



EFFECTIVE May 10, 2017 – J.F. Drake State Community & Technical College has updated the Instructional Programs to include the following:

New Programs offerings:

Nursing (ADN with PN Option)

Advanced Manufacturing

- Additive Manufacturing (ADM – AAS, CER)
- Injection Molding (ADM – AAS, CER)
- Machine Tool (MTT – AAS, CER, STC)
- Mechatronics (INT, MTT, WDT – AAS, CER, STC)
- Welding (WDT – AAS, CER, STC)
- Electrical Technology (ELT – AAS, CER, STC)
- Engineering Design (DDT – AAS, CER, STC)

Removed from page 73.

- Industrial Robotics
- Industrial Systems – Basic Maintenance
- Industrial Systems

Removed from pages 164-167, 168, 170.

- Industrial Robotics
- Industrial Systems – Basic Maintenance
- Industrial Systems

Added to page 205:

- WDT124

Added to page 206:

- WDT166 and WDT167

Updated the President’s Cabinet

economics, geography, political science, psychology, and sociology.

**Must complete a 6 semester hour sequence either in literature or history.*

| <i>Course Title</i> | <i>Cr. Hrs.</i> |
|--|-----------------|
| ECO231 Principles of Macroeconomics | 3 |
| ECO232 Principles of Microeconomics | 3 |
| HIS121 World History I | 3 |
| HIS122 World History II | 3 |
| HIS201 US History I | 3 |
| HIS202 US History II | 3 |
| POL200 Introduction to Political Science | 3 |
| PSY200 General Psychology | 3 |
| PSY210 Human Growth & Development | 3 |
| SOC200 Introduction to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 19-23 Cr. Hrs.

Must complete courses appropriate to the degree requirements and major of the individual student and electives.

Students completing courses that have been approved for the General Studies Curriculum and are appropriate to their major and/or degree program may transfer these courses with credit applicable to their degree program among two-year and four-year colleges and universities.

Included in the 19-23 credit hours are ORI 101, CIS 146, and WKO 107; these are institutional requirements. ORI 101 is required of all students except transfer students who have transferred 12 or more semester hours prior to transferring to Drake State.

ADVANCED MANUFACTURING TECHNOLOGIES

The Advanced Manufacturing Program prepares individuals to apply basic engineering principles and technical skills to the identification and resolution of production problems in the

manufacture of products. It includes instruction in machine operations, production line operations, engineering analysis, systems analysis, instrumentation, physical controls, automation, computer-aided manufacturing (CAM), manufacturing planning, quality control, and informational infrastructure. The Associate in Applied Science Degree in Advanced Manufacturing (ADM) has options in Machine Tool Technology, Electrical Technology, Welding Technology, Industrial Systems Technology, Engineering Graphics Technology, Injection Molding, and Additive Manufacturing. Advanced certificates are also available to shape the fundamentals into different forms in manufacturing of operations.

Advanced Manufacturing Courses

ADM101 – Precision Measurement – (3 cr. hrs)

This course covers the use of precision measurement instruments utilized in inspection. In addition, basic print reading techniques reverse engineering, and related industry standards required in advanced manufacturing disciplines are covered. Upon completion, students should be able to demonstrate correct use of precision measuring instruments, interpret basic prints and apply basic reverse engineering techniques.

Note: This is a suitable substitute for MTT 127.

ADM106 – Quality Control Concepts – (3 cr. hrs)

This course provides an overview of the materials and processes and quality assurance topics used in commercial and specialized manufacturing products. Emphasis is placed on process evaluation techniques that can be extrapolated to other system areas such as new products and new technology. Emphasis is also placed on quality assurance including the history of the quality movement, group problem solving, and statistical methods such as statistical process control (SPC), process capability studies, and the concepts associated with lean manufacturing.

ADM108 – Intro to 3D Modeling – (3 cr. hrs)

This course introduces basic 3Dimensional (3D) modeling functions and techniques and the parametric concept. “Hands-on” class structure

utilizes various 3D software applications. Topics include terminology, hardware, basic 3D modeling involving sketching and 3D feature creations, feature application and operating system functions.

Students will be able to generate basic 3D parts and associated working drawings in soft and hard copy format.

ADM110 – Blueprint Reading – (3 cr. hrs)

This course is designed to provide students with a comprehensive understanding of blueprint reading. Topics include identifying types of lines and symbols used in mechanical drawings; recognition and interpretation of various types of views, tolerance, and dimensions.

ADM112 – Orientation to Additive Manufacturing – (3 cr. hrs)

Introduction to basics of manufacturing, including personal protective equipment (PPE), safety practices, general lab procedures and the proper use of equipment to perform basic manufacturing processes such as drilling and cutting on commonly used materials, including metals and composites. Topics include Additive Manufacturing fundamentals, history, and terminology. Additive Manufacturing systems types, advantages vs. disadvantages of various Additive Manufacturing technologies will be discussed.

ADM145 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn the fundamentals of injection molding operations, including molding terminology, machine part identification, operating safety, machine controls and machine startup and shutdown. Students are taught to identify common part defects such as short shots, flash, warp, surface defects, color changes and shrinkage. Students learn the properties of commonly used molding materials. This course is also taught as MTT 110 and AUT 145.

ADM146 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn to safely operate an injection molding machine. Students learn to properly startup, set machine controls and shutdown a molding machine.

ADM147 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn to identify the components of an injection mold such as mold base, sprue bushing,

runner system, gates, vents, cavities, inserts and ejection system. Students learn the purpose of each component of an injection mold. Students learn common materials used to build an injection mold.

ADM148 – Injection Molding Design Lab – (3 cr. hrs)

Students demonstrate proper and safe techniques to build components of an injection mold such as sprue bushings, runner systems, gates, vents, cavities, inserts and ejection systems.

ADM160 – Additive Manufacturing Production Techniques – (3 cr. hrs)

In this class student will utilize the various Additive Manufacturing (AM) design software to learn different techniques of building additively. Student will engaged in using the software and build theory to discover best build for the part. Tool paths, angles, rotation and build support will be discussed. Additive process will include polymers and powders. Cost and build time will be calculated on the different build parameters.

ADM162 – Additive Manufacturing Processes – Polymers (3 cr. hrs.)

This course focuses on basic principles and methodology of different types of polymers and processes created with the Additive Manufacturing (AM) process. Comparison of selecting the best type of polymer for production will be discussed. Students receive proper instruction on safety operations, set-up and routine maintenance and production on the AM systems. Students learn the various types of polymer AM systems; ie. Fused Deposition Manufacturing (FDM), PolyJet, and SLA. Students also learn the software used for each AM system. Upon completion, students will be able to describe the different types of polymers available for the AM process including, but not limited to ABS, PC, PC-ABS, ULT, PPSF, and Nylon and explain what the benefits are of basic AM. They should be able to demonstrate the how to take a “part” from start to finish on the AM system and be able to select the best process for the type of product being produced.

ADM164 – Quality Control Concepts – (3 cr. hrs.)

This course focuses on the basic principles and methodology of different types of metal powders and processes created with the Additive

Manufacturing (AM) process. Students receive instruction on safety operations, set-up and routine maintenance and production of the AM Systems. Students learn metal powder based AM with the use of the Direct Metal Laser Sintering (DMLS) system. Students also learn various design software programs used for a metal powder system. Upon completion, students will be able to describe the different types of metal powders including, but not limited to aluminum, stainless steel, cobalt, titanium, and nickel and explain what the benefits are of basic AM. They should be able to demonstrate how to take a “part” from start to finish on the AM system and be able to select the best process for the type of product being produced.

ADM205 – Advanced Injection Molding – (3 cr. hrs)

Students learn advanced applications in injection molding, including fill time, cycle time, melt temperature, part size and weight, injection pressure and clamp pressure. Students learn solutions for common part defects such as short shots, flash, warp, surface defects, color changes and shrinkage.

ADM206 – Advanced Injection Molding Lab – (3 cr. hrs.)

Students demonstrate advanced techniques in injection molding by adjusting machine settings to fix common molding problems.

ADM208 – Intermediate 3D Modeling – (3 cr. hrs.)

In this course students will receive instruction on intermediate 3D modeling concepts, such as sheet metal modeling, intermediate assemblies, 3D sketching and weldments. Students will explore an introduction to prototyping and design concepts in a 3D environment. 3D software will be utilized to produce properly detailed construction drawings, using multi-views, section views, and auxiliary views. Proper, industry standard dimensioning with basic tolerances will be discussed and applied to parts. Emphasis will be placed on the theory as well as the mechanics of concepts using 3D and 2D applications. Upon completion, student will produce 3D models in a CAD environment, simple prototype models and working drawings based on proper industry standards.

ADM241 – Additive Manufacturing Test Prep – (3 cr. hrs.)

This test prep class will review concepts of Additive Manufacturing (AM) taught in this course of study. We will review instructions on Additive Manufacturing principles and review concepts will be supported by observation of Additive Manufacturing applications in action. Student will participate in practice exercises that incorporate concepts and applications from the lecture and lab of their previous coursework. The SME Additive Manufacturing Certificate serves as verifiable proof of your foundational knowledge by successfully completing an exam.

ADM255 – Application of Design Capstone – (3 cr. hrs.)

This is a project- or research-oriented course that emphasizes synthesis through collaborative learning. Students integrate and apply previous knowledge, skills, and experiences they learned in their major and other academic courses to complete individual & team-based projects. AM student will be required to serve as interns in the AM Lab. Architectural and Engineer students will serve as interns doing live work, campus project or in an office. The course emphasizes communication skills, critical thinking, problem solving, computer literacy, and teaming skills. NOTE: This course is usually taken during the last 2 semesters of the program of study.

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

**Associate of Applied Science Degree
Additive Manufacturing AAS**

| Area I: Written Composition | | 6 Cr Hrs |
|-----------------------------|------------------|----------|
| Course | Title | Cr. Hrs. |
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

Note: Students considering a future four-year degree should consider taking literature courses as a 6-hour pair. Consult with the admissions office of the targeted four-year institution for advice on selection of literature courses. An additional 3 hours in humanities and fine arts must be taken along with SPH 106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: CIS146 is required. MTH100 or higher is required. PHY201 is preferred.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |

| | | |
|--------|-------------------------------------|---|
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| PHY201 | General Physics I | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 38 Cr. Hrs. (38 required, 2 institutional)

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| ADM108 | Intro to 3D Modeling | 3 |
| ADM112 | Orientation to Additive Manufacturing | 3 |
| ADM160 | Additive Manufacturing Production Technology | 3 |
| ADM162 | Additive Manufacturing Proc-Polymer | 3 |

| | | |
|--------|---|---|
| ADM164 | Additive Manufacturing Proc- Powders | 3 |
| ADM206 | Metal Materials Post Proc | 3 |
| ADM241 | Additive Manufacturing Test Prep | 3 |
| ADM255 | App of Additive Manufacturing Design | 3 |
| WKO110 | NCCER Core | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Electives: No requirements.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ACT201 | Entrepreneurialism | 3 |
| CIS130 | Intro to Information Systems | 3 |
| OAD101 | Beginning Keyboard | 3 |
| RDG114 | Critical Reading | 3 |
| MTH100 | Intermediate College Algebra | 3 |

Total Degree Credit Hours 60

Certificate – Additive Manufacturing

Area I: Written Composition 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

Note: Students considering a future four-year degree should consider taking literature courses as a 6-hour pair. Consult with the admissions office of the targeted four-year institution for advice on selection of literature courses. An additional 3 hours in humanities and fine arts must be taken along with SPH

106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|---------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | 2Calculus and Its Application | 3 |
| MTH125 | 2Calculus I | 4 |
| MTH126 | 2Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences

No Requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs.
(24 required, 2 institutional)

| Course | Title | Cr. Hrs. |
|--------|--|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| ADM108 | Intro to 3D Modeling | 3 |
| ADM112 | Orientation to Additive Manufacturing | 3 |
| ADM160 | Additive Manufacturing Production Technology | 3 |
| ADM162 | Additive Manufacturing Proc-Polymer | 3 |
| WKO110 | NCCER Core | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Electives: No requirements.

| Course | Title | Cr. Hrs. |
|---------------------------------------|------------------------------|-----------|
| ACT201 | Entrepreneurialism | 3 |
| CIS130 | Intro to Information Systems | 3 |
| OAD101 | Beginning Keyboard | 3 |
| RDG114 | Critical Reading 3 | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| Total Certificate Credit Hours | | 38 |

A program that prepares individuals to apply technical knowledge and skills to install, operate, maintain, and repair electric apparatus and systems such as residential, commercial,

and industrial electric-power wiring; and DC and AC motors, controls, and electrical distribution panels. Includes instruction in the principles of electronics and electrical systems, wiring, power transmission, safety, industrial and household appliances, job estimation, electrical testing and inspection, and applicable codes and standards.

Advanced Manufacturing – AAS - ELECTRICAL TECHNOLOGY Degree

Area I: Written Composition 6 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------|----------|
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

Note 1: If transferring to a 4 year institution, students are highly recommended to take a sequence of 6 hours in either Literature or History. An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101, or SPA102 to satisfy requirements in Area II.

Note 2: An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| Course | Title | Cr. Hrs. |
|--------|----------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |

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|--------|------------------------------------|---|
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

| | | |
|--------|------------------------------|---|
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 44 Cr. Hrs.
(42 required, 2 institutional)

Note: All courses are required except.

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

*Note: At least one computer class is required.
At least one math class is required.*

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------|-----------------|
| ACT201 | Entrepreneurism | 3 |
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| ELT108 | DC Fundamentals | 3 |
| ELT109 | AC Fundamentals | 3 |
| ELT114 | Residential Wiring Methods I | 3 |
| ELT115 | Residential Wiring Methods II | 3 |
| ELT117 | DC/AC Machines | 3 |

Area VI: General Electives 15 Cr. Hrs.

| | | |
|--------|---------------------------------------|---|
| ELT118 | Commercial/Indust. Wiring I | 3 |
| ELT209 | Motor Controls I | 3 |
| ELT219 | Fluid Power | 3 |
| ELT230 | Programmable Controls | 6 |
| ELT241 | National Electric Code | 3 |
| INT126 | Preventive Maintenances | 3 |
| ELT253 | Industrial Robotics | 3 |
| ELT254 | Robot Maintenance and Troubleshooting | 3 |
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--------------|-----------------|
|---------------|--------------|-----------------|

| | | |
|--------|------------------------------|---|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

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|--------|----------------------|---|
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Total Certificate Credit Hours 66

Electrical Wiring Certificate

Area I: Written Composition 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|-----------------|----------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

Note 1: If transferring to a 4 year institution, students are highly recommended to take a sequence of 6 hours in either Literature or History. An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101, or SPA102 to satisfy requirements in Area II.

Note 2: An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| Course | Title | Cr. Hrs. |
|--------|------------------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 29 Cr. Hrs. (27 required, 2 institutional)

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| ELT108 | DC Fundamentals | 3 |
| ELT109 | AC Fundamentals | 3 |
| ELT114 | Residential Wiring Methods I | 3 |
| ELT115 | Residential Wiring Methods II | 3 |
| ELT118 | Comm. /Industry Wiring | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|-----------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
|--------|-----------------------|---|

| | | |
|--------|------------------------------|---|
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours **41**

Electrical Technology STC1 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and
Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral
Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and
Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| WKO110 | NCCER Core | 3 |
| ELT108 | DC Fundamentals | 3 |
| ELT109 | AC Fundamentals | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC1 Certificate Credit Hours **9**

Preventive Maintenance STC2 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and
Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral
Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and
Elective Courses 12 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--------------------------|-----------------|
| WKO110 | NCCER Core | 3 |
| ELT108 | DC Fundamentals | 3 |
| ELT109 | AC Fundamentals | 3 |
| INT126 | Preventative Maintenance | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC2 Certificate Credit Hours **12**

Electrical Technology STC3 Robotics Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and
Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral
Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and
Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--------------|-----------------|
| ELT219 | Fluid Power | 3 |

| | | |
|--------|-------------------|---|
| ELT253 | Ind. Robotics | 3 |
| ELT254 | Robot Maintenance | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC3 Certificate Credit Hours 9

Electrical (ELT) Course Descriptions

ELT108 – DC Fundamentals (3 cr. hrs.) This course is designed to provide students with a working knowledge of basic direct current (DC) electrical principles. Topics include safety, basic atomic structure and theory, magnetism, conductors, insulators, use of Ohm's law to solve for voltage, current, and resistance, electrical sources, power, inductors, and capacitors. Students will perform lockout/tagout procedures, troubleshoot circuits and analyze series, parallel, and combination DC circuits using the electrical laws and basic testing equipment to determine unknown electrical quantities. This course is also taught as ILT 160. PREREQUISITE: As required by program.

ELT109 – AC Fundamentals (3 cr. hrs.) This course is designed to provide students with a working knowledge of basic alternating current (AC) electrical principles. Topics include basic concepts of electricity, electrical components, basic circuits, measurement instruments, the laws of alternating current, and electrical safety with lockout procedures. Hands on laboratory exercises are provided to analyze various series, parallel, and combination alternating current circuit configurations containing resistors, inductors, and capacitors. Upon course completion, students will be able to describe and explain alternating current circuit fundamentals such as RLC circuits, impedance, phase relationships, and power factors. They should also be able to perform fundamental tasks associated with troubleshooting, repairing, and maintaining industrial AC

systems. This course is also taught as ILT161. PREREQUISITE: As required by program.

ELT114 – Residential Wiring Methods (3 cr. hrs.) This course is a study of residential wiring practices and methods, the NEC requirements and residential blueprint interpretations. ELT 114 and ELT 115 may be taken in the place of ELT 116. PREREQUISITE: As required by program.

ELT115 – Residential Wiring Methods II (3 cr. hrs.) This course is a study of residential wiring practices and methods, the NEC requirements and residential blueprint interpretations. ELT 114 and ELT 115 may be taken in the place of ELT 116. PREREQUISITE: As required by program.

ELT117 – AC/DC Machines (3 cr. hrs.) This course covers the theory and operation of DC motors single and three phase AC motors and the labs will reinforce this knowledge. Emphasis is placed on the various types of single and three phase motors, wiring diagrams, starting devices, and practical application in the lab. PREREQUISITE: As required by program.

ELT118 – Commercial/Industrial Wiring I (3 cr. hrs.) This course focuses on principles and applications of commercial and industrial wiring. Topics include, electrical safety practices, an overview of National Electric Code requirements as applied to commercial and industrial wiring, conduit bending, circuit design, pulling cables, transformers, switch gear, and generation principles. PREREQUISITE: As required by program.

ELT181 – Special Topics in ELT Technology (3 cr. hrs.) These courses provide specialized instruction in various areas related to electrical technology. Emphasis is placed on meeting students' needs.

ELT209 – Motor Controls I (3 cr. hrs.) This course covers the use of motor control symbols, magnetic motor starters, running overload

protection, push-button stations, sizing of magnetic motor starters and overload protection, and complex ladder diagrams of motor control circuits. Topics include sizing magnetic starters and overload protection, the use of push-button stations, ladder diagrams, and magnetic motor starters in control of electric motors, wye-delta starting, part start winding, resistor starting and electric starting devices. Upon completion, students should be able to understand the operation of motor starters, overload protection, interpret ladder diagrams using push-button stations and understand complex motor control diagrams. PREREQUISITE: As required by program.

ELT213 – Industrial Equipment (3 cr. hrs.) This course is designed to give a general overview of the different types of equipment used in large commercial and industrial facilities. Topics covered include, but are not limited to the following: motor coupling and alignment, gears and pulleys, belts and chains, basic hydraulics, basic pneumatics, and other applications. The students will learn the techniques involved with each application and, where applicable, demonstrate their abilities with practical examples. PREREQUISITES: As required by program.

ELT219 – Fluid Power Systems (3 cr. hrs.) This course includes the fundamental concepts and theories for the safe operation of hydraulic and pneumatic systems used with industrial production equipment. Topics include the physical concepts, theories, laws, air flow characteristics, actuators, valves, accumulators, symbols, circuitry, filters, servicing safety, and preventive maintenance and the application of these concepts to perform work. Upon completion, students should be able to service and perform preventive maintenance functions on hydraulic and pneumatic systems. PREREQUISITE: As required by program.

ELT230 – Programmable Controls (6 cr. hrs.) This state-of-the-art course includes the fundamental principles of programmable logic

controls (PLC's) including hardware, programming and program design. Emphasis is placed on hardwiring associated with PLC, different options available with most PLC's basic ladder logic programming, developing working programs, timers, counters, different special functions, and designing programs from existing hardwired systems. Upon completion, students should be able to develop programs, load programs into PLC's and troubleshoot the system. PREREQUISITE: As required by program.

ELT241 – National Electric Code (3 cr. hrs.) This course introduces the students to the National Electric Code and text and teaches the student how to find needed information within this manual. Emphasis is placed on locating and interpreting needed information within the NEC code manual. Upon completion, students should be able to locate, with the NEC code requirements for a specific electrical installation. PREREQUISITE: As required by program.

ELT253 – Industrial Robotics (3 cr. hrs.) This course provides instruction in concepts and theories for the operation of robotic servo motors and power systems used with industrial robotic equipment. Emphasis is on the application of the computer to control power systems to perform work. Student competencies include understanding of the functions of hydraulic, pneumatic, and electrical power system components, ability to read and interpret circuitry for proper troubleshooting and ability to perform preventative maintenance. PREREQUISITE: As required by program.

ELT254 – Robot Maintenance and Troubleshooting (3 cr. hrs.) This course introduces the principle concepts of the troubleshooting and maintenance of robots. Topics include the recognition and description of major robot components. Students will learn to diagnose robot mechanical problems to the component level, replace mechanical

components and perform adjustments, troubleshooting class 1, 2, and 3 faults, to manipulate I/O for the robot, and periodic and preventive maintenance. Students will learn how to safely power up robots for complete shutdown and how to manipulate robots using the teach pendant. Upon completion students will be able to describe the various robot.

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

Advanced Manufacturing – AAS – Engineering Design Degree

Area I: Written Composition 6 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------|----------|
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

Note 1: If transferring to a 4 year institution, students are highly recommended to take a sequence of 6 hours in either Literature or History. An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101, or SPA102 to satisfy requirements in Area II.

Note 2: An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| Course | Title | Cr. Hrs. |
|--------|------------------|----------|
| ART100 | Art Appreciation | 3 |

| | | |
|--------|------------------------------------|---|
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: A 4 credit hour Science is required. PHY201 is preferred. CIS146 and MTH100 or higher are required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| PHY201 | General Physics I | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ECO231 | Principles of Macroeconomics | 3 |

| | | |
|--------|------------------------------|---|
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses **41 Cr. Hrs.**
(27 required, 2 institutional)

Note: All courses are required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| DDT104 | Intro to Computer Aided Drafting and Design | 3 |
| DDT111 | Fundamentals of Drafting and Design Technology | 3 |
| DDT124 | Intro to Technical Drawing | 3 |
| DDT128 | Intermediate Technical Drawing | 3 |
| DDT130 | Fundamentals of Drafting or Related Trades | 3 |

Area VI: General Electives **12 Cr. Hrs.**

Note: The DDT233, DDT235, DDT236, and DDT260 are highly recommended.

| | | |
|--------|------------------------------------|---|
| DDT122 | Advanced Technical Drawing | 3 |
| DDT215 | Geometric Dimensioning Tolerancing | 3 |
| DDT233 | Three Dimensional Modeling | 3 |
| DDT234 | Three – D Graphics and Animations | 3 |
| DDT235 | Specialized CAD | 3 |

| | | |
|--------|------------------------------|---|
| DDT236 | Design Project | 3 |
| DDT260 | Portfolio | 3 |
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours **63**

Engineering Design Certificate

Area I: Written Composition **3 Cr. Hrs.**

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts **3 Cr. Hrs.**

Note 1: If transferring to a 4 year institution, students are highly recommended to take a sequence of 6 hours in either Literature or History. An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101, or SPA102 to satisfy requirements in Area II.

Note 2: An additional 3 hours in humanities and fine arts must be taken along with SPH106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs. (24 required, 2 institutional)

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| DDT104 | Intro to Computer Aided Drafting and Design | 3 |
| DDT111 | Fundamentals of Drafting and Design Technology | 3 |
| DDT124 | Intro to Technical Drawing | 3 |
| DDT128 | Intermediate Technical Drawing | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|------------------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 38

Engineering Design STC1 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|----------------------------|----------|
| WKO110 | NCCER Core | 3 |
| ADM101 | Precision Measurement | 3 |
| DDT122 | Advanced Technical Drawing | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC1 Certificate Credit Hours 9

Mechanical Design Fundamentals STC2 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|--|----------|
| WKO110 | NCCER Core | 3 |
| DDT104 | Intro to CAD | 3 |
| DDT111 | Fundamentals of Drafting and Design Technology | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC2 Certificate Credit Hours 9

Mechanical Design Quality STC3 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 12 Cr. Hrs.

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|--|----------|
| ADM106 | Fluid Power | 3 |
| ADM110 | Ind. Robotics | 3 |
| DDT215 | Geometric Dimensioning and Tolerancing | 3 |
| DDT234 | Three-D Graphics and Animations | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC3 Certificate Credit Hours 9

Engineering Graphics (DDT) Course Descriptions

DDT104 – Introduction to Computer Aided Drafting and Design (3 cr. hrs.) This course provides an introduction to basic Computer Aided Drafting and Design (CADD) functions and techniques, using “hands-on” applications. Topics include terminology, hardware, basic CADD and operating system functions, file manipulation, and basic CADD software applications in producing softcopy and hardcopy. PREREQUISITE: None.

DDT111 – Fundamentals of Drafting and Design Technology (3 cr. hrs.) This course serves as an introduction to the field of drafting and design and provides a foundation for the entire curriculum. Topics include safety, lettering, tools and equipment, geometric constructions, and orthographic sketching, and drawing. PREREQUISITE: None.

DDT115 – Blueprint Reading for Machinists (3 cr. hrs.) This course provides the students with terms and definitions, theory of orthographic projection, and other information required to interpret drawings used in the machine trades. Topics include multiview projection, pictorial drawings, dimensions and notes, lines and symbols, and sketching. Upon completion, students should be able to interpret blueprint drawings used in the machine trades. PREREQUISITE: None.

DDT116 – Blueprint Reading for Construction (3 cr. hrs.) This course provides the students with terms and definitions, theory of orthographic projection, and other information required to interpret drawings used in the construction trades. Topics include multiview projection, dimensions and notes, lines and symbols, sketching, foundations plans, site plans, floor plans, elevations, sections, details, schedules, electrical plans and specifications. Upon completion, students should be able to interpret blueprint drawings used in the machine trades. PREREQUISITE: None.

DDT117 – Manufacturing Process (3 cr. hrs.) This course in materials and processes includes the principles and methodology of material selection, application, and manufacturing processes. Emphasis is directed to solids to include material characteristics, castings, forging, and die assemblies. Upon completion, students should be able to discuss and understand the significance of materials' properties, structure, basic manufacturing processes, and express and interpret material specifications. PREREQUISITE: None.

DDT118 – Basic Electrical Drafting (3 cr. hrs.) This course covers the universal language of electrical drafting, including electrical lines, symbols, abbreviations, and notation. Emphasis is placed on typical components such as generators, controls, transmission networks, and lighting, heating, and cooling devices. Upon completion, students should be able to draw basic diagrams of electrical and electronic circuits using universally accepted lines and symbols. PREREQUISITE: DDT104

DDT122 – Advanced Technical Drawing (3 cr. hrs.) This course covers the methods of providing size description and manufacturing information for production drawings. Emphasis will be placed on accepted dimensioning and tolerancing practices including Geometric Dimensioning and Tolerancing for both the Customary English System and the ISO System. Upon completion, students should be able to apply dimensions, tolerances, and notes to drawings to acceptable standards, including Geometric Dimensioning and Tolerancing, and produce drawings using and specifying common threads and various fasteners, including welding methods. PREREQUISITE: DDT104, DDT111, and DDT124.

DDT124 – Introduction to Technical Drawing (3 cr. hrs.) This course covers sections, auxiliary views, and basic space geometry. Emphasis will be placed on the theory as well as the mechanics of applying sections, basic dimensioning, auxiliary views, and basic space geometry. PREREQUISITE: As required by college.

DDT127 – Intermediate Computer Aided Drafting and Design (3 cr. hrs.) This course covers intermediate-level concepts and applications of CADD. Emphasis will be placed on intermediate-level features, commands, and applications of CADD software. PREREQUISITE: As required by college.

DDT128 – Intermediate Technical Drawing (3 cr. hrs.) This course is designed to develop a strong foundation in common drafting and design practices and procedures. Topics include dimensioning concepts and pictorial drawings. PREREQUISITE: As required by college.

DDT130 – Fundamentals of Drafting for Related Trades (3 cr. hrs.) This course provides an overview of related technical trades drafting. Theory is covered within a broad range of drafting specialties including civil, structural, electrical, mechanical, and electronic drawing. Emphasis is placed on a basic understanding of what each of these fields require for graphic communication. PREREQUISITE: As required by college.

DDT132 – Architectural Drafting (3 cr. hrs.) This course in architectural design and drafting introduces basic terminology, concepts and principles of architectural design and drawing. Topics include design considerations, lettering, terminology; site plans, and construction drawings. Upon completion, students should be able to draw, dimension, and specify basic residential architectural construction drawings. PREREQUISITE: None.

DDT133 – Basic Surveying (3 cr. hrs.) This course covers the use of surveying instruments, mathematical calculations and the theory of land surveying. Topics include USGS benchmarks, measuring horizontal and vertical angles and distances, terms, and recording and interpreting field notes. Upon completion, students should be able to recognize benchmarks and measure, specify, and record field notes. PREREQUISITE: None.

DDT181 – Special Topics in Drafting and Design Technology (3 cr. hrs.) This course provides specialized instruction in various areas related to the drafting industry. Emphasis is placed on meeting students' needs. PREREQUISITE: Permission of instructor.

DDT144 - Basic 3D Modeling – (3 cr. Hrs.)

This course is an introduction to 3D solid modeling techniques utilizing feature-based, constraint-based parametric design. This course encourages the student to visualize parts in which they will design. Upon completion of the course students should be able to create basic 3D models and 2D working drawings. Prerequisite: DDT124 and DDT127.

DDT182 – Special Topics in Drafting and Design Technology (3 cr. hrs.) This course provides students with opportunities to apply drafting and design concepts. PREREQUISITE: Permission of instructor.

DDT191 – Drafting Internship (1 cr. hr.) This course is designed for those who are involved in a structured employment situation that is directly related to the field of drafting and design and is coordinated with the drafting instructor. The student must spend at least 5 hours per week in an activity planned and coordinated jointly by the instructor and the employer. Upon completion, the student will have gained valuable work experience in a well-planned, coordinated training/work situation. PREREQUISITE: Recommendation of instructor.

DDT193 – Drafting Internship (3 cr. hrs.) This course is limited to those who are involved in a structured employment situation that is directly related to the field of drafting and design and is coordinated with the drafting instructor. The student must spend at least 15 hours per week in an activity planned and coordinated jointly by the instructor and the employer. Upon completion, the student will have gained valuable work experience in a well-planned, coordinated training/work situation. PREREQUISITE: Recommendation of instructor.

DDT212 – Intermediate Architectural Drafting (3 cr. hrs.) This second course in architectural design and drafting continues with more advanced and detailed architectural plans. Topics include floor construction and detailing, foundation, wall, and roof construction and detailing; use of standards manuals; perspective

drawings; electrical plans; plumbing plans; and building materials, with emphasis on residential and some light commercial applications. Upon completion, students should be able to draw and specify advanced-level plans including various architectural details. PREREQUISITE: DDT132.

DDT215 – Geometric Dimensioning and Tolerancing (3 cr. hrs.) This course is designed to teach fundamental concepts of size description by geometric methods including appropriate engineering controls. Emphasis is placed on the drawing and application of common geometric dimensioning and tolerancing symbols to engineering drawings as designated by the latest ANSI/ASME Standards. Upon completion, students should be able to use geometric dimensioning and tolerancing symbols in applying size information and manufacturing controls to working drawings. PREREQUISITE: DDT104, DDT111, DDT124.

DDT217 – Building Codes, Ordinances, Zoning Restrictions and the A.D.A. (3 cr. hrs.) This course provides an in-depth study of building codes, municipal ordinances, zoning restrictions, and compliance with the Americans with Disability Act as related to commercial drafting and design. Emphasis is placed upon working understanding of these topics. PREREQUISITE: None.

DDT222 – Advanced Architectural Drafting (3 cr. hrs.) This third course in architectural design and drafting continues with advanced architectural plans, including a slant toward light commercial construction. Topics include climate control plans, application of building codes, building materials and finish specifications, cost estimating, and bid specifications. Upon completion, students should be able to apply current techniques in producing advanced-level architectural plans, including residential and light commercial applications. PREREQUISITE: DDT132, DDT212, DDT235.

DDT226 – Technical Illustration (3 cr. hrs.) This course provides the student with various methods of illustrating structures and machine parts. Topics include axonometric drawings; exploded assembly drawings; one point, two point, and three point perspectives, surface textures, and renderings. Upon completion, students should be able to produce drawings and illustrations using the previously described methods. PREREQUISITE: DDT111, DDT124, DDT235.

DDT227 – Strengths of Materials (4 cr. hrs.) This course in statics and strength of materials includes the study of forces and how they act and react on bodies and structures. Topics include the effects of forces as found in structures and machines under conditions of equilibrium, how materials resist forces, strengths of common construction materials and structural components. Force systems such as parallel, concurrent, and non-concurrent are studied in co-planar and non-coplanar situations are included. Upon completion, students should understand and be able apply the principles of force in engineering drawings. PREREQUISITE: As required by college.

DDT231 – Advanced CAD (4 cr. hrs.) This course covers the advanced applications of CAD software to engineering projects in various applications, including architectural, civil, mechanical, and environmental engineering, with consideration for advanced physical and psychological principle of CAD. These principles will be applied toward CAD customization and programming principles, for the expressed purpose of increasing productivity and improving the performance of the CAD operator, thereby, making CAD much more productive in an engineering environment. Emphasis will be place on using intelligent CAD techniques to increase the quality of output. And, 3D modeling and rendering will be introduced. Upon completion, students should be able to apply advanced CAD techniques in solving complex problems related to all

engineering applications. PREREQUISITE: Permission of instructor.

DDT233 – Three Dimensional Modeling (3 cr. hrs.) This course provides instruction in 3D Design Modeling utilizing the 3D capabilities of CAD software. Emphasis is placed on 3D wire-frame, surface and solids modeling along with the development of 2D detail drawings from 3D models. Upon completion, students should be able to generate 3D surface and solid models and 2D orthographic production drawings from created solid models. PREREQUISITE: DDT111, DDT124.

DDT234 – Three-D Graphics and Animations (3 cr. hrs.) This course is design to challenge the imagination of the student in a 3-dimensional problem solving environment. The student will be given a basic introduction to the concepts of 3D design and animation, then apply those concepts to a design project. Upon completion, students should be able to create and animate objects in a 3-dimensional environment. PREREQUISITE: DDT111, DDT124.

DDT235 – Specialized CAD (3 cr. hrs.) This course allows the student to plan, execute, and present results of individual projects in Specialized CAD topics. Emphasis is placed on enhancing skill attainment in Specialized CAD skill sets. The student will be able to demonstrate and apply competencies identified by the instructor. PREREQUISITE: Permission of instructor.

DDT236 – Design Project (3 cr. hrs.) This course is designed for advanced students who aspire to more advanced and specialized skills in one certain drafting area. Emphasis will be place on the student's ability to apply the principles learned in previous drafting classes in one special area, as approved by the instructor. The required project must be agreed upon by the instructor and the student, as well as how the work is to be accomplished. Upon completion, students will further reinforce previously learned concepts by apply engineering

principles and controls to a personal design project. PREREQUISITE: DDT235.

DDT237 – Current Topics in CAD (3 cr. hrs.) This course serves to introduce changing technology and current CAD subjects and software and the computing hardware needed to utilize new products. Topics include currents trends in how industries use CAD applications, new developments, improvements and progressions within specific CAD applications as well as the necessary hardware. Upon completion, students should be able to use more updated software in a specific CAD application and be more aware of improvements in CAD software and how to apply advancing technology in improving their CAD proficiency. PREREQUISITE: Permission of instructor.

DDT238 – Special Topics in CAD (3 cr. hrs.) This course in special CAD and multimedia topics covers special capabilities possible with CAD software, especially in conjunction with other graphical software, such as virtual "walk-throughs" or multimedia presentations. Topics include but are not limited to combining CAD software, image editing software, authoring software, and 3D software into one harmonious relationship to produce multimedia presentations. Upon completion, students should be aware of and understand how to utilize several software packages to produce multimedia presentations. PREREQUISITE: Permission of instructor.

DDT239 – Independent Studies (3 cr. hrs.) This course provides practical application of prior attained skills and experiences as selected by the instructor for the individual student. Emphasis is placed on applying knowledge from prior courses toward the solution of individual drafting and design problems. With completion of this course, the student will demonstrate the application of previously attained skills and knowledge in the solution of typical drafting applications and problems.

DDT260 – Portfolio (3 cr. hrs.) This course includes the preparation of technical and or architectural drawings for a portfolio presentation and a resume for portfolio presentation. Hard copy drawings as well as electronic will be discussed, finalized and developed for presentation. Upon completion, students should be able to prepare and produce a portfolio for presentation. This course includes the preparation of artwork and a resume for portfolio presentation. Topics include production of a resume and portfolio for presentation during the last semester of course work. Upon completion, students should be able to prepare and produce a resume and portfolio for presentation in both hard copy as well as electronic copy. PREREQUISITE: Permission of instructor.

DDT267 – Drafting Internship (1 cr. hr.) - This course allows the student to work parallel in a job closely related to the student's major while attending college. The grade is based on the employer's evaluation of the student's productivity, an evaluation work report submitted by the student, and the student's learning contract. PREREQUISITE: Permission of instructor.

DDT268 – Drafting Internship (2 cr. hrs.) This course allows the student to alternate semesters of full-time work in a job closely related to the student's major with semesters of full-time school. The grade is based on the employer's evaluation of the student's productivity, an evaluation work report submitted by the student, and the student's learning contract.

DDT290 – Survey of Aerospace Technology (3 cr. hrs.) This course provides a survey of Aerospace technology including the history of spaceflight, propulsion, orbital mechanics, and the space environment. A discussion of unmanned spacecraft, and the manned space program is also included, as well as, debate about the future, with solid facts and some

speculation about humankind's ventures in the final frontier. PREREQUISITE: None.

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

**ADVANCED MANUFACTURING
Injection Molding - AAS**

Associate of Applied Science Degree

Area I: Written Composition 6 Cr Hrs

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------|-----------------|
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |

THR126 Intro to Theater 3

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: CIS146 is required. MTH100 or higher is required. A 4 credit hour science is required. PHY201 is preferred.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| PHY201 | General Physics I | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 38 Cr. Hrs. (36 required, 2 institutional)

| Course | Title | Cr. Hrs. |
|--------|--------------------------------|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| ADM145 | Intro to Injection Molding | 3 |
| ADM146 | Intro to Injection Molding Lab | 3 |
| ADM147 | Injection Mold Design | 3 |
| ADM148 | Injection Mold Design Lab | 3 |
| ADM205 | Advanced Injection Molding | 3 |
| ADM206 | Advanced Injection Molding Lab | 3 |
| MTT219 | CNC Graphics Turning | 3 |
| MTT220 | CNC Graphics Milling | 3 |
| WKO110 | NCCER Core | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Electives: No requirements.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ACT201 | Entrepreneurialism | 3 |
| CIS130 | Intro to Information Systems | 3 |
| OAD101 | Beginning Keyboard | 3 |
| RDG114 | Critical Reading | 3 |
| MTH100 | Intermediate College Algebra | 3 |

Total Degree Credit Hours 60

Certificate – Injection Molding

Area I: Written Composition 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|-----------------|----------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | 2Calculus and Its Application | 3 |
| MTH125 | 2Calculus I | 4 |
| MTH126 | 2Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences

No Requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs. (24 required, 2 institutional)

| Course | Title | Cr. Hrs. |
|--------|--------------------------------|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| ADM145 | Intro to Injection Molding | 3 |
| ADM146 | Intro to Injection Molding Lab | 3 |
| ADM147 | Injection Mold Design | 3 |
| ADM148 | Injection Mold Design Lab | 3 |
| WKO110 | NCCER Core | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Electives: No requirements.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ACT201 | Entrepreneurialism | 3 |
| CIS130 | Intro to Information Systems | 3 |
| OAD101 | Beginning Keyboard | 3 |
| RDG114 | Critical Reading 3 | 3 |
| MTH100 | Intermediate College Algebra | 3 |

Total Certificate Credit Hours 38

Advanced Manufacturing (ADM) Course Descriptions

ADM101 – Precision Measurement – (3 cr. hrs)
 This course covers the use of precision measurement instruments utilized in inspection. In addition, basic print reading techniques reverse engineering, and

related industry standards required in advanced manufacturing disciplines are covered. Upon completion, students should be able to demonstrate correct use of precision measuring instruments, interpret basic prints and apply basic reverse engineering techniques.

Note: This is a suitable substitute for MTT 127.

ADM106 – Quality Control Concepts – (3 cr. hrs)

This course provides an overview of the materials and processes and quality assurance topics used in commercial and specialized manufacturing products. Emphasis is placed on process evaluation techniques that can be extrapolated to other system areas such as new products and new technology. Emphasis is also placed on quality assurance including the history of the quality movement, group problem solving, and statistical methods such as statistical process control (SPC), process capability studies, and the concepts associated with lean manufacturing.

ADM108 – Intro to 3D Modeling – (3 cr. hrs)

This course introduces basic 3Dimensional (3D) modeling functions and techniques and the parametric concept. “Hands-on” class structure utilizes various 3D software applications. Topics include terminology, hardware, basic 3D modeling involving sketching and 3D feature creations, feature application and operating system functions. Students will be able to generate basic 3D parts and associated working drawings in soft and hard copy format.

ADM110 – Blueprint Reading – (3 cr. hrs)

This course is designed to provide students with a comprehensive understanding of blueprint reading. Topics include identifying types of lines and symbols used in mechanical drawings; recognition and interpretation of various types of views, tolerance, and dimensions.

ADM112 – Orientation to Additive Manufacturing – (3 cr. hrs)

Introduction to basics of manufacturing, including personal protective equipment (PPE), safety practices, general lab procedures and the proper use of equipment to perform basic manufacturing processes such as drilling and cutting on commonly used materials, including metals and composites. Topics include Additive Manufacturing fundamentals, history, and terminology. Additive

Manufacturing systems types, advantages vs. disadvantages of various Additive Manufacturing technologies will be discussed.

ADM145 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn the fundamentals of injection molding operations, including molding terminology, machine part identification, operating safety, machine controls and machine startup and shutdown. Students are taught to identify common part defects such as short shots, flash, warp, surface defects, color changes and shrinkage. Students learn the properties of commonly used molding materials. This course is also taught as MTT 110 and AUT 145.

ADM146 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn to safely operate an injection molding machine. Students learn to properly startup, set machine controls and shutdown a molding machine.

ADM147 – Additive Manufacturing Production Techniques – (3 cr. hrs)

Students learn to identify the components of an injection mold such as mold base, sprue bushing, runner system, gates, vents, cavities, inserts and ejection system. Students learn the purpose of each component of an injection mold. Students learn common materials used to build an injection mold.

ADM148 – Injection Molding Design Lab – (3 cr. hrs)

Students demonstrate proper and safe techniques to build components of an injection mold such as sprue bushings, runner systems, gates, vents, cavities, inserts and ejection systems.

ADM160 – Additive Manufacturing Production Techniques – (3 cr. hrs)

In this class student will utilize the various Additive Manufacturing (AM) design software to learn different techniques of building additively. Student will engaged in using the software and build theory to discover best build for the part. Tool paths, angles, rotation and build support will be discussed. Additive process will include polymers and powders. Cost and build time will be calculated on the different build parameters.

ADM162 – Additive Manufacturing Processes – Polymers (3 cr. hrs.)

This course focuses on basic principles and methodology of different types of polymers and processes created with the Additive Manufacturing (AM) process. Comparison of selecting the best type of polymer for production will be discussed. Students receive proper instruction on safety operations, set-up and routine maintenance and production on the AM systems. Students learn the various types of polymer AM systems; ie. Fused Deposition Manufacturing (FDM), PolyJet, and SLA. Students also learn the software used for each AM system. Upon completion, students will be able to describe the different types of polymers available for the AM process including, but not limited to ABS, PC, PC-ABS, ULT, PPSF, and Nylon and explain what the benefits are of basic AM. They should be able to demonstrate the how to take a “part” from start to finish on the AM system and be able to select the best process for the type of product being produced.

ADM164 – Quality Control Concepts – (3 cr. hrs.)

This course focuses on the basic principles and methodology of different types of metal powders and processes created with the Additive Manufacturing (AM) process. Students receive instruction on safety operations, set-up and routine maintenance and production of the AM Systems. Students learn metal powder based AM with the use of the Direct Metal Laser Sintering (DMLS) system. Students also learn various design software programs used for a metal powder system. Upon completion, students will be able to describe the different types of metal powders including, but not limited to aluminum, stainless steel, cobalt, titanium, and nickel and explain what the benefits are of basic AM. They should be able to demonstrate how to take a “part” from start to finish on the AM system and be able to select the best process for the type of product being produced.

ADM205 – Advanced Injection Molding – (3 cr. hrs)

Students learn advanced applications in injection molding, including fill time, cycle time, melt temperature, part size and weight, injection pressure and clamp pressure. Students learn solutions for common part defects such as short shots, flash, warp, surface defects, color changes and shrinkage.

ADM206 – Advanced Injection Molding Lab – (3 cr. hrs.)

Students demonstrate advanced techniques in injection molding by adjusting machine settings to fix common molding problems.

ADM208 – Intermediate 3D Modeling – (3 cr. hrs.)

In this course students will receive instruction on intermediate 3D modeling concepts, such as sheet metal modeling, intermediate assemblies, 3D sketching and weldments. Students will explore an introduction to prototyping and design concepts in a 3D environment. 3D software will be utilized to produce properly detailed construction drawings, using multi-views, section views, and auxiliary views. Proper, industry standard dimensioning with basic tolerances will be discussed and applied to parts. Emphasis will be placed on the theory as well as the mechanics of concepts using 3D and 2D applications. Upon completion, student will produce 3D models in a CAD environment, simple prototype models and working drawings based on proper industry standards.

ADM241 – Additive Manufacturing Test Prep – (3 cr. hrs.)

This test prep class will review concepts of Additive Manufacturing (AM) taught in this course of study. We will review instructions on Additive Manufacturing principles and review concepts will be supported by observation of Additive Manufacturing applications in action. Student will participate in practice exercises that incorporate concepts and applications from the lecture and lab of their previous coursework. The SME Additive Manufacturing Certificate serves as verifiable proof of your foundational knowledge by successfully completing an exam.

ADM255 – Application of Design Capstone – (3 cr. hrs.)

This is a project- or research-oriented course that emphasizes synthesis through collaborative learning. Students integrate and apply previous knowledge, skills, and experiences they learned in their major and other academic courses to complete individual & team-based projects. AM student will be required to serve as interns in the AM Lab. Architectural and Engineer students will serve as interns doing live work, campus project or in an office. The course emphasizes communication skills, critical thinking, problem solving, computer literacy, and teaming

skills. NOTE: This course is usually taken during the last 2 semesters of the program of study.

| | | |
|--------|----------------------|---|
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: A 4 credit hour science is required. PHY201 is preferred. CIS146 and MTH100 or higher are required.

Advanced Manufacturing – AAS – Machine Tool

Degree

Area I: Written Composition 6 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------|-----------------|
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| PHY201 | General Physics I | 4 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and
Elective Courses 50 Cr. Hrs.
(48 required, 2 institutional)

Note: All courses are required.

| Course | Title | Cr. Hrs. |
|--------|---|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| MTT107 | Machining Calculations I | 3 |
| MTT129 | Lathe Operations | 6 |
| MTT139 | Basic Computer Numerical Control | 3 |
| MTT140 | Basic Computer Numerical Control Turning I | 3 |
| MTT141 | Basic Computer Numeric Control Milling Programming I | 3 |
| MTT147 | Intro to Machine Shop I | 3 |
| MTT148 | Intro to Machine Shop I Lab | 3 |
| MTT150 | Introduction to Machine Shop II Lab | 3 |

Area VI: General Electives 6 Cr. Hrs.

*Note: The DDT233, DDT235, DDT236, and
DDT260 are highly recommended.*

| | | |
|--------|--|---|
| MTT128 | Geometric Dimensioning Tolerancing I | 3 |
| MTT135 | Lathe Operations I Lab | 3 |
| MTT219 | Computer Numerical Control Graphics Turning | 3 |
| MTT220 | Computer Numerical Control Graphics Milling | 3 |
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

*Note: ORI101 must be taken in the first
semester. WKO107 must be taken in the final
semester.*

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 72

Machining Fundamentals Certificate

Area I: Written Composition 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|-----------------|----------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|---------------------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and
Mathematics 6 Cr. Hrs.

*Note: CIS146 and MTH100 or higher is
required.*

| Course | Title | Cr. Hrs. |
|--------|-------|----------|
|--------|-------|----------|

| | | |
|--------|--|---|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs.
(24 required, 2 institutional)

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| MTT147 | Intro to Machine Shop I | 3 |
| MTT148 | Intro to Machine Shop I Lab | 3 |
| MTT149 | Introduction to Machine Shop II | 3 |
| MTT150 | Introduction to Machine Shop II Lab | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|------------------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 38

CNC Machining Fundamentals Certificate

Area I: Written Composition 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs.
(24 required, 2 institutional)

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|---|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| MTT107 | Machining Calculations I | 3 |
| MTT139 | Basic Computer Numerical Control | 3 |
| MTT140 | Basic Computer Numerical Control Turning I | 3 |
| MTT141 | Basic Computer Numeric Control Milling Programming | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|------------------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------------------------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |
| Total Certificate Credit Hours | | 38 |

Precision Machining Milling STC1 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|---|-----------------|
| ADM101 | Precision Measurement | 3 |
| MTT128 | Geometric Dimensioning and Tolerancing I | 3 |
| MTT135 | Lathe Operations Lab I | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC1 Certificate Credit Hours 9

Precision Machining Fundamentals STC2 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|-----------------------------|----------|
| WKO110 | NCCER Core | 3 |
| MTT147 | Intro to Machine Shop I | 3 |
| MTT148 | Intro to Machine Shop I Lab | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC2 Certificate Credit Hours 9

Machine Tool (MTT) Course Descriptions

MTT100 – Machining Technology I – (6 cr. hrs.)

This course introduces machining operations as they relate to the metalworking industry.

Topics include machine shop safety, measuring tools, lathes, saws, milling machines, grinding machines, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, grinding, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. MTT 147 and 148 are suitable substitutes for this course. PREREQUISITE: As required by program.

MTT103 – Machining Technology II (6 cr. hrs.)

This course provides additional instruction and practice in the use of measuring tools, lathes, milling machines, and grinders. Emphasis is placed on setup and operation of machine tools including the selection of work holding devices, speeds, feeds, cutting tools and coolants. Upon completion, students should be able to perform

intermediate level procedures of precision grinding, measuring, layout, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. MTT 149 and 150 are suitable substitutes for MTT 103.

PREREQUISITE: As required by program.

MTT107 – Machining Calculations I (3 cr. hrs.)

This course introduces basic calculations as they relate to machining occupations. Emphasis is placed on basic calculations and their applications in the machine shop. Upon completion, students should be able to perform basic shop calculations. This course is aligned with NIMS certification standards.

PREREQUISITE: As required by program.

MTT121 – Basic Print Reading for Machinists (3 cr. hrs.)

This course covers the basic principles of print reading and sketching. Topics include multi-view drawings; interpretation of conventional lines; and dimensions, notes, and thread notations. Upon completion, students should be able to interpret basic drawings, visualize parts, and make pictorial sketches. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT127 – Metrology (3 cr. hrs.)

This course covers the use of precision measuring instruments. Emphasis is placed on the inspection of machine parts and use of a wide variety of measuring instruments. Upon completion students should be able to demonstrate correct use of measuring instruments. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT128 – Geometric Dimensioning and Tolerancing I (3 cr. hrs.)

This course is designed to teach students how to interpret engineering drawings using modern conventions, symbols, datums, datum targets, and projected tolerance zones. Special emphasis is placed upon print reading skills, and industry specifications and standards. This course is aligned with NIMS

certification standards. PREREQUISITE: As required by program.

MTT129 – Lathe Operations (6 cr. hrs.) This course includes more advanced lathe practices such as set-up procedures, work planning, inner- and outer-diameter operations, and inspection and process improvement. Additional emphasis is placed on safety procedures. Upon completion, students will be able to apply advanced lathe techniques. MTT134 AND MTT135 are suitable substitutes for MTT129. This course is aligned with NIMS standards. PREREQUISITE: As required by program.

MTT136 – Milling Operations (6 cr. hrs.) This course covers manual milling operations. Emphasis is placed on related safety, types of milling machines and their uses, cutting speed, feed calculations, and set-up and operation procedures. Upon completion, students should be able to apply manual milling techniques (vertical and horizontal/universal) to produce machine tool projects. MTT137 and MTT138 are suitable substitutes for this course. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT139 – Basic Computer Numerical Control (3 cr. hrs.) This course introduces the concepts and capabilities of computer numeric control (CNC) machine tools. Topics include setup, operation, and basic applications. Upon completion, students should be able to develop a basic CNC program to safely operate a lathe and milling machine. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT140 – Basic Computer Numerical Control Turning I (3 cr. hrs.) This course covers concepts associated with basic programming of a computer numerical control (CNC) turning center. Topics include basic programming characteristics, motion types, tooling, workholding devices, setup documentation,

tool compensations, and formatting. Upon completion, students should be able to write a basic CNC turning program that will be used to produce a part. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT141 – Basic Computer Numeric Control Milling Programming I (3 cr. hrs.) This course covers concepts associated with basic programming of a computer numerical control (CNC) milling center. Topics include basic programming characteristics, motion types, tooling, workholding devices, setup documentation, tool compensations, and formatting. Upon completion, students should be able to write a basic CNC milling program that will be used to produce a part. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT147 – Introduction to Machine Shop I (3 cr. hrs.) This course introduces machining operations as they relate to the metalworking industry. Topics include machine shop safety, measuring tools, lathes, saws, milling machines, bench grinders, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, drilling, sawing, turning, and milling. PREREQUISITE: As required by college.

MTT148 – Introduction to Machine Shop I Lab (3 cr. hrs.) This course provides practical application of the concepts and principles of machining operations learned in MTT 147. Topics include machine shop safety, measuring tools, lathes, saws, milling machines, bench grinders, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. PREREQUISITE: As required by college.

MTT219 – Computer Numerical Control Graphics: Turning (3 cr. hrs.) This course covers techniques involved in writing a program

for a multi-axis computerized numeric control (CNC) turning machine using computer assisted manufacturing (CAM) software. In addition, CNC turning machine setup, programming, and operation are detailed. Upon completion, the student should be able to set up, program, and operate a 3-axis CNC turning machine to produce a 2½-axis part using CAM software. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT220 – Computer Numerical Control Graphics: Milling (3 cr. hrs.) This course covers techniques involved in writing a program for a multi-axis computerized numeric control (CNC) milling machine using computer assisted manufacturing (CAM) software. In addition, CNC milling machine setup, programming, and operation are detailed. Upon completion, the student should be able to set up, program, and operate a 3-axis CNC milling machine to produce a 2½-axis part using CAM software. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

WKO110 – NCCER CORE – (3 cr. hrs.)
This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

Advanced Manufacturing – AAS – Mechatronics

Degree

Area I: Written Composition 6 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| ENG101 | English Comp. I | 3 |

ENG102 English Comp. II 3

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: A 4 credit hour science is required. PHY201 is preferred. CIS146 and MTH100 or higher are required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

PHY201 General Physics I 4

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 47 Cr. Hrs. (46 required, 2 institutional)

Note: All courses are required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| MTT139 | Basic Computer Numerical Control | 3 |
| MTT147 | Intro to Machine Shop I | 3 |
| WDT157 | Consumable Welding Processes | 3 |
| INT101 | DC Fundamentals | 3 |
| INT103 | AC Fundamentals | 3 |
| INT118 | Fundamentals of Pneumatics /Hydraulics | 3 |
| INT153 | Precision Machining Fundamentals | 3 |
| INT206 | Industrial Motors I | 3 |

Area VI: General Electives 9 Cr. Hrs.

INT212 Industrial Motor Control I 3

| | | |
|--------|--|---|
| INT284 | Advanced Programmable Logic Controllers | 3 |
| INT288 | Applied Principles of Programmable Controllers | 3 |
| INT126 | Preventive Maintenance | 3 |
| INT253 | Industrial Robotics | 3 |
| INT254 | Robot Maintenance and Troubleshooting | 3 |
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 69

Mechatronics - Certificate

Area I: Written Composition 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------|-----------------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------|-----------------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |

| | | |
|--------|------------------------------------|---|
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 32 Cr. Hrs.
(30 required, 2 institutional)

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------------|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |

| | | |
|--------|--|---|
| MTT139 | Basic CNC | 3 |
| MTT147 | Intro to Machine Shop I | 3 |
| WDT157 | Consumable Welding Processes | 3 |
| INT101 | DC Fundamentals | 3 |
| INT103 | AC Fundamentals | 3 |
| INT118 | Fundamentals of Industrial Pneumatics and Hydraulics | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|------------------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 44

Mechatronics STC1 IND ELECT FUN Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|-------------------------------------|-----------------|-----------------|
| WKO110 | NCCER Core | 3 |
| INT101 | DC Fundamentals | 3 |
| INT103 | AC Fundamentals | 3 |
| Area VI: General Electives | | 0 Cr. Hrs. |
| Total STC1 Certificate Credit Hours | | 9 |

Mechatronics – IND AUTOMATION STC2 Certificate

| | |
|--|-------------|
| Area I: Written Composition | 0 Cr. Hrs. |
| Area II: Humanities and Fine Arts | 0 Cr. Hrs. |
| Area III: Natural Sciences and Mathematics | 0 Cr. Hrs. |
| Area IV: History, Social and Behavioral Sciences | 0 Cr. Hrs. |
| No requirements | |
| Area V: Pre-professional, Major and Elective Courses | 12 Cr. Hrs. |

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|-------------------------------------|------------------------|-----------------|
| WKO110 | NCCER Core | 3 |
| INT101 | DC Fundamentals | 3 |
| INT103 | AC Fundamentals | 3 |
| INT126 | Preventive Maintenance | 3 |
| Area VI: General Electives | | 0 Cr. Hrs. |
| Total STC2 Certificate Credit Hours | | 12 |

Mechatronics Industrial Automation STC3 Certificate

| | |
|--|------------|
| Area I: Written Composition | 0 Cr. Hrs. |
| Area II: Humanities and Fine Arts | 0 Cr. Hrs. |
| Area III: Natural Sciences and Mathematics | 0 Cr. Hrs. |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 21 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|-------------------------------------|---------------------------------------|-----------------|
| ADM101 | Precision Measurement | 3 |
| WKO110 | NCCER Core | 3 |
| INT101 | DC Fundamentals | 3 |
| INT103 | AC Fundamentals | 3 |
| INT126 | Preventive Maintenance | 3 |
| INT253 | Industrial Robotics | 3 |
| INT254 | Robot Maintenance and Troubleshooting | 3 |
| Area VI: General Electives | | 0 Cr. Hrs. |
| Total STC3 Certificate Credit Hours | | 21 |

Industrial Systems (INT) Course Descriptions

INT101 – DC Fundamentals (3 cr. hrs.) This course provides an in depth study of direct current (DC) electronic theory. Topics include atomic theory, magnetism, properties of conductors and insulators, and characteristics of series, parallel, and series-parallel circuits. Inductors and capacitors are introduced and their effects on DC circuits are examined. Students are prepared to analyze complex DC circuits, solve for unknown circuit variables and to use basic electronic test equipment. This course also provides hands on laboratory exercises to analyze, construct, test, and troubleshoot DC circuits. Emphasis is placed on the use of scientific calculator and the operation of common test equipment used to analyze and troubleshoot DC and to prove the

theories taught during classroom instruction.
PREREQUISITE: As required by program.

INT103 – AC Fundamentals (3 cr. hrs.) This course provides an in depth study of alternating current (AC) electronic theory. Students are prepared to analyze complex AC circuit configurations with resistors, capacitors, and inductors in series and parallel combinations. Topics include electrical safety and lockout procedures, specific AC theory functions such as RLC, impedance, phase relationships, and power factor. Students will be able to define terms, identify waveforms, solve complex mathematical problems, construct circuits, explain circuit characteristics, identify components, and make accurate circuit measurements using appropriate measurement instruments. They should also be able to perform fundamental tasks associated with troubleshooting, repairing, and maintaining industrial AC systems. This course is also taught as ILT143. PREREQUISITE: As required by program.

INT117 – Principles of Industrial mechanics (3 cr. hrs.) This course provides instruction in basic physics concepts applicable to mechanics of industrial production equipment. Topics include the basic application of mechanical principles with emphasis on power transmission, specific mechanical components, alignment, and tension. Upon completion, students will be able to perform basic troubleshooting, repair and maintenance functions on industrial production equipment. PREREQUISITE: As required by program.

INT118- Fundamentals of Industrial Pneumatics and Hydraulics (3 cr. hrs.) This course includes the fundamental concepts and theories for the safe operation of hydraulic and pneumatic systems used with industrial production equipment. Topics include the physical concepts, theories, laws, air flow characteristics, actuators, valves, accumulators, symbols, circuitry, filters, servicing safety, and preventive maintenance and the application of

these concepts to perform work. Upon completion, students should be able to service and perform preventive maintenance functions on hydraulic and pneumatic systems.
PREREQUISITE: As required by program.

INT119 – Principles of Mechanical Measurement and Technical Drawing (3 cr. hrs.) This course provides instruction in the use of precision measuring tools and the interpretation of technical drawings. Topics include the use of calipers, micrometers, steel rules, dial indicators, identifying types of lines and symbols of technical drawings, recognition and interpretation of various types of views, tolerances, and dimensions. Upon course completion, students will be able to use precision measuring tools and interpret technical drawings. PREREQUISITE: As required by program.

INT126 – Preventive Maintenance (3 cr. hrs.) This course focuses on the concepts and applications of preventive maintenance. Topics include the introduction of alignment equipment, job safety, tool safety, preventive maintenance concepts, procedures, tasks, and predictive maintenance concepts. Upon course completion, students will demonstrate the ability to apply proper preventive maintenance and explain predictive maintenance concepts. PREREQUISITE: As required by program.

INT127 – Principles of Industrial Pumps and Piping Systems (3 cr. hrs.) This course provides instruction in the fundamental concepts of industrial pumps and piping systems. Topics include pump identification, operation, and installation, maintenance and troubleshooting, and piping systems, and their installation. Upon course completion, students will be able to install, maintain, and troubleshoot industrial pumps and piping systems. PREREQUISITE: As required by program.

INT134 – Principles of Industrial Maintenance Welding and Metal Cutting Techniques (3 cr. hrs.) This course provides instruction in the fundamentals of acetylene cutting and the

basics of welding needed for the maintenance and repair of industrial production equipment. Topics include oxy-fuel safety, choice of cutting equipment, proper cutting angles, equipment setup, cutting plate and pipe, hand tools, types of metal welding machines, rod and welding joints, and common welding passes and beads. Upon course completion, students will demonstrate the ability to perform metal welding and cutting techniques necessary for repairing and maintaining industrial equipment. PREREQUISITE – As required by program.

INT153 – Precision Machining Fundamentals I (3 cr. hrs.) This course focuses on metal cutting machines used to make parts and tools. Topics include lathes, mills, drills, and presses. Upon course completion, students will have the ability to use precision measurement instruments and to read mechanical drawings. PREREQUISITE: As required by program.

INT158 – Industrial Wiring I (3 cr. hrs.) This course focuses on principles and applications of commercial and industrial wiring. Topics include, electrical safety practices, an overview of National Electric Code requirements as applied to commercial and industrial wiring, conduit bending, circuit design, pulling cables, transformers, switch gear, and generation principles. PREREQUISITE: As required by program.

INT206 – Industrial Motors I (3 cr. hrs.) This course focuses on basic information regarding industrial electrical motors. Upon completion students will be able to troubleshoot, remove, replace, and perform routine maintenance on various types of motors. PREREQUISITE: As required by program.

INT212 – Industrial Motor Control I (3 cr. hrs.) This course focuses on information regarding industrial motor controls and basic information regarding process logic controllers. Upon completion students will be able to remove, replace, and wire different types of control devices for operating industrial motors.

INT253 – Industrial Robotics (3 cr. hrs.) This course provides instruction in concepts and theories for the operation of robotic servo motors and power systems used with industrial robotic equipment. Emphasis is on the application of the computer to control power systems to perform work. Student competencies include understanding of the functions of hydraulic, pneumatic, and electrical power system components, ability to read and interpret circuitry for proper troubleshooting and ability to perform preventative maintenance. PREREQUISITE: As required by program.

INT254 – Robot Maintenance and Troubleshooting (3 cr. hrs.) This course introduces the principle concepts of the troubleshooting and maintenance of robots. Topics include the recognition and description of major robot components. Students will learn to diagnose robot mechanical problems to the component level, replace mechanical components and perform adjustments, troubleshooting class 1, 2, and 3 faults, to manipulate I/O for the robot, and periodic and preventive maintenance. Students will learn how to safely power up robots for complete shutdown and how to manipulate robots using the teach pendant. Upon completion students will be able to describe the various robot classifications, characteristics, explain system operations of simple robots, and maintain robotic systems. PREREQUISITE: As required by program.

INT284 – Advanced Programmable Logic Controllers (3 cr. hrs.) This course includes the advanced principals of PLC's including hardware, programming, and troubleshooting. Emphasis is placed on developing advanced working programs, and troubleshooting hardware and software communication problems. Upon completion, students should be able to demonstrate their ability in developing programs and troubleshooting the system. PREREQUISITE: As required by program.

INT288 – Applied Principles of Programmable Controllers (3 cr. hrs.) This course provides a

Machine Tool (MTT) Course Descriptions

MTT100 – Machining Technology I – (6 cr. hrs.)

This course introduces machining operations as they relate to the metalworking industry. Topics include machine shop safety, measuring tools, lathes, saws, milling machines, grinding machines, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, grinding, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. MTT 147 and 148 are suitable substitutes for this course. PREREQUISITE: As required by program.

MTT103 – Machining Technology II (6 cr. hrs.)

This course provides additional instruction and practice in the use of measuring tools, lathes, milling machines, and grinders. Emphasis is placed on setup and operation of machine tools including the selection of work holding devices, speeds, feeds, cutting tools and coolants. Upon completion, students should be able to perform intermediate level procedures of precision grinding, measuring, layout, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. MTT 149 and 150 are suitable substitutes for MTT 103. PREREQUISITE: As required by program.

MTT107 – Machining Calculations I (3 cr. hrs.)

This course introduces basic calculations as they relate to machining occupations. Emphasis is placed on basic calculations and their applications in the machine shop. Upon completion, students should be able to perform basic shop calculations. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT121 – Basic Print Reading for Machinists (3 cr. hrs.) This course covers the basic principles

of print reading and sketching. Topics include multi-view drawings; interpretation of conventional lines; and dimensions, notes, and thread notations. Upon completion, students should be able to interpret basic drawings, visualize parts, and make pictorial sketches. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT127 – Metrology (3 cr. hrs.) This course covers the use of precision measuring instruments. Emphasis is placed on the inspection of machine parts and use of a wide variety of measuring instruments. Upon completion students should be able to demonstrate correct use of measuring instruments. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT128 – Geometric Dimensioning and Tolerancing I (3 cr. hrs.) This course is designed to teach students how to interpret engineering drawings using modern conventions, symbols, datums, datum targets, and projected tolerance zones. Special emphasis is placed upon print reading skills, and industry specifications and standards. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT129 – Lathe Operations (6 cr. hrs.) This course includes more advanced lathe practices such as set-up procedures, work planning, inner- and outer-diameter operations, and inspection and process improvement. Additional emphasis is placed on safety procedures. Upon completion, students will be able to apply advanced lathe techniques. MTT134 AND MTT135 are suitable substitutes for MTT129. This course is aligned with NIMS standards. PREREQUISITE: As required by program.

MTT136 – Milling Operations (6 cr. hrs.) This course covers manual milling operations. Emphasis is placed on related safety, types of

milling machines and their uses, cutting speed, feed calculations, and set-up and operation procedures. Upon completion, students should be able to apply manual milling techniques (vertical and horizontal/universal) to produce machine tool projects. MTT137 and MTT138 are suitable substitutes for this course. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT139 – Basic Computer Numerical Control (3 cr. hrs.) This course introduces the concepts and capabilities of computer numeric control (CNC) machine tools. Topics include setup, operation, and basic applications. Upon completion, students should be able to develop a basic CNC program to safely operate a lathe and milling machine. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT140 – Basic Computer Numerical Control Turning I (3 cr. hrs.) This course covers concepts associated with basic programming of a computer numerical control (CNC) turning center. Topics include basic programming characteristics, motion types, tooling, work holding devices, setup documentation, tool compensations, and formatting. Upon completion, students should be able to write a basic CNC turning program that will be used to produce a part. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT141 – Basic Computer Numerical Control Milling Programming I (3 cr. hrs.) This course covers concepts associated with basic programming of a computer numerical control (CNC) milling center. Topics include basic programming characteristics, motion types, tooling, workholding devices, setup documentation, tool compensations, and formatting. Upon completion, students should be able to write a basic CNC milling program that will be used to produce a part. This course

is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT147 – Introduction to Machine Shop I (3 cr. hrs.) This course introduces machining operations as they relate to the metalworking industry. Topics include machine shop safety, measuring tools, lathes, saws, milling machines, bench grinders, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, drilling, sawing, turning, and milling. PREREQUISITE: As required by college.

MTT148 – Introduction to Machine Shop I Lab (3 cr. hrs.) This course provides practical application of the concepts and principles of machining operations learned in MTT 147. Topics include machine shop safety, measuring tools, lathes, saws, milling machines, bench grinders, and layout instruments. Upon completion, students will be able to perform the basic operations of measuring, layout, drilling, sawing, turning, and milling. This course is aligned with NIMS certification standards. PREREQUISITE: As required by college.

MTT219 – Computer Numerical Control Graphics: Turning (3 cr. hrs.) This course covers techniques involved in writing a program for a multi-axis computerized numeric control (CNC) turning machine using computer assisted manufacturing (CAM) software. In addition, CNC turning machine setup, programming, and operation are detailed. Upon completion, the student should be able to set up, program, and operate a 3-axis CNC turning machine to produce a 2½-axis part using CAM software. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

MTT220 – Computer Numerical Control Graphics: Milling (3 cr. hrs.) This course covers techniques involved in writing a program for a multi-axis computerized numeric control (CNC) milling machine using computer assisted manufacturing (CAM) software. In addition,

CNC milling machine setup, programming, and operation are detailed. Upon completion, the student should be able to set up, program, and operate a 3-axis CNC milling machine to produce a 2½-axis part using CAM software. This course is aligned with NIMS certification standards. PREREQUISITE: As required by program.

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

Welding (WDT) Course Descriptions

WDT108 – SMAW Fillet/OFC (3 cr. hrs.) This course provides the student with instruction on safety practices and terminology in the Shielded Metal Arc Welding (SMAW) process. Emphasis is placed on safety, welding terminology, equipment identification, set-up and operation, and related information in the SMAW process. This course also covers the rules of basic safety and identification of shop equipment and provides the student with the skills and knowledge necessary for the safe operation of oxy-fuel cutting. PREREQUISITE: Approval of instructor.

WDT109 – SMAW Fillet/PAC/CAC (3 cr. hrs.)

This course provides the student with instruction on safety practices and terminology in the Shielded Metal Arc Welding (SMAW) process. Emphasis is placed on safety, welding terminology, equipment identification, set-up and operation, and related information in the SMAW process. This course also covers the rules of basic safety and identification of shop equipment and provides the student with the skills and knowledge necessary for the safe operation of carbon arc cutting and plasma arc cutting. PREREQUISITE: Approval of Instructor.

WDT110 – Industrial Blueprint Reading (3 cr. hrs.)

This course provides students with the understanding and fundamentals of industrial blueprint reading. Emphasis is placed on reading and interpreting lines, views, dimensions, weld joint configurations and weld symbols. Upon completion students should be able to interpret welding symbols and blueprints as they apply to welding and fabrication. PREREQUISITE: As required by program.

WDT115 – GTAW Carbon Pipe (3 cr. hrs.)

This course is designed to provide the student with the practices and procedures of welding carbon pipe using the gas tungsten arc weld (GTAW) process. Emphasis is placed on pipe positions, filler metal selection, purging gasses, joint geometry joint preparation and fit-up. Upon completion, students should be able to identify pipe positions, filler metals, purging gas, proper joint geometry, joint preparation and fit-up to the applicable code. PREREQUISITE: As required by program.

WDT119 – Gas Metal Arc Flux Cored Arc

Welding (3 cr. hrs.) This course introduces the student to the gas metal arc and flux-cored arc welding process. Emphasis is placed on safe operating practices, handling and storage of compressed gasses, process principles, component identification, various welding techniques and base and filler metal identification. PREREQUISITE: As required by program.

WDT 120 – SMAW (Shielded Metal Arc

Welding) Groove (3 cr. hrs.) This course provides the student with instruction on joint design, joint preparation, and fit-up of groove welds in accordance with applicable welding codes. Emphasis is placed on safe operation, joint design, joint preparation, and fit-up. Upon completion, students should be able to identify the proper joint design, joint preparation and fit-up of groove welds in accordance with applicable welding codes. PREREQUISITE: As required by program.

WDT 122 – SMAW Fillet/OFC Lab (3 cr. hrs.)

This course is designed introduce the student to the proper set-up and operation of the shielded metal arc welding equipment. Emphasis is placed on striking and controlling the arc, and proper fit up of fillet joints. This course is also designed to instruct students in the safe operation of oxy-fuel cutting. Upon completion, students should be able to make fillet welds in all positions using electrodes in the F-3 groups in accordance applicable welding code and be able to safely operate oxy-fuel equipment and perform those operations as per the applicable welding code. PREREQUISITE: As required by program.

WDT123 – SMAW Fillet/PAC/CAC Lab (3 cr. hrs.)

This course is designed introduce the student to the proper set-up and operation of the shielded metal arc welding equipment. Emphasis is placed o striking and controlling the arc, and proper fit up of fillet joints. This course is also designed to instruct students in the safe operation of plasma arc and carbon arc cutting. Upon completion, students should be able to make fillet welds in all positions using electrodes in the F-4 groups in accordance with applicable welding code and be able to safely operate plasma arc and carbon arc equipment and perform those operations as per applicable welding code. PREREQUISITE: As required by program.

WDT124 – Gas Metal ARC/Flux Cored ARC Welding Lab (3 cr. hrs.)

This course provides instruction and demonstration using the various transfer methods and techniques to gas metal arc and flux cored arc welds. Topics included are safety, equipment set-up, joint design and preparation, and gases.

WDT125 – Shielded Metal ARC Welding Groove Lab (3 cr. hrs.) This course provides instruction and demonstrations in the shielded metal arc welding process on carbon steel plate with various size F3 and F4 group electrodes in all positions. Emphasis is placed on welding groove joints and using various F3 and F4 group

electrodes in all positions. Upon completion, the student should be able to make visually acceptable groove weld joints in accordance with applicable welding codes. PREREQUISITE: As required by program.

WDT155 – GTAW Carbon Pipe Lab (3 cr. hrs.)

This course is designed to provide the student with the skills in welding carbon steel pipe with gas tungsten arc welding techniques in various pipe weld positions. Upon completion, students should be able to perform gas tungsten arc welding on carbon steel pipe with the prescribed filler metals in various positions in accordance with the applicable code. PREREQUISITE: WDT115 and/or as required by program.

WDT156 – GTAW Stainless Pipe Lab (3 cr. hrs.)

This course is designed to provide the student with the skills in welding stainless steel pipe with gas tungsten arc welding techniques in various pipe weld positions. Upon completion, students should be able to perform gas tungsten arc welding on stainless steel pipe with the prescribed filler metals in various positions in accordance with the applicable code. PREREQUISITE: WDT116.

WDT157 – Consumable Welding Processes (3 cr. hrs.)

This course provides instruction and demonstration with the consumable welding processes to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of electrode, current/polarity, shielding gas and base metals. PREQUISITE: As required by program.

WDT158 – Consumable Welding Processes Lab (3 cr. hrs.)

This course provides instruction and demonstration with the consumable welding processes to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of electrode, current/polarity,

shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using consumable welding processes according to AWS Codes and standards. PREREQUISITE: WDT157

WDT160 – Robotics Lab I (3 cr. hrs.) This course is the practical application of robotics theory. Students will complete machine origins, robotic programming, robotic welding parameters, link programs to create jobs, and allocate a weave start. PREREQUISITE: INT253 Industrial Robotics.

WDT166 – Flux Core ARC Welding (FCAW) (3 cr. hrs.) This course provides instruction and demonstration with the flux core arc welding process to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of filler metals, current/polarity, shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using the FCAW welding process, according to AWS Codes and Standards. This course supports CIP code 48.0508.

WDT167 – Flux Core Welding Lab (3 cr. hrs.) This course provides instruction and demonstration with the flux core arc welding process to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of filler metals, current/polarity, shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using the FCAW welding process, according to AWS Codes and Standards.

WDT217 – SMAW Carbon Pipe (3 cr. hrs.) This course introduces the student to the practices and procedures of welding carbon steel pipe using the shielded metal arc weld (SMAW) process. Emphasis is placed on pipe positions, electrode selection, joint geometry, joint preparation and fit-up. Upon completion, students should be able to identify pipe positions, electrodes, proper joint geometry,

joint preparation, and fit-up in accordance with applicable codes. PREREQUISITE: As required by program.

WDT 218 – Certification Theory (3 cr. hrs.) This course is designed to provide the student with the knowledge needed to perform welds using the prescribed welding process. Emphasis is placed on the welding test joints in accordance with the prescribed welding code. Upon completion, students should be able to pass an industry welding test in accordance with various applicable welding code requirements. This course supports CIP code 48.0508. PREREQUISITE: As required by program.

WDT219 – Welding Inspection and Testing (3 cr. hrs.) This course provides the student with inspection skills and knowledge necessary to evaluate welded joints and apply quality control measures as needed. Emphasis is placed on interpreting welding codes, welding procedures, and visual inspection methods. Upon completion, students should be able to visually identify visual acceptable weldments as prescribed by the code or welding specification report. PREREQUISITE: As required by program.

WDT221 – Pipe Fitting and Fabrication (3 cr. hrs.) This course provides the student with skills and practices necessary for fabricating pipe plans using pipe and fittings. Emphasis is placed on various pipefittings to include various degree angles. Upon completion, students should be able to fit various pipefittings, and cut and fabricate tees, and assorted angles. PREREQUISITE: As required by program.

WDT223 – Blueprint Reading for Fabrication (3 cr. hrs.) This course provides a student with advanced skills in identifying and interpreting lines, views, dimensions, notes, bill of materials, and the use of tools of the trade. Emphasis is placed on figuring dimensional tolerances, layout and fitting of different component parts. Upon course completion, a student should be able to interpret, layout, and fabricate from

blueprints to given tolerances. PREREQUISITE: As required by program.

WDT228 – Gas Tungsten Arc Welding (3 cr. hrs.) This course provides student with knowledge needed to perform gas tungsten arc welds using ferrous and/or non-ferrous metals, according to applicable welding codes. Topics include safe operating practices, equipment identification and set-up, correct selection of tungsten type, polarity, shielding gas and filler metals. Upon completion, a student should be able to identify safe operating practices, equipment identification and setup, correct selection of tungsten type, polarity, shielding gas, filler metals, and various welds on ferrous and/or non-ferrous metals, using the gas tungsten arc welding process according to applicable welding codes. PREREQUISITE: As required by program.

WDT257 – SMAW Carbon Pipe Lab (3 cr. hrs.) This course is designed to provide the student with the skills in welding carbon steel pipe with shielded metal arc welding techniques in various pipe welding positions. Upon completion, students should be able to perform shielded metal arc welding on carbon steel pipe with the prescribed electrodes in various positions in accordance with the applicable codes. PREREQUISITE: As required by program.

WDT258 – Certification Lab (3 cr. hrs.) This course is designed to provide the student with the skills needed to perform welds using the prescribed welding process. Emphasis is placed on the welding test joints in accordance with the prescribed welding code. Upon completion, students should be able to pass and industry standard welding test in accordance with various welding code requirements. PREREQUISITE: Approval of Instructor.

WDT268 – Gas Tungsten ARC Lab (3 cr. hrs.) This course provides student with skills needed to perform gas tungsten arc welds using ferrous and/or non-ferrous metals, according to applicable welding codes. Topics include safe

operating practices, equipment identification and set-up, correct selection of tungsten type, polarity, shielding gas and filler metals. Upon completion, a student should be able to identify safe operating practices, equipment identification and setup, correct selection of tungsten type, polarity, shielding gas, filler metals, and various welds on ferrous and/or non-ferrous metals, using the gas tungsten arc welding process according to applicable welding codes. PREREQUISITE: Approval of Instructor.

WDT 269 – Boiler Tube Lab (3 cr. Hrs.) This course is designed to provide the student with the skills in welding boiler tubes using the gas tungsten arc and shielded metal arc welding process using filler metals in the F6 and F4 groups to applicable code. Emphasis is placed on welding boiler tubes using the gas tungsten arc and shielded metal arc welding process in the 2G and 6G positions in accordance with the applicable code. Upon completion, students should be able to perform gas tungsten arc and shielded metals arc welding on boiler tubes with the prescribed filler metals in the 2G and 6G positions to the applicable code. PREREQUISITE: **WDT 229** and/or as required by program.

WDT280 – Special Topics (3 cr. hrs.) This course provides specialized instruction in various areas related to the welding industry. Emphasis is placed on meeting students' needs. PREREQUISITE: As required by program.

WDT281 – Special Topics in Welding Technology (3 cr. hrs.) This course provides specialized instruction in various areas related to the welding industry. Emphasis is placed on meeting students' needs. PREREQUISITE: As required by program.

WKO110 – NCCER CORE – (3 cr. hrs.) This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core

curriculum and prepares students to test for the NCCER credential.

Advanced Manufacturing – AAS – Welding

Degree

Area I: Written Composition 6 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------|----------|
| ENG101 | English Comp. I | 3 |
| ENG102 | English Comp. II | 3 |

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 10 Cr. Hrs.

Note: A 4 credit hour science is required. PHY201 is preferred. CIS146 and MTH100 or higher are required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| PHY201 | General Physics I | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 47 Cr. Hrs. (45 required, 2 institutional)

Note: All courses are required.

| Course | Title | Cr. Hrs. |
|--------|-----------------------|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |

| | | |
|--------|---|---|
| WDT108 | SMAW Fillet/OFC | 3 |
| WDT109 | SMAW Fillet/PAC/CAC | 3 |
| WDT120 | SMAW Groove | 3 |
| WDT122 | SMAW Fillet/OFC Lab | 3 |
| WDT123 | SMAW Fillet/PAC/CAC Lab | 3 |
| WDT124 | Gas Metal Arc/Flux Cored Arc Welding Lab | 3 |
| WDT125 | Shielded Metal Arc Welding Groove Lab | 3 |

Area VI: General Electives 12 Cr. Hrs.

Note: WDT223, WDT228, WDT258 and WDT268 are highly recommended.

| | | |
|--------|-----------------------------------|---|
| WDT115 | GTAW Carbon Pipe | 3 |
| WDT166 | Flux Core ARC Welding (FCAW) | 3 |
| WDT167 | Flux Core ARC Welding Lab | 3 |
| WDT257 | SMAW Carbon Pipe Lab | 3 |
| WDT223 | Blueprint Reading for Fabrication | 3 |
| WDT228 | Gas Tungsten ARC Welding | 3 |
| WDT258 | Certification Lab | 3 |
| WDT268 | Gas Tungsten ARC Lab | 3 |
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 69

Welding – Certificate SMA Welding

Area I: Written Composition 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|-------|----------|
|--------|-------|----------|

| | | |
|--------|-----------------|---|
| ENG101 | English Comp. I | 3 |
|--------|-----------------|---|

Area II: Humanities and Fine Arts 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|---------------------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| Course | Title | Cr. Hrs. |
|--------|--|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 26 Cr. Hrs.
(24 required, 2 institutional)

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|-----------------------|----------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| ADM110 | Blueprint Reading | 3 |
| WKO110 | NCCER Core | 3 |
| WDT108 | SMAW Fillet/OFC | 3 |
| WDT109 | SMAW Fillet/PAC/CAC | 3 |
| WDT120 | SMAW Groove | 3 |
| WDT122 | SMAW Fillet/OFC Lab | 3 |

Area VI: General Electives 0 Cr. Hrs.

| | | |
|--------|------------------------------|---|
| OAD101 | Beginning Keyboarding | 3 |
| RDG114 | Critical Reading | 3 |
| CIS130 | Intro to Information Systems | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| ACT201 | Entrepreneurship | 3 |

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 38

Welding SMA STC1 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 9 Cr. Hrs.

Note: All courses are required except.

| Course | Title | Cr. Hrs. |
|--------|---------------------|----------|
| WKO110 | NCCER Core | 3 |
| WDT108 | SMAW Fillet/OFC | 3 |
| WDT109 | SMAW Fillet/PAC/CAC | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC1 Certificate Credit Hours 9

Welding Certification Prep STC2 Certificate

Area I: Written Composition 3 Cr. Hrs.

| | | |
|--------|---------------------|---|
| ENG101 | English Composition | 3 |
|--------|---------------------|---|

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 6 Cr. Hrs.

Note: CIS146 and MTH100 or higher is required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 18 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--------------------------|-----------------|
| WKO110 | NCCER Core | 3 |
| ADM101 | Precision Measurement | 3 |
| WDT115 | GTAW Carbon Pipe | 3 |
| WDT228 | Gas Tungsten ARC Welding | 3 |
| WDT257 | SMAW Carbon Pipe Lab | 3 |
| WDT258 | Certification Lab | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC2 Certificate Credit Hours 27

Flux Core Welding STC3 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 3 Cr. Hrs.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 21 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|--|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| WKO110 | NCCER Core | 3 |
| WDT124 | Gas Metal Arc/Flux Cored Arc Welding Lab | 3 |
| WDT166 | Flux Core ARC Welding (FCAW) | 3 |
| WDT167 | Flux Core ARC Welding Lab | 3 |
| WDT258 | Certification Lab | 3 |

Area VI: General Electives 0 Cr. Hrs.

Total STC3 Certificate Credit Hours 24

GTAW Certificate Prep STC4 Certificate

Area I: Written Composition 0 Cr. Hrs.

Area II: Humanities and Fine Arts 0 Cr. Hrs.

Area III: Natural Sciences and Mathematics 0 Cr. Hrs.

Area IV: History, Social and Behavioral Sciences 0 Cr. Hrs.

No requirements

Area V: Pre-professional, Major and Elective Courses 12 Cr. Hrs.

Note: All courses are required except.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------|-----------------|
| ADM101 | Precision Measurement | 3 |
| ADM106 | Quality Control | 3 |
| WKO110 | NCCER Core | 3 |
| WDT228 | GTAW | 3 |
| WDT258 | Certification Prep Lab | 3 |

Welding (WDT) Course Descriptions

WDT108 – SMAW Fillet/OFC (3 cr. hrs.) This course provides the student with instruction on safety practices and terminology in the Shielded Metal Arc Welding (SMAW) process. Emphasis is placed on safety, welding terminology, equipment identification, set-up and operation, and related information in the SMAW process. This course also covers the rules of basic safety and identification of shop equipment and provides the student with the skills and knowledge necessary for the safe operation of oxy-fuel cutting. PREREQUISITE: Approval of instructor.

WDT109 – SMAW Fillet/PAC/CAC (3 cr. hrs.) This course provides the student with instruction on safety practices and terminology in the Shielded Metal Arc Welding (SMAW) process. Emphasis is placed on safety, welding terminology, equipment identification, set-up and operation, and related information in the SMAW process. This course also covers the rules of basic safety and identification of shop equipment and provides the student with the skills and knowledge necessary for the safe operation of carbon arc cutting and plasma arc cutting. PREREQUISITE: Approval of Instructor.

WDT110 – Industrial Blueprint Reading (3 cr. hrs.) This course provides students with the understanding and fundamentals of industrial blueprint reading. Emphasis is placed on reading and interpreting lines, views, dimensions, weld joint configurations and weld symbols. Upon completion students should be able to interpret welding symbols and blueprints as they apply to welding and fabrication. PREREQUISITE: As required by program.

WDT115 – GTAW Carbon Pipe (3 cr. hrs.) This course is designed to provide the student with the practices and procedures of welding carbon pipe using the gas tungsten arc weld (GTAW) process. Emphasis is placed on pipe positions, filler metal selection, purging gasses, joint geometry joint preparation and fit-up. Upon completion, students should be able to identify pipe positions, filler metals, purging gas, proper joint geometry, joint preparation and fit-up to the applicable code. PREREQUISITE: As required by program.

WDT119 – Gas Metal Arc Flux Cored Arc Welding (3 cr. hrs.) This course introduces the student to the gas metal arc and flux-cored arc welding process. Emphasis is placed on safe operating practices, handling and storage of compressed gasses, process principles, component identification, various welding techniques and base and filler metal identification. PREREQUISITE: As required by program.

WDT 120 – SMAW (Shielded Metal Arc Welding) Groove (3 cr. hrs.) This course provides the student with instruction on joint design, joint preparation, and fit-up of groove welds in accordance with applicable welding codes. Emphasis is placed on safe operation, joint design, joint preparation, and fit-up. Upon completion, students should be able to identify the proper joint design, joint preparation and fit-up of groove welds in accordance with applicable welding codes. PREREQUISITE: As required by program.

WDT 122 – SMAW Fillet/OFC Lab (3 cr. hrs.) This course is designed introduce the student to the proper set-up and operation of the shielded metal arc welding equipment. Emphasis is placed on striking and controlling the arc, and proper fit up of fillet joints. This course is also designed to instruct students in the safe operation of oxy-fuel cutting. Upon completion, students should be able to make fillet welds in all positions using electrodes in the F-3 groups in accordance applicable welding

code and be able to safely operate oxy-fuel equipment and perform those operations as per the applicable welding code. PREREQUISITE: As required by program.

WDT123 – SMAW Fillet/PAC/CAC Lab (3 cr. hrs.) This course is designed to introduce the student to the proper set-up and operation of the shielded metal arc welding equipment. Emphasis is placed on striking and controlling the arc, and proper fit up of fillet joints. This course is also designed to instruct students in the safe operation of plasma arc and carbon arc cutting. Upon completion, students should be able to make fillet welds in all positions using electrodes in the F-4 groups in accordance with applicable welding code and be able to safely operate plasma arc and carbon arc equipment and perform those operations as per applicable welding code. PREREQUISITE: As required by program.

WDT124 – Gas Metal ARC/Flux Cored ARC Welding Lab (3 cr. hrs.)

This course provides instruction and demonstration using the various transfer methods and techniques to gas metal arc and flux cored arc welds. Topics included are safety, equipment set-up, joint design and preparation, and gases.

WDT125 – Shielded Metal ARC Welding Groove Lab (3 cr. hrs.) This course provides instruction and demonstrations in the shielded metal arc welding process on carbon steel plate with various size F3 and F4 group electrodes in all positions. Emphasis is placed on welding groove joints and using various F3 and F4 group electrodes in all positions. Upon completion, the student should be able to make visually acceptable groove weld joints in accordance with applicable welding codes. PREREQUISITE: As required by program.

WDT155 – GTAW Carbon Pipe Lab (3 cr. hrs.) This course is designed to provide the student with the skills in welding carbon steel pipe with gas tungsten arc welding techniques in various pipe weld positions. Upon completion,

students should be able to perform gas tungsten arc welding on carbon steel pipe with the prescribed filler metals in various positions in accordance with the applicable code. PREREQUISITE: WDT115 and/or as required by program.

WDT156 – GTAW Stainless Pipe Lab (3 cr. hrs.) This course is designed to provide the student with the skills in welding stainless steel pipe with gas tungsten arc welding techniques in various pipe weld positions. Upon completion, students should be able to perform gas tungsten arc welding on stainless steel pipe with the prescribed filler metals in various positions in accordance with the applicable code. PREREQUISITE: WDT116.

WDT157 – Consumable Welding Processes (3 cr. hrs.) This course provides instruction and demonstration with the consumable welding processes to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of electrode, current/polarity, shielding gas and base metals. PREREQUISITE: As required by program.

WDT158 – Consumable Welding Processes Lab (3 cr. hrs.) This course provides instruction and demonstration with the consumable welding processes to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of electrode, current/polarity, shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using consumable welding processes according to AWS Codes and standards. PREREQUISITE: WDT157

WDT160 – Robotics Lab I (3 cr. hrs.) This course is the practical application of robotics theory. Students will complete machine origins, robotic programming, robotic welding

parameters, link programs to create jobs, and allocate a weave start. PREREQUISITE: INT253 Industrial Robotics.

WDT166 – Flux Core ARC Welding (FCAW) (3 cr. hrs.) This course provides instruction and demonstration with the flux core arc welding process to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of filler metals, current/polarity, shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using the FCAW welding process, according to AWS Codes and Standards. This course supports CIP code 48.0508.

WDT167 – Flux Core Welding Lab (3 cr. hrs.) This course provides instruction and demonstration with the flux core arc welding process to produce groove and fillet welds in all positions, according to applicable welding codes. Topics include safe operating practices, equipment identification, equipment set-up, correct selection of filler metals, current/polarity, shielding gas and base metals. Upon completion, the student should be able to produce groove and fillet welds using the FCAW welding process, according to AWS Codes and Standards.

WDT217 – SMAW Carbon Pipe (3 cr. hrs.) This course introduces the student to the practices and procedures of welding carbon steel pipe using the shielded metal arc weld (SMAW) process. Emphasis is placed on pipe positions, electrode selection, joint geometry, joint preparation and fit-up. Upon completion, students should be able to identify pipe positions, electrodes, proper joint geometry, joint preparation, and fit-up in accordance with applicable codes. PREREQUISITE: As required by program.

WDT 218 – Certification Theory (3 cr. hrs.) This course is designed to provide the student with the knowledge needed to perform welds using the prescribed welding process. Emphasis is placed on the welding test joints in accordance with the prescribed welding code. Upon completion, students should be able to pass an

industry welding test in accordance with various applicable welding code requirements. This course supports CIP code 48.0508. PREREQUISITE: As required by program.

WDT219 – Welding Inspection and Testing (3 cr. hrs.) This course provides the student with inspection skills and knowledge necessary to evaluate welded joints and apply quality control measures as needed. Emphasis is placed on interpreting welding codes, welding procedures, and visual inspection methods. Upon completion, students should be able to visually identify visual acceptable weldments as prescribed by the code or welding specification report. PREREQUISITE: As required by program.

WDT221 – Pipe Fitting and Fabrication (3 cr. hrs.) This course provides the student with skills and practices necessary for fabricating pipe plans using pipe and fittings. Emphasis is placed on various pipefittings to include various degree angles. Upon completion, students should be able to fit various pipefittings, and cut and fabricate tees, and assorted angles. PREREQUISITE: As required by program.

WDT223 – Blueprint Reading for Fabrication (3 cr. hrs.) This course provides a student with advanced skills in identifying and interpreting lines, views, dimensions, notes, bill of materials, and the use of tools of the trade. Emphasis is placed on figuring dimensional tolerances, layout and fitting of different component parts. Upon course completion, a student should be able to interpret, layout, and fabricate from blueprints to given tolerances. PREREQUISITE: As required by program.

WDT228 – Gas Tungsten Arc Welding (3 cr. hrs.) This course provides student with knowledge needed to perform gas tungsten arc welds using ferrous and/or non-ferrous metals, according to applicable welding codes. Topics include safe operating practices, equipment identification and set-up, correct selection of tungsten type, polarity, shielding gas and filler metals. Upon completion, a student should be

able to identify safe operating practices, equipment identification and setup, correct selection of tungsten type, polarity, shielding gas, filler metals, and various welds on ferrous and/or non-ferrous metals, using the gas tungsten arc welding process according to applicable welding codes. PREREQUISITE: As required by program.

WDT257 – SMAW Carbon Pipe Lab (3 cr. hrs.)

This course is designed to provide the student with the skills in welding carbon steel pipe with shielded metal arc welding techniques in various pipe welding positions. Upon completion, students should be able to perform shielded metal arc welding on carbon steel pipe with the prescribed electrodes in various positions in accordance with the applicable codes. PREREQUISITE: As required by program.

WDT258 – Certification Lab (3 cr. hrs.) This course is designed to provide the student with the skills needed to perform welds using the prescribed welding process. Emphasis is placed on the welding test joints in accordance with the prescribed welding code. Upon completion, students should be able to pass an industry standard welding test in accordance with various welding code requirements. PREREQUISITE: Approval of Instructor.

WDT268 – Gas Tungsten ARC Lab (3 cr. hrs.)

This course provides student with skills needed to perform gas tungsten arc welds using ferrous and/or non-ferrous metals, according to applicable welding codes. Topics include safe operating practices, equipment identification and set-up, correct selection of tungsten type, polarity, shielding gas and filler metals. Upon completion, a student should be able to identify safe operating practices, equipment identification and setup, correct selection of tungsten type, polarity, shielding gas, filler metals, and various welds on ferrous and/or non-ferrous metals, using the gas tungsten arc welding process according to applicable welding codes. PREREQUISITE: Approval of Instructor.

WDT 269 – Boiler Tube Lab (3 cr. Hrs.) This course is designed to provide the student with the skills in welding boiler tubes using the gas tungsten arc and shielded metal arc welding process using filler metals in the F6 and F4 groups to applicable code. Emphasis is placed on welding boiler tubes using the gas tungsten arc and shielded metal arc welding process in the 2G and 6G positions in accordance with the applicable code. Upon completion, students should be able to perform gas tungsten arc and shielded metals arc welding on boiler tubes with the prescribed filler metals in the 2G and 6G positions to the applicable code. PREREQUISITE: **WDT 229** and/or as required by program.

WDT280 – Special Topics (3 cr. hrs.) This course provides specialized instruction in various areas related to the welding industry. Emphasis is placed on meeting students' needs. PREREQUISITE: As required by program.

WDT281 – Special Topics in Welding Technology (3 cr. hrs.) This course provides specialized instruction in various areas related to the welding industry. Emphasis is placed on meeting students' needs. PREREQUISITE: As required by program.

WKO110 – NCCER CORE – (3 cr. hrs.)

This course is designed to provide students with knowledge and skills related to multi-craft technicians in a variety of fields. Information in this course is based on the National Center for Construction Education and Research (NCCER) core curriculum and prepares students to test for the NCCER credential.

AUTOMOTIVE TECHNOLOGY

The Automotive technology program is an Associate Degree program designed to provide the necessary educational background to repair today's automobiles and light trucks. The program's main goal is to assist each individual in choosing, preparing for, and becoming

ENG101 English Comp. I 3

Area II: Humanities & Fine Arts 3 Cr. Hrs.

At least 1 SPH class is required.

SPH106 Fundamentals of Oral Communication 3
 SPH107 Fundamentals of Public Speaking 3

Area III: Natural Sciences and Mathematics 3 Cr. Hrs.

Note: At least one math class is required.

| Course | Title | Cr. Hrs. |
|--------|-------------------------------------|----------|
| CIS130 | Intro to Information Systems | 3 |
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH110 | Finite Mathematics | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |

Area IV: History, Social & Behavioral Sciences 3 Cr. Hrs.

PSY210 Human Growth and Development 3

Area V: Pre-professional, Major and Elective Courses 35 Cr. Hrs. (33 required, 2 institutional)

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| BIO201 | Human Anatomy & Physiology I | 4 |

BIO202 Human Anatomy & Physiology II 4
 NUR112 Fundamental Concepts of Nursing 7
 NUR113 Nursing Concepts I 8
 NUR114 Nursing Concepts II 8
 NUR115 Evidence Based Clinical Reasoning 2

Institutional Requirements (2 credits):

Note: ORI101 must be taken in the first semester. WKO107 must be taken in the final semester.

| Course | Title | Cr. Hrs. |
|--------|------------------------------|----------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Certificate Credit Hours 47

Curriculum AAS in Nursing

Area I: Written Composition 3 Cr. Hrs.

| Course | Title | Cr. Hrs. |
|--------|-----------------|----------|
| ENG101 | English Comp. I | 3 |

Area II: Humanities and Fine Arts 6 Cr. Hrs. (1 SPH and 1 Humanities course)

Note: If transferring to a 4 year institution, students are highly recommended to take a sequence of 6 hours in either Literature (AreaII) or History (AreaIV). An additional 3 hours in humanities and fine arts must be taken along with SPH 106, SPH107, SPA101 or SPA102 to satisfy requirements in Area II.

| Course | Title | Cr. Hrs. |
|--------|------------------------|----------|
| ART100 | Art Appreciation | 3 |
| ART203 | Art History I | 3 |
| ENG251 | American Literature I | 3 |
| ENG252 | American Literature II | 3 |
| ENG261 | English Literature I | 3 |

| | | |
|--------|------------------------------------|---|
| ENG262 | English Literature II | 3 |
| ENG271 | World Literature I | 3 |
| ENG272 | World Literature II | 3 |
| MUS101 | Music Appreciation | 3 |
| PHL206 | Ethics & Society | 3 |
| PHL210 | Ethics for the Health Sciences | 3 |
| REL100 | History of World Religions | 3 |
| REL151 | Survey of Old Testament | 3 |
| REL152 | Survey of New Testament | 3 |
| SPA101 | Introductory Spanish I | 3 |
| SPA102 | Introductory Spanish II | 3 |
| SPH106 | Fundamentals of Oral Communication | 3 |
| SPH107 | Fundamentals of Public Speaking | 3 |
| THR120 | Theater Appreciation | 3 |
| THR126 | Intro to Theater | 3 |

Area III: Natural Sciences and Mathematics 15 Cr. Hrs.

Note: MTH100 or higher is required. BIO201 and BIO202 is required. BIO220 is required for the RN track

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-------------------------------------|-----------------|
| CIS146 | Microcomputer Applications | 3 |
| MTH100 | Intermediate College Algebra | 3 |
| MTH110 | Finite Mathematics | 3 |
| MTH112 | Pre-Calculus Algebra | 3 |
| MTH113 | Pre-Calculus Trigonometry I | 3 |
| MTH115 | Pre-Calculus Algebra & Trigonometry | 4 |
| MTH120 | Calculus and Its Application | 3 |
| MTH125 | Calculus I | 4 |
| MTH126 | Calculus II | 4 |
| MTH227 | Calculus III | 4 |
| BIO103 | Principles of Biology I | 4 |
| BIO104 | Principles of Biology II | 4 |
| BIO201 | Human Anatomy & Physiology I | 4 |
| BIO202 | Human Anatomy & Physiology II | 4 |
| BIO220 | Microbiology | 4 |
| CHM111 | College Chemistry I | 4 |
| CHM112 | College Chemistry II | 4 |
| GEO101 | Principles of Physical Geography I | 4 |

| | | |
|--------|-------------------------------------|---|
| GEO102 | Principles of Physical Geography II | 4 |
| PHS111 | Physical Science I | 4 |
| PHS112 | Physical Science II | 4 |
| PHY120 | Intro to Physics | 4 |
| PHY201 | General Physics I | 4 |
| PHY202 | General Physics II | 4 |
| PHY213 | Gen. Physics with Calculus I | 4 |
| PHY214 | Gen. Physics with Calculus II | 4 |

Area IV: History, Social and Behavioral Sciences 3 Cr. Hrs. PSY210 is required.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ECO231 | Principles of Macroeconomics | 3 |
| ECO232 | Principles of Microeconomics | 3 |
| GEO100 | World Regional Geography | 3 |
| HIS101 | Western Civilization I | 3 |
| HIS102 | Western Civilization II | 3 |
| HIS121 | World History I | 3 |
| HIS122 | World History II | 3 |
| HIS201 | US History I | 3 |
| HIS202 | US History II | 3 |
| POL200 | Intro to Political Science | 3 |
| PSY200 | General Psychology | 3 |
| PSY210 | Human Growth and Development | 3 |
| SOC200 | Intro to Sociology | 3 |

Area V: Pre-professional, Major and Elective Courses 41 Cr. Hrs.

(39 required, 2 institutional)

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|-----------------------------------|-----------------|
| NUR112 | Fundamental Concepts of Nursing | 7 |
| NUR113 | Nursing Concepts I | 8 |
| NUR114 | Nursing Concepts II | 8 |
| NUR115 | Evidence Based Clinical Reasoning | 2 |

| | | |
|--------|--|---|
| NUR211 | Advanced Nursing Concepts | 7 |
| NUR221 | Advanced Evidence Based Clinical Reasoning | 7 |

Institutional Requirements (2 credits):

Note: Institutional requirement course ORI101 must be taken in the 1st semester. Institutional requirement course WKO107 must be taken in the final semester.

| <i>Course</i> | <i>Title</i> | <i>Cr. Hrs.</i> |
|---------------|------------------------------|-----------------|
| ORI101 | Orientation to College | 1 |
| WKO107 | Workplace Skills Preparation | 1 |

Total Degree Credit Hours **68**

Practical Nursing (NUR) Course Descriptions

NUR102 – Fundamentals of Nursing (6 cr. hrs.)

This course provides opportunities to develop competencies necessary to meet the needs of individuals throughout the lifespan in a safe, legal, and ethical manner using the nursing process. Students learn concepts and theories basic to the art and science of nursing. The role of the nurse as a member of the healthcare team is emphasized. Students are introduced to the concepts of client needs, safety, communication, teaching/learning, critical thinking, ethical-legal, cultural diversity, nursing history, and the program's philosophy of nursing. Additionally, this course introduces psychomotor nursing skills needed to assist individuals in meeting basic human needs. Skills necessary for maintaining microbial, physical, and psychological safety are introduced along with skills needed in therapeutic interventions. At the conclusion of this course students demonstrate competency in performing basic nursing skills for individuals with common health alterations. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR103 – Health Assessment (1 cr. hr.) This course is designed to provide students the opportunity to learn and practice history taking and physical examination skills with individuals of all ages, with emphasis on the adult. The focus is on symptom analysis along with physical, psychosocial, and growth and development assessments. Students will be able to utilize critical thinking skills in identifying health alterations, formulating nursing diagnoses and documenting findings appropriate to nursing. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR104 – Introduction to Pharmacology (1 cr. hr.) This course provides opportunities to develop competencies necessary to meet the needs of individuals throughout the lifespan in a safe, legal, and ethical manner using the nursing process. This course introduces students to basic principles of pharmacology and the knowledge necessary to safely administer medication. Course content includes legal implications, pharmacokinetics, pharmacodynamics, calculations of drug dosages, medication administration, and an overview of drug classifications. Students will be able to calculate and administer medications.

NUR105 – Adult Nursing (8 cr. hrs.) This course provides opportunities to develop competencies necessary to meet the needs of individuals throughout the lifespan in a safe, legal, and ethical manner using the nursing process. Emphasis is placed on providing care to individuals undergoing surgery, fluid and electrolyte imbalance, and common alterations in respiratory, musculoskeletal, gastro-intestinal, cardiovascular, and endocrine systems. Nutrition, pharmacology, communication, cultural, and community concepts are integrated. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR106 – Maternal and Child Nursing (5 cr. hrs.) This course focuses on the role of the nurse in meeting the physiological, psychosocial, cultural and developmental needs of the maternal and child client. Course content includes antepartal, intrapartal, and postpartal care, complications of pregnancy, newborn care, human growth and development, pediatric care, and selected pediatric alterations. Nutrition, pharmacology, cultural diversity, use of technology, communication, anatomy and physiology review, medical terminology, critical thinking, and application of the nursing process are integrated throughout this course. Upon completion of this course students will be able to provide and manage care for maternal and pediatric clients in a variety of settings. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR107 – Adult/Child Nursing (8 cr. hrs.) This course provides students with opportunities to develop competencies necessary to meet the needs of individuals throughout the life span in a safe, legal, and ethical manner using the nursing process in a variety of settings. Emphasis is placed on providing care to individuals experiencing complex alterations in: sensory/perceptual, reproductive, endocrine, genitourinary, neurological, immune, cardiovascular, and lower gastrointestinal systems. Additional instruction is provided for care for clients experiencing burns, cancer, and emergent conditions. Nutrition, pharmacology, therapeutic communication, community, cultural diversity, health promotion, error prevention, critical thinking, impacts on maternal and child clients are integrated throughout the course. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR108 – Psychosocial Nursing (3 cr. hrs.) This course is designed to provide an overview of psychosocial adaptation and coping concepts used when caring for clients with acute and chronic alterations in mental health in a variety

of settings. Topics include therapeutic communication skills, normal and abnormal behaviors, treatment modalities, and developmental needs. Upon completion of this course, students will demonstrate the ability to assist clients in maintaining psychosocial integrity through the use of the nursing process. PREREQUISITE: As required by program. COREQUISITE: As required by program.

NUR109 – Role transition for the Practical Nurse (3 cr. hrs.) This course provides students with opportunities to gain knowledge and skills necessary to transition from student to practicing nurse. Content includes a discussion of current issues in health care, practical nursing leadership and management, professional practice issues, and transition into the workplace. Emphasis is placed on NCLEX-PN test-taking skills, computer-assisted simulations and practice tests, development of a prescriptive plan for remediation, and review of selective content, specific to the practice of practical nursing. PREREQUISITE: As required by program. COREQUISITE: As required by program.

The above curriculum is being phased out; a teach-out plan is in place. A new concept based curriculum is implemented as of fall 2016.

Nursing (NUR) Course Descriptions

NUR112 Fundamental Concepts of Nursing (7 credit hours)

This course teaches foundational knowledge of nursing concepts and clinical decision making to provide evidence-based nursing care. Content includes but is not limited to: healthcare delivery systems, professionalism, health promotion, psychosocial well-being, functional ability, gas exchange, safety, pharmacology, and coordinator/manager of care.

Prerequisites: Admission to the Program
Co-Requisites: BIO201 Human Anatomy & Physiology I, MTH100 Intermediate College Algebra or higher level math

NUR113 Nursing Concepts I (8 credit hours)

This course teaches foundational knowledge of nursing concepts and clinical decision making to provide evidