechanical ventilation indications, physics, complications, management, monitoring, devices, and weaning. There will be discussion of advanced modes of mechanical ventilation. (Prerequisites: Completion of all prior semesters' courses on the RT planner or instructor consent) (4 hrs lec/2 hrs lab/0 hrs OJT)

RESP 2420 3 credits
Adult Critical Care
This course covers invasive hemodynamic monitoring and noninvasive monitoring. Chest tubes, fluid and electrolyte balance, and other critical care content will be covered. (Prerequisites: Completion of all semester one, two, and three courses on the RT planner or instructor's consent) (3 hr lec/0 hrs lab/0 hrs OJT)

RESP 2430 1 credits
Special Topics in Respiratory Therapy
This course covers pulmonary rehabilitation and home care as it applies to respiratory therapists and their patients. Other topics that are current to the profession will be discussed in this class. (Prerequisites: Completion of Semesters I, Semesters II, and Semesters III of the RT planner or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

RESP 2440 2 credits
Neonatal/Pediatric Respiratory Therapy
This course covers developmental anatomy and physiology, neonatal/pediatric diseases, assessment, oxygen therapy, airway care, and mechanical ventilation of the neonatal and pediatric patient. (Prerequisite: Completion of all prior semesters courses on the RT planner, or instructor consent) (2 hrs lec/0 hrs lab/0 hrs OJT)

RESP 2460 7 credits
Respiratory Therapy Clinical III
This course will provide the student an opportunity to integrate and practice respiratory therapy theory and laboratory applications in a clinical environment. (Prerequisites: Completion of all Semester II, II, and III courses on the RT planner or instructor's consent) (0 hrs lec/14 hrs lab/0 hrs OJT)

RESP 2478 1 credits
Respiratory Therapy Refresher Clinical II
This course will provide the student an opportunity to integrate and practice second year respiratory therapy theory and laboratory applications in a clinical environment. This course is intended for students who have stopped out of the RT program after having completed one semester or more of clinical courses. Before the student reenters the clinical courses on the RT planner, they need to review and practice clinical procedures. (Prerequisites: Completion of RESP1560, RESP1578, RESP1660, and RESP2460 and current CPR certification) (0 hrs lec/2 hrs lab/0 hrs OJT)

RESP 2510 3 credits
Directed Studies in Respiratory Therapy
This course will review respiratory therapy with emphasis on areas of need for administration of the self assessment exams. The course will cover

advanced analysis of clinical data and integration of data into clinical management plans. The course prepares the student for the NBRC, CRTT, and RRT exams they will be taking after graduation for national credentialing. (Prerequisites: Completion of semesters I, II, III, and IV courses on the RT planner or instructor's consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

RESP 2560 **6 credits**
Respiratory Therapy Clinical IV
This course will provide the student an opportunity to integrate and practice respiratory care theory and laboratory applications in a clinical environment. (Prerequisites: Completion of all prior semesters courses on the RT planner or instructor consent.) (0 hrs lec/0 hrs lab/18 hrs OJT)

Sheet Metal

SMET 1400 **1 credits**
Environmental Health and Safety
Apprentices will cover OSHA 10 requirements and other safety information. The apprentice will be able to match the six types of OSHA inspections with their descriptions, identify citations, and describe job-hazard analysis; recognize electrical hazards; describe methods of fall protection; describe safety guidelines when using hand and power tools; describe scaffold safety; identify stairway and ladder safety; describe personal protective equipment components; describe safe handling, storage, and disposal of materials; and fire safety and hazard communication. This course will also cover job-site safety and confined spaces. (Prerequisites: None) (1 hr lec/0 hrs lab/0 hrs OJT)

SMET 1410 **3 credits**
Sheet Metal Tools and Fabrication
The apprentice will be able to identify and use hand tools; form seams, locks, and edges; describe shop procedures; and identify and use shop equipment. (Prerequisites: SMET1400 or concurrent enrollment; or instructor consent) (1 hr lec/4 hrs lab/0 hrs OJT)

SMET 1420 **2 credits**
Sheet Metal Drafting I
The course introduces the apprentice to the use of drafting tools, lines and lettering, orthographic projection, pictorial drawings and sketches, and plans and specifications. (Prerequisites: SMET1410 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

SMET 1430 **2 credits**
Sheet Metal Layout, Fabrication, and Installation I
The apprentice will be able to describe the principles of layout, layout construction lines, use layout tools, and understand layout terms. Layout on metal, parallel and radial line layout, and triangulation will also be covered. (Prerequisites: SMET1420 or concurrent enrollment) (1 hr lec/2 hrs lab/0 hrs OJT)

SMET 1460 **2 credits**
OJT-Technical Concentration I
The sheet metal apprentice must complete a minimum of 2000 hours of on-the-job training at an approved sheet metal job site. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

SMET 1500 **2 credits**
Applied Sheet Metal Mathematics
The apprentice will be able to calculate problems using whole number, fractions, decimals, and percentages; measure using the metric and imperial system; calculate powers and roots; calculate area, volume, perimeter, and circumference; calculate angles; use measurement tools; calculate sides and lengths of triangles; use geometric construction; use layout tools; apply math principles to layout on metal; apply parallel line basics; and utilize pattern development. (Prerequisites: SMET1430 and SMET1460) (2 hrs lec/0 hrs lab/0 hrs OJT)

SMET 1510 **3 credits**
Sheet Metal Layout, Fabrication, and Installation II
The apprentice will be able to make the transition from an idea on paper to a real three-dimensional object and apply the proper math, drafting, and fabrication procedures necessary to layout sheet metal projects. The apprentice will also be able to layout and fabricate round tees, elbows, and tapers; and layout offset square-to-rounds, rectangular transitions, duct-change elbows, regular and change-ogee offsets, square heel and throats, square throat and radius heels, and radius heel and throat layouts. (Prerequisites: SMET1500 or concurrent enrollment; or instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

SMET 1520 **3 credits**
Sheet Metal Drafting II
The apprentice will apply the basics learned in SMET1420 Sheet Metal Drafting I to develop orthographic projections, pictorial drawings and sketches, plans, and specifications. Apprentices will also learn how to field measure. (Prerequisites: SMET1510 or concurrent enrollment; or instructor consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

SMET 1530 **1 credits**
Sheet Metal Welding I
The apprentice will be able to perform oxy-acetylene safety inspections; make minor external repairs; set up oxy-acetylene for cutting operations; operate oxy-fuel gas cutting equipment; perform straight, shape, and bevel operations; and weld metal removal and pierce operations. The apprentice will also be able to perform shielded metal arc welding safety inspections, make minor external repairs, set up and operate shielded metal arc welding equipment, deposit beads on flat plate, and deposit lap beads on flat plate. (Prerequisites: SMET1520 or concurrent enrollment; or instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

SMET 1560 **2 credits**
OJT-Technical Concentration II
The sheet metal apprentice must complete a minimum of 2000 hours of on-the-job training at an approved sheet metal job site. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

SMET 2400 **2 credits**
HVAC Fundamentals, Heat Loads, and Psychometrics
The apprentice will be introduced to HVAC systems and be able to describe air patterns and properties of air; use psychrometric charts; determine the difference between positive and negative building pressure; identify sources of infiltration and exfiltration; identify methods of measuring ventilation; describe warm air and hydronic heating systems; use Fahrenheit and Celsius scales; use BTU's; explain basic principles of cooling air; use equations to calculate air quantity, velocity and duct size; use fan laws; sketch and describe duct systems; size duct runs; explain friction loss; use good design principles when fabricating and installing; describe grills, registers, and diffusers; explain air movement terms; describe contract documents; and explain purpose and organization of specifications. (Prerequisites: SMET1530 and SMET1560; or instructor consent) (1 hr lec/2 hrs lab/0 hrs OJT)

SMET 2410 **3 credits**
Sheet Metal Drafting III
The apprentice will be able to develop orthographic projections; gore elbow, offset square to round, ninety degree boot, wye branch, and drop cheek elbow layouts; isometric drawings and corner views; and demonstrate CAD basics. (Prerequisites: SMET2400 or concurrent enrollment; or instructor consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

SMET 2420 **1 credits**
Sheet Metal Blueprint Reading I
The apprentice will be able to interpret parts of plans and specifications used for sheet metal jobs; identify symbols and specifications; interpret sheet metal information on architectural, structural, mechanical, and electrical drawings; and identify and calculate costs for bids. (Prerequisites: SMET2410 or concurrent enrollment; or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

SMET 2430 **1 credits**
Sheet Metal Welding II
The apprentice will be able to perform gas metal arc welding safety inspections, make minor external repairs, set up and operate gas metal arc welding equipment and deposit beads on sheet metal joints; make fillet and groove welds; and perform short circuit transfer and make groove welds with spray transfer in the flat position. The apprentice will also be able to make shielded metal arc welding fillet welds and single V groove welds in the 2G, 3G, and 4G positions. (Prerequisites: SMET2420 or concurrent enrollment; or instructor consent) (o hrs lec/2 hrs lab/0 hrs OJT)

SMET 2440 **3 credits**
Sheet Metal Layout, Fabrication, and Installation III
The apprentice will layout and fabricate double seam can, pipelock and elbow edge, one-sided taper straight, five gore elbow, three piece elbow, square to round offsets, ninety degree angle boots, wye branches, drop cheek elbows, and takeoff cubes.

(Prerequisites: SMET2430 or concurrent enrollment; or instructor consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

SMET 2460 **2 credits**
OJT-Technical Concentration III
The sheet metal apprentice must complete a minimum of 2000 hours of on-the-job training at an approved sheet metal job site. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

SMET 2500 **1 credits**
Basic Electricity
The apprentice will be able to define and show the relationship between volts, amps, and ohms in an electrical circuit; identify series and parallel circuits; explain how components of circuits react to different circuit conditions; and explain inductance and inductive reactance. (Prerequisites: SMET2450 and SMET2460; or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

SMET 2510 **2 credits**
Sheet Metal Drafting IV
The apprentice will be able to interpret architectural, civil, structural, and mechanical drawings in relation to sheet metal installation. (Prerequisites: SMET2500 or concurrent enrollment; or instructor consent) (1 hr lec/2 hrs lab/0 hrs OJT)

SMET 2520 **1 credits**
Sheet Metal Blueprint Reading II
The apprentice will be able to interpret architectural, civil, structural, and mechanical drawings in relation to sheet metal installation. (Prerequisites: SMET2510 or concurrent enrollment; or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

SMET 2530 **1 credits**
HVAC Air Systems
The apprentice will be able to explain the need for testing, adjusting and balancing air flow, describe the skills and knowledge that a TAB technician needs, and assemble documents and information needed for TAB job; explain the difference between proportional air balancing and sequential air balancing, balance air flow in a single zone, and constant volume system; explain why filters are used, describe types of filters and other air cleaners, and install and service filters properly; explain the importance of good indoor air quality; and explain the need for clean rooms and maintain standards required to fabricate and install clean rooms. (Prerequisites: SMET2420 or concurrent enrollment; or instructor consent) (1 hr lec/0 hrs lab/0 hrs OJT)

SMET 2540 **3 credits**
Sheet Metal Layout, Fabrication, and Installation IV
The apprentice will utilize all layout techniques for pattern development. Accuracy and productivity will be emphasized. (Prerequisites: SMET2530 or concurrent enrollment; or instructor consent) (0 hrs lec/6 hrs lab/0 hrs OJT)

SMET 2550 **1 credits**
Sheet Metal Welding III
The apprentice will learn the basics of plasma arc cutting, flux core arc welding, gas tungsten arc welding, carbon arc welding, and gas metal arc welding; pulsed spray transfer; and gas tungsten pulsed arc welding. Basic electricity as it relates to welding is also covered. (Prerequisites: SMET2540 or concurrent enrollment; or instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

SMET 2560 **2 credits**
OJT-Technical Concentration IV
The sheet metal apprentice must complete a minimum of 2000 hours of on-the-job training at an approved sheet metal job site. (Prerequisites: Instructor consent) (0 hrs lec/0 hrs lab/6 hrs OJT)

SMET 2570 **1 credits**
Sheet Metal Welding IV
The apprentice will gain more advanced skills in plasma arc cutting, gas tungsten arc welding and gas metal arc welding; pulsed spray transfer; and gas tungsten pulsed arc welding. Basic electricity as it relates to welding is also reviewed. (Prerequisites: SMET2550 or concurrent enrollment; or instructor consent) (0 hrs lec/2 hrs lab/0 hrs OJT)

Supervisory Management

SMGT 1400 **3 credits**
Supervisory Leadership
This course teaches participants current principles, concepts, responsibilities and practical application skills fundamental to success as a supervisor.

Students will participate in hands-on projects in class and at work dealing with topics such as leadership, communication, employee motivation, delegation, planning, team building, quality and productivity, problem-solving, organizing, and managing performance. (Prerequisites: College level reading and writing.) (3 hrs lec/0 hrs lab/0 hrs OJT)

Sociology

SOC 1111 **3 credits**

Introduction to Sociology

This course involves both an explanation of and active practice in using the sociological perspective to examine the world around us. It introduces Sociology as a discipline and sociological ways of understanding human social interaction and processes such as socialization, deviance, culture/society, and social change. This class teaches the use of Sociology in class via small-group exercises and the use of computers to explore questions about the social world. This is a required course for the Minnesota State Sociology Transfer Pathway. MTC goal areas: (5) History and the Social and Behavior Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1114 **3 credits**

Criminal Justice in Society

This course will explore the development of the U.S. criminal justice system, focusing both on the social values which form the basis for this institution and on the particular institutional arrangements through which society aspires to foster responsible behavior among its citizens. It will examine the broad ideals of justice and the underlying assumptions about the personal rights and obligations that come with membership in a society. It will analyze the workings of the criminal justice system within the context of a free society characterized by broad human diversity. The course meets the Elective A Learning Outcome of the Minnesota State Sociology Transfer Pathway. MTC goal areas: (5) History and Social and Behavioral Sciences and (9) Ethical and Civic Responsibility. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1125 **3 credits**

Social Deviance

This course examines how societies come to define social deviance as well as how societies influence their members to conform. It explores social and behavioral science research addressing the question: Is anything inherently deviant? The course prepares students to take their places as global citizens, respecting the enormous diversity of what is considered socially acceptable behavior. In this class, students explore the various theories of deviance, comparatively analyze their own and other societies' responses to deviance, and consider the role that social deviance plays in widespread social change in today's world. MTC goal areas: (5) History and Social and Behavior Sciences and (8) Global Perspective. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1130 **3 credits**

Juvenile Delinquency

This course will explore the concepts of childhood and delinquency and their social construction. Students will examine the measurement of delinquent behavior along with competing theories of delinquency. The course addresses the relationship between delinquency and various influences such as gender, family, peers, schools, and media. It examines the intersection of social institutions as they both facilitate and attempt to control delinquency. Finally, students will evaluate programs for the prevention and treatment of delinquency, and examine the development and operation of the juvenile justice system in the United States. MTC goal areas (5) History and Social and Behavior Sciences (9) Ethical and Civic Responsibilities (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1140 **3 credits**

Marriages and Families

This course is an examination of marriage and family as a form of social organization existing within a larger social system. Both the larger social system and differences in individuals are emphasized as factors that create wide diversity in families within each culture and across cultures. Cultural beliefs about and perceptions of "the family" i.e., myths, ideals, and values are critically analyzed. Diverse families are

studied in their functioning around intimacy, work, children, violence, marriage, divorce, economics, race, and gender. MTC goal areas: (5) History and the Social and Behavioral Sciences and (7) Human Diversity. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1145 3 credits
Race, Class, and Gender
This course uses the sociological perspective to explore issues of race, class, and gender as they intersect in the lives of individuals and in society at large. It addresses both disadvantage and privilege and concludes with an examination of social activism. This course meets the Elective B Learning Outcome of the Minnesota State Sociology Transfer Pathway. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1155 3 credits
Human Sexuality
This course is an introduction to human sexuality as a social behavior in a social context, influenced by both biology and culture. Class discussion examines cross-cultural sexual variation sexual anatomy and functioning, sexual coercion, commercialization, and issues related to sexual orientation, sexual health, variations in sexual behavior within a culture, sexual abuse. MTC goal areas: (5) History and the Social and Behavioral Sciences, and (7) Human Diversity. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1165 3 credits
Patterns of Domestic Violence
This course examines the social context of violence in a domestic setting. It focuses on the commonalities in strategies used by perpetrators of violence and survival mechanisms common to those victimized. The course introduces local domestic violence services. Finally, the course connects students with state and national-level policy debates and legislative initiatives dealing with domestic violence. This course meets the Elective B Learning Outcome of the Minnesota State Sociology Transfer Pathway. MTC goal areas: (5) History and Social and Behavioral Sciences, and (9) Ethic and Civic Responsibilities. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1170 3 credits
Drugs and Society
This course uses sociology to analyze the varied responses of societies around the world to substances, from socially accepted substances like caffeine to tolerated substances like alcohol and nicotine all the way to more controversial substances like marijuana and heroin. The course will examine the ways in which these substances have been defined and regulated historically and cross-culturally. Major themes will include public drug policy, drug countercultures, social movements for prohibition, legalization and reform, harm reduction approaches, subcultural drug use within a society, and, finally, wars on drugs. MTC goal areas: (5) History and Social and Behavioral Sciences and (8) Global Perspective. (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 1185 3 credits
Gender, Power and Society
This course examines gender issues from the sociological perspective. It explores the development of gender roles across cultures and the consequences of gender roles on individuals and society. Topics for discussion include: the social construction of gender; gender role socialization; the impact of race and class on gendered experiences; gender and communication styles; gender issues related to family, work, education, and the media; patterns of gender-based violence; and past and present strategies used to achieve social change. This course meets the Elective B Learning Outcome of the Minnesota State Sociology Transfer Pathway. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2103 3 credits
Body Culture
This course explores the ways social forces and culture shape the human body as well as the way the human body is experienced. Because bodies can significantly influence our opportunities, abilities, and experiences, we will examine the human body as a source of power, repression, and subjugation, a medium for expression, and an entity that can be controlled. This course will examine the meanings attached to the body and particular body parts, and

the ways in which we experience our own bodies in contemporary society. We will consider aspects such as body size, race/ethnicity, sex/gender, and physical ability, along with the ways in which individuals may choose (or be forced to participate in) body modification through exercise, illness, eating disorders, plastic surgery, piercing, tattooing, and other methods. MTC goal areas: (5B) History and Social and Behavioral Sciences and (7) Human Diversity. (Prerequisites: College-level reading and writing) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2120 **3 credits**
Social Problems
This course uses the topic of social problems to teach sociological concepts and processes coupled with civic responsibility. It examines a range of social problems and the diverse views of the common good that affect our perceptions of these problems. It encourages students to understand their own and others' positions and to define social justice in light of those positions. MTC goal areas: (5) History and the Social and Behavioral Sciences and (9) Ethic and Civic Responsibility. This course meets the Elective A Learning Outcome of the Minnesota State Sociology Transfer Pathway. (Prerequisites: College-level reading) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2123 **3 credits**
People and the Environment
This course examines the relationship of people to their environment from a social and behavioral science perspective. It explores the impact of socio-cultural systems on the bio-physical environment and focuses on alternative solutions to the environmental challenges causes by individual social behaviors and broader societal policies. MTC goal areas: (5) History & Social and Behavioral Sciences and (10) People and the Environment. (Prerequisites: College-level reading and writing and SOC1111) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2125 **3 credits**
Social Movements
This course explores the dynamics of social movements from a sociological perspective. It examines both national and global social movements and their impact on societies within the framework of social change analysis. MTC goal areas: (5) History and Social and Behavioral Sciences and (8) Global Perspective (Prerequisites: ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT) (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2127 **3 credits**
Race, Power, and Justice
This course is a sociological examination of race, ethnicity, and structural racism in the United States. It will examine ways in which historical and contemporary structures of racism systemically shape complex social, political, economic, and environmental inequities. It will explore the sociohistorical origins of race and will provide a social history of relations between dominant and minority groups in the U.S. In its coverage of intergroup relations, the course will analyze how patterns of racial and ethnic inequality have been created and maintained by social institutions. This will involve analysis of dynamics related to housing, jobs, schools, family, media, and the criminal justice system. The course will also cover social justice efforts to counteract the impact and existence of systemic racism, including the study of various social movements. MTC goal area: (7) Human Diversity (3 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2779 **1-2 credits**
Community Service Collaboration
This course is designed to engage students in providing service to identified individuals or groups in order to facilitate the accomplishment of specific learning outcomes. MTC goal areas: (9) Ethic and Civic Responsibility. (Prerequisites: SOC1145; college-level reading and writing) (1-2 hrs lec/0 hrs lab/0 hrs OJT)

SOC 2999 **1-3 credits**
Special Topics in Sociology
Study of special topics in sociology. Special course topics will be announced in the class schedule.

Spanish

SPAN 1010 **4 credits**
Beginning Spanish I

Beginning Spanish is a grammatical approach to introductory vocabulary and verb tenses with emphasis on vocabulary building, listening comprehension, verbal response, and writing skills. MTC goal areas: (8) Global Perspective. (Prerequisites: College-level reading) (4 hrs lec/0 hrs lab/0 hrs OJT)

SPAN 1020 **4 credits**
Beginning Spanish II
A continuation of SPAN1010, a first course grammatical approach. MTC goal area: (8) Global Perspective. (Prerequisites: SPAN1010 or instructor's consent) (4 hrs lec/0 hrs lab/0 hrs OJT)

SPAN 2010 **4 credits**
Intermediate Spanish I
A grammatical approach to intermediate level reading, writing, listening and speaking. Readings deal with social and cultural topics of Spanish speaking countries with emphasis on vocabulary building. MTC goal area: (8) Global Perspective. (Prerequisites: College-level reading and writing and computer skills) (4 hrs lec/0 hrs lab/0 hrs OJT)

SPAN 2020 **4 credits**
Intermediate Spanish II
Intensified study of the Spanish language through listening, speaking, and composition. MTC goal areas: (8) Global Perspective. (Prerequisites: College-level reading, writing, and computer skills) (4 hrs lec/0 hrs lab/0 hrs OJT)

SPAN 2999 **1-3 credits**
Special Topics in Spanish
Study of special topics in Spanish. Special course topics will be announced in the class schedule.

Surgical Technology

SURG 1210 **3 credits**
Introduction to Surgical Technology
This course provides an introduction to the field of Surgical Technology. It covers the characteristics of a professional surgical technologist, expectations of their role as a member of the surgical team, education requirements, and an overview of agencies that impact the provision of surgical services. Other topics covered include legal and ethical concerns, patient populations, and the healthcare facility environment. (Prerequisites: All pre-program course requirements) (3 hrs lec/0 hrs lab/0 hrs OJT)

SURG 1212 **2 credits**
Surgical Lab I
This introductory lab course teaches basic skills required of the surgical technologist during the preoperative surgical phase. During this course students will learn such skills as the surgical hand scrub, donning sterile attire, creating the sterile field, surgical counts, and safe medication handling. Theory and rationale are discussed in addition to skill performance. Emphasis is placed on the principles of asepsis including recognition and mitigation of breaks in sterile technique. (Prerequisites: SURG 1210) (0 hrs lec/4 hrs lab/0 hrs OJT)

SURG 1310 **3 credits**
Surgical Techniques I
This course introduces knowledge and techniques essential to the surgical technologist during the perioperative time frame. Emphasis is placed on hemostasis, wound healing, wound closure, and identification and proper usage of instruments, equipment, and supplies. This course covers the role of the assistant circulator and patient preparation concepts such as patient transport, transfer and positioning, and surgical skin prep. (Prerequisites: SURG 1210, SURG 1212) (3 hrs lec/0 hrs lab/0 hrs OJT)

SURG 1312 **4 credits**
Surgical Lab II
This lab course introduces practical concepts, principles, and professional standards required for clinical practice. The focus of this course is the application of aseptic technique to ensure safe patient care practices as they apply to the first scrub, second scrub, and assistant circulator roles during the perioperative period. (Prerequisites: SURG 1212, SURG 1310) (0 hrs lec/8 hrs lab/0 hrs OJT)

SURG 2210 **3 credits**
Surgical Techniques II
This course discusses minimally invasive surgery along with the modalities of electricity, radiation, and lasers. There is a focus on sterile technique and the principles of asepsis, decontamination, disinfection, and sterilization. The course also addresses

pharmacology and anesthesia applications. (Prerequisites: SURG 1310 and SURG 1312) (3 hrs lec/0 hrs lab/0 hrs OJT)

SURG 2212 4 credits
Surgical Clinical I
This clinical rotation provides an introduction into the operating room for the student surgical technologist. Application of knowledge of surgical techniques, procedures, equipment, instruments, and supplies in a real-world environment is emphasized. Students will work under direct supervision of faculty and operating room staff as they develop their hands-on skills and progress from simple to complex tasks as their technique improves. (Prerequisites: SURG 1310 and SURG 1312) (0 hrs lec/8 hrs lab/0 hrs OJT)

SURG 2214 6 credits
Surgical Procedures
This course summarizes select diagnostic procedures and abdominal incisions in addition to surgeries related to the following specialties: General, Obstetric and Gynecologic, Ophthalmic, Otorhinolaryngologic, Oral and Maxillofacial, Plastic and Reconstructive, Genitourinary, Orthopedic, Cardiothoracic, Peripheral Vascular, and Neurosurgery. (Prerequisites: SURG 1310 and SURG 1312) (6 hrs lec/0 hrs lab/0 hrs OJT)

SURG 2312 12 credits
Surgical Clinical II
This clinical rotation focuses on demonstration of leveled mastery of learned skills as students assist in a variety of surgeries and duties. Students will work under direct supervision of faculty and operating room staff as they focus on improving their skill set with the ultimate goal of becoming an entry-level surgical technologist. All students must complete the Association of Surgical Technologists' requirement of documented surgical procedures in order to graduate. (Prerequisites: BIOL 1141, SURG 2210, SURG 2212, and SURG 2214) (0 hrs lec/24 hrs lab/0 hrs OJT)

SURG 2320 2 credits
Professional Preparation and Review
This course prepares students for their new role as entry-level surgical technologists. Students develop a plan to secure employment in the healthcare field by creating a resume and participating in mock interviews. Students also prepare for the national certification exam by utilizing review strategies and taking practice tests, which culminates in the national certification exam to conclude the course. (Prerequisites: SURG 2210, SURG 2212 and SURG 2214) (1 hrs lec/0 hrs lab/0 hrs OJT)

SURG 2999 1-3 credits
Special Topics in Surgical Technology
Study of special topics in surgical technology. Special course topics will be announced in the class schedule.

Truck Driving

TDT 1810 1 credits
Truck Driving – HAZMAT Theory for CDL
This course will prepare current and new entrant commercial drivers for basic HM competencies, including FMCSR requirements when HM is being transported. This training will teach HM communication requirements including: shipping paper requirements, marking, labeling, placarding, emergency response information, and shipper's responsibility. (Prerequisites: None) (1 cr lec/0 cr lab/0 cr OJT

TDT 1820 3 credits
Truck Driving – Commercial Driver's Lcense (CDL) Theory
This course covers the theory components required to become an entry-level commercial Class A driver as mandated by the Federal Motor Carrier Safety Regulations. (Prerequisites: None) (3 cr lec/0 cr lab/0 cr OJT)

TDT 1822 4 credits
Truck Driving – Class A CDL Range
This course covers the range components required to become an entry-level commercial Class A driver as mandated by the Federal Motor Carrier Safety Regulations. Range components include operating large commercial vehicles in a confined space, numerous backing maneuvers, vehicle inspections and procedures and coupling and uncoupling combination vehicles. (Prerequisite: TDT 1820 or instructor approval. The student must also pass a DOT Physical and Drug Screen)

TDT 1824 3 credits
Truck Driving – Class A CDL On Road Training

This course covers instruction in truck driving techniques, procedures, vehicle inspection and Department of Transportation regulations. (Prerequisite: Class A CDL permit with Air Brakes)

TDT 1832 **3 credits**
Truck Driving – Class B Theory
This course covers the theory components required to become an entry-level commercial class B driver as mandated by the Federal Motor Carrier Safety Regulations. (Prerequisites: None) (3 cr lec/0 cr lab/0 cr OJT)

TDT 1834 **2 credits**
Truck Driving – Class B Range
This course covers the range components required to become an entry-level commercial class B driver as mandated by the Federal Motor Carrier Safety Regulations. Range components include operating large commercial vehicles in a confined space, numerous backing maneuvers and vehicle inspections. (Prerequisites: TDT 1820 or instructor approval) (0 cr lec/4 cr lab/0 cr OJT)

TDT 1836 **1 credits**
Truck Driving – Class B On Road Driving
This course covers the on-road driving components required to become an entry-level commercial class B driver as mandated by the Federal Motor Carrier Safety Regulations. On-road driving components include operating large single commercial motor vehicles on public roadways. (Prerequisites: Must show proficiency in Class B Range) (0 cr lec/2 cr lab/0 cr OJT)

TDT 1840 **9 credits**
Basic Vehicle Operation and Control
This course covers instruction in truck driving techniques, procedures, vehicle inspection, and DOT regulations. (Prerequisites: Students must be able to possess a Class A CDL Permit. The CDL Permit must be obtained prior to the first day of class. The student must also pass a DOT Physical and Drug Screen under FMCSR's 391.41 prior to the start of class. If these criteria are not obtained, the student will not be allowed to start class.)

TDT 1841 **4 credits**
Truck Driving Internship 1
This course provides the student with work site experience in which skills and knowledge learned in previous coursework may be applied. These internship experiences include safety procedures, quality control, personnel procedures, company organization, contractual agreements, and other employer expectations. Technical skills and knowledge will include basic vehicle operation and control. (Prerequisites: Class A commercial drivers license (CDL)) (0 hrs lec/0 hrs lab/12 hrs OJT)

TDT 1842 **2 credits**
Truck Driving Internship 2
This course provides the student with work site experience in which skills and knowledge learned in previous coursework may be applied. These internship experiences include safety procedures, quality control, personnnel procedures, company organization, contractural agreements, and other employer expectations. Technical skills and knowledge will include advanced vehicle operation and control. (Prerequisites: Class A commercial drivers license (CDL)). (0 hrs lec/0 hrs lab/6 hrs OJT)

TDT 1999 **1-3 credits**
Special Topics in Truck Driving
Special course topics will be announced in the class schedule.

Theater

THTR 1210 **3 credits**
Theatre Appreciation
An introduction to the appreciation and practices of the theatre arts. Students will view great plays and live theatrical performances, explore theatre practices of the past and present, and examine how theatre practice is influenced by the culture and time period in which the play is written. Students will develop an understanding of the variety of types of plays so they are more prepared to attend a theatrical production ad can become a more critically observant and discriminating theatergoer. Students will be expected to attend one theatre production outside scheduled class time. MTC goal areas: (6) Humanities and Fine Arts and (8) Global Perspectives (Prerequisites: None) (3 hrs lec/0 hrs lab/0 hrs OJT)

THTR 2999 **1-3 credits**

Special Topics in Theatre
Study of special topics in theatre. Special course topics will be announced in the class schedule. (1-3 hrs lec/0 hrs lab/0 hrs OJT)

Welding

WLDG 1408 **3 credits**
Layout and Fabrication
Students will learn fabrication procedures to fabricate or repair various types of weldments using proper layout procedures. (Prerequisites: INMG 1410, Mechanical Print Reading, WLDG 1400, Gas Metal Arc Welding (MIG) or WLDG 1404, Shielded Metal Arc Welding (STIK)) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1500 **3 credits**
Blueprint Reading for Welders
This course provides students with the knowledge and skills necessary to identify welding symbols and manipulate fractions, decimals, and metric units. Students will be able to convert measurements and determine weld specifications from engineering drawings. Students will also be able to fit-up and weld an assembly or weldment given a bill of materials and a drawing. (Prerequisites: (ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT; MATH0520; may be taken concurrently or instructor consent) (3 hrs lec/0 hrs lab/0 hrs OJT)

WLDG 1520 **3 credits**
Gas Tungsten Arc Welding I
This course introduces students to the gas tungsten arc welding process including equipment, terms, and safety procedures. Students will learn how to setup, adjust, and shut down gas tungsten arc welding equipment. Students will be able to deposit stringer beads in the flat position, produce fillet weld lap joints in the flat and horizontal position, and produce fillet weld outside corner joints in the flat position. The metallurgy and weldability of carbon steel will also be covered. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1522 **3 credits**
Gas Tungsten Arc Welding II
This course expands on the knowledge and skills learned in GTAW I. This course covers the proper fit-up and welding of fillet and groove welds using stainless steel and aluminum. Students will learn about the welding characteristics of stainless steel and aluminum as it relates to the GTAW process. Students will learn how to use the GTAW process to produce lap, butt, and t-joints, in the flat and horizontal positions using both aluminum and stainless steel. Visual and destructive testing will be performed on weldments. Students will have the opportunity to prepare for the GTAW workmanship tests. (Prerequisites: WLDG1520 or instructor's consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1524 **3 credits**
Gas Tungsten Arc Welding III
This course expands on the knowledge and skills learned in GTAW I and II. This course covers fillet welds in T joints and square-groove welds using carbon steel in the vertical and overhead positions. Students will be instructed on how to properly prep and assemble open root pipe joints to be welded using the GTAW process and use the GTAW process to weld pipe. Students will produce single V-groove butt joint welds in pipe in 2G, 5G, and 6G positions. Visual inspection and destructive tests will be performed on pipe and weldments. (Prerequisites: WLDG 1520 and WLDG1522 or instructor consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1540 **3 credits**
Shielded Metal Arc Welding I
This course introduces students to the shielded metal arc welding process including equipment, terms, and safety procedures. Students will learn how to strike and control arc to produce quality welds. Students will learn how to deposit a pad of beads in the flat position. Students will be able to produce lap joint fillet welds in the horizontal position and E6010 pad of beads in the flat position. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1542 **3 credits**
Shielded Metal Arc Welding II
This course will teach students how to produce single and multiple pass fillet welds in the vertical up and overhead positions. Students will also learn how to produce square groove welds in the vertical up and overhead positions. Electrode selection, power sources, destructive testing, and distortion control will be included. Students will have the opportunity to prepare for the SMAW welder qualification test. (Prerequisites: WLDG1500 and WLDG1540) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1544 **3 credits**
Shielded Metal Arc Welding III
This course will teach students how to perform open root V groove welds in the flat, horizontal, vertical, and overhead positions with multiple electrodes. Students will also learn how to perform open root V groove welds on pipe with a 6010 root pass and 7018 fill and cover passes. Students will understand pipe welding nomenclature, positions, and tools. Students will become familiar with welding codes, documents, preheat, interpass heat, and welding procedures. (Prerequisites: WLDG1542) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1550 **3 credits**
CNC Plasma and Cutting Processes
This course introduces students to the plasma cutting and CNC methods. Students will plan, design, and produce parts with hand-controlled and CNC plasma cutters. Students will have the option to further develop their knowledge and skills in CNC programming. (Prerequisites: WLDG1500) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1560 **3 credits**
Gas Metal Arc Welding I
This course introduces students to the gas metal arc welding process including equipment, terms, and safety procedures. Students will learn how to setup, adjust, and shut down gas metal arc welding equipment. Students will be able to deposit surface welds in the flat position. Square groove and fillet butt, lap, and T-joints welds in the flat and horizontal position will also be covered. Students will be introduced to welding variables as it affects the quality of welds. (Prerequisites: None) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1562 **3 credits**
Gas Metal Arc Welding II
Students will learn how to produce square groove and fillet welds in the flat, horizontal, vertical, and overhead positions. Students will also be able to produce single V-groove butt joint welds in the horizontal and vertical position to the Guided Bend Test standard. The effect of shielding gases on metal transfer will be examined. Students will be given the opportunity to practice for the GMAW workmanship test. (Prerequisites: WLDG1560 or instructor consent) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1564 **3 credits**
Gas Metal Arc Welding III
Students will learn to produce single V-groove butt joint welds in the flat, horizontal, vertical up, and overhead positions. Students will utilize spray transfer method to produce a fillet weld in lap joints in the flat and horizontal positions and a single V-groove weld in the flat position. Students will understand advanced levels of gas metal arc welding on pipe. Students will understand proper fit up, amperage, control, electrode selection, and welding procedures to produce quality welds on pipe. Students will understand the different positions of pipe and produce a weld in 1G, 2G, 5G, and 6G positions. Students will learn and practice the proper safety precautions associated with gas metal arc welding process. Students will further develop their knowledge of welding codes and procedures used throughout the industry. (Prerequisites: WLDG1562 or concurrent enrollment; college-level reading, writing, and math) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1570 **3 credits**
Flux Cored Arc Welding I
This course introduces students to the flux cored arc welding process including equipment terms and safety procedures. Students will learn how to setup, adjust, and shut down flux cored arc welding equipment. Students will be able to produce fillet T-joint welds in the horizontal, vertical, and overhead position and single-V-groove butt joint welds in the horizontal and vertical position. Students will also be able to classify electrodes and conduct single-V-

groove tests. (Prerequisites: WLDG1560) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1572 3 credits
Flux Cored Arc Welding II
Students will learn how to produce single-V-groove butt joint welds using gas-shielded tubular electrode wire. Students will also produce fillet weld lap joints and single-V-groove butt joints with metal-cored wire and single-V-groove welds in butt joints on pipe. Destructive tests will be performed on selected welds. Students will have the option to further develop their knowledge and skills to prepare for the flux-cored Welder Qualification Test. (Prerequisites: WLDG1500 and WLDG1570) (2 hrs lec/2 hrs lab/0 hrs OJT)

WLDG 1580 4 credits
Welding Fabrication Methods
In this course, students will learn to combine welding skills to fabricate various types of weldments using proper layout procedures. Students will develop complete drawings with welding symbols, bill of materials,and cost estimates. (Prerequisites: Completion of one of the following: WLDG 1522, WLDG 1542, WLDG 1562 or instructor's consent) (1 hrs lec/6 hrs lab/0 hrs OJT)

WLDG 1590 2 credits
Introduction to Robotic Welding
This course will involve the introduction to basic robotic welding operations, and programming. This course will also look at the electrical systems, along with the fluid power components of robotic welding. The final component will be the maintenance, and daily operations of robotic welding. (Prerequisites: WLDG1560, CADE1468, ENGL0950 or ENGL0955 or READ0950 or READ0955, or equivalent, or 78 or higher on the reading comprehension portion of the CPT, and MATH0520) (1 hr lec/2 hrs lab/0 hrs OJT)

WLDG 1999 1-3 credits
Special Topics in Welding
Special topics in welding. Special course topics will be announced in the class schedule.

WLDG 2402 2 credits
Introduction to Metallurgy
This course covers the fundamental concepts and terminology of metallurgy. Physical and mechanical properties of ferrous and nonferrous metal will be covered, along with the classifications of the different types of metals. Students will demonstrate an understanding of the range of usefulness of the materials in the metal working community. Information will be presented in accordance with American Society of Mechanical Engineers (ASME) and American Welding Society (AWS) Standards. (Prerequisites: WLDG 1560) (2 hrs lec/0 hrs lab/0 hrs OJT)

WLDG 2450 3-9 credits
Welding Internship
This course will offer students the opportunity to acquire practical work experience utilizing a variety of welding processes. Students will be using the knowledge and skills gained in the classroom to complete tasks in an active production environment. Each student will have a customized internship plan developed with an industry partner. This course is intended for students who have completed their first year of the welding program and have maintained a 3.0 GPA.. (Prerequisites: Instructor Approval) (0 hrs lec/0 hr lab/9-27 hrs OJT)

WLDG 2502 1 credits
Weld Qualification
This course offers students opportunity to develop their welding skills through performance qualification tests that align with American Welding Society (AWS) entry level welder certification. Students learn about the AWS qualification process, proper material preparation, testing procedures, and performance requirements. (Prerequisites: WLDG1500, WELD1520, WELD1540, WELD1562, and WELD1570) (.05 hrs lec/1 hr lab/0 hrs OJT)

Administration and Faculty Credentials

LSC students quickly discover that the faculty and staff of the college are friendly, helpful, and concerned about students. Each member of the faculty brings a wealth of education and experience to LSC's classrooms and labs. These dedicated professionals are eager to help students meet their goals. Whether you are planning to transfer to a four-year institution or preparing for a new career, LSC staff members are ready to help. In fact, everyone at LSC - faculty, administration, maintenance, and clerical staff - is committed to student success!

Administration Credentials

Nickoel Anderson, Vice President of Finance and Administration
B.S., Accounting, University of Wisconsin, Superior
C.P.A. (inactive), State of Wisconsin

Timothy Brandon, Dean of Business & Industry
M.A., Educational Leadership, Minnesota State University Moorhead
B.S., Applied Management, Bemidji State University
A.A.S., Auto Body Technology, Lake Superior College
A.A.S, Automotive Service Technology, Lake Superior College

Wade Gordon, Dean of Student Affairs
B.A., Psychology, University of Wisconsin-Superior
A.A., Fond du Lac Tribal and Community College

Linda Kingston, Vice President of Academic and Student Affairs
Ph.D., Education – Instructional Design for Online Learning, Capella University
M.S., Mathematics, St. Cloud State University
B.S., Education – Mathematics, University of North Dakota

David Kline, Vice President of Advancement and External Relations
M.B.C., Public Relations, University of St. Thomas
B.S., Business, University of Minnesota, Carlson School of Management
A.A., Liberal Arts, North Hennepin Community College

Cary Komoto, Dean of Liberal Arts and Sciences
Ph.D., Geography, University of Minnesota
M.A., Geography, University of Minnesota
B.S., Geography, University of Minnesota

Patricia L. Rogers, President
Ph.D., Instructional Systems & Technology and Art Education, University of Minnesota, Twin Cities
M.A., Art Education and Curriculum & Instruction, University of Minnesota, Twin Cities
B.S., Art Education and Theater Arts, University of Minnesota, Twin Cities

Anna Sackette-Urness, Dean of Allied Health and Nursing
M.S., Nursing Education, University of North Dakota
B.A., Nursing, College of St. Scholastica

Jestina Vichorek, Executive Human Resources Officer
B.A., Political Science, Hamline University, St. Paul
B.A., Legal Studies, Hamline University, St. Paul
Certificate, ABA Approved Paralegal Certificate

Trevor Wills, Associate Dean of Business and Industry
D.Ed., Leadership, St. Mary's University of Minnesota
M.A.B., Business Administration, Wayland Baptist University
B.S, Aviation Business Administration, Embry-Riddle Aeronautical University
A.A.S., Avionic Systems Technology, Community College of the Air Force

Faculty Credentials

Alan Alberg, Electronics
A.A.S., Engineering Technology, Lake Superior College
Diploma, Automotive Technology, Central Lakes College
NABCEP Certified PV Associate

Corissa Anderson, Nursing
F.N.P., Nursing, University of North Dakota
B.S.N., Nursing, University of North Dakota

Roslyn Andrew, Fire Technology and Administration
B.S., Nursing, University of Iowa

Diane Arendt, Civil Engineering Technology
A.A., Business Administration, Mid-State Technical College
A.A.S., Civil Engineering Technology, Mid-State Technical College

Lillyam Arroyave, Spanish
M.A., Spanish, University of Iowa
B.S., Psychology, Universidad del Norte

Heidi Bagley, Communications
M.S.E., School Counseling, University of Wisconsin-Superior
M.S.E., Human Relations, University of Wisconsin-Superior
B.A., Psychology, University of Minnesota Duluth

Shelly Barlass, Nursing
M.S.N., Nursing, Walden University
B.S., Nursing, Minnesota State University Mankato

Mary Beebe, Biology
M.S., Zoology, Miami University
B.A., Biology, Wittenberg University

William Beecroft, Aviation Maintenance
A.S., Aircraft Electronics, Fox Valley Technical College
Diploma, Airframe & Powerplant Mechanics, Fox Valley Technical College

Zach Bennett, Biology
M.S., Integrated Biosciences, University of Minnesota Duluth
B.A., Biology, College of St. Scholastica

Timothy Brandon, Auto Body Collision and Repair Technology
A.A.S., Auto Body Technology, Lake Superior College
A.A.S., Automotive Service Technology, Lake Superior College

Susan Brashaw, Psychology
M.A., Educational Psychology, University of Minnesota Duluth
B.S., Health Promotion/Wellness, University of Wisconsin-Stevens Point

Peter Bromen, Aviation
M.S., International Relations
B.A., Criminology/Aerospace Studies

Jeri Brysch, Accounting
M.B.A., Metropolitan State University
B.A., Accounting, University of Minnesota
C.P.A., State of Minnesota
C.G.M.A., American Institute of Certified Public Accountants

Sarah Thilmany Bustrom, Mathematics
M.Ed., Curriculum and Instruction, College of St. Scholastica
B.A.S., Teaching Mathematics, University of Minnesota Duluth

Lynn Cain, Nursing
M.S.N., Nursing, Lubbock Christian University
B.S., Nursing, Lubbock Christian University
A.S., Registered Nurse, Northeast Wisconsin Technical College

Kaitlin Campbell, Dental Hygiene
B.S., Dental Hygiene, Minnesota State University, Mankato
A.A.S., Dental Hygiene, Lake Superior College
A.A., Liberal Arts, Lake Superior College

Terease Caywood, Dental Hygiene
M.Ed., University of Minnesota Duluth
B.A.S., Health Education, University of Minnesota Duluth
A.S., Dental Hygiene, University of Minnesota Duluth

Julia Cherotich, Nursing
B.S.N., Nursing, College of St. Scholastica
A.A.S., Nursing, Lake Superior College

Sheree Christian, Physical Therapist Assistant
B.A., Physical Therapy, College of St. Scholastica

Adam Chunn, Aviation
B.S., Aeronautics & Commercial Aviation, University of North Dakota
CFI/CFII/Robinson Transitions, Lake Superior College

Chris Cid, Fire Technology
IFSAC Certified Firefighter I & II, MFSCB
IFSAC Certified Instructor I, MFSCB
IFSAC Certified Officer I, MFSCB
National Registered EMT
Hazardous Materials Technician, Duluth, MN

Dana Cunningham, Accounting
B.A.S., Accounting, University of Wisconsin-Superior
B.A., Music, University of Minnesota Duluth
C.P.A., State of Minnesota

Steven Dalager, English
M.A., English, University of North Dakota
B.S., English, University of North Dakota
A.A., Northland Community College

Philip Darg, History, Political Science, Communication
Ph.D., History, University of North Dakota
M.A., Speech Communication, Minnesota State University, Mankato
M.A., History/Political Science, Minnesota State University, Mankato
B.A., History, University of Minnesota

Natalie Dawe, Dental Hygiene
B.S., Dental Hygiene, Minnesota State University, Mankato
A.A.S., Dental Hygiene, Lake Superior College
A.A., Liberal Arts, Lake Superior College

Joshua Debevec, Aviation
B.S., Aeronautics, University of North Dakota

Amanda Delich, Psychology
M.S., Multi-Interdisciplinary Studies, Minnesota State University, Mankato
M.S., Psychology, Walden University
B.S., Psychology, University of Wisconsin-Superior

Mark DeLong, Chemistry
M.S., Chemistry, University of Minnesota Duluth
B.S., Biochemistry, University of Minnesota Duluth

David Demars, Medical Laboratory Technology
B.S., Biology/Biological Sciences, University of Wisconsin-Superior
A.A.S., Medical Laboratory Technician, Lake Superior College
A.A.S., General Studies, University of Wisconsin-Barron

Renee DeWitte, Chemistry
M.S., Paper Science & Engineering, Institute of Paper Science and Technology
B.S., Mathematics, University of Wisconsin-Stevens Point

Erin Dinneen, Anthropology
M.S., Anthropology, University of Alaska
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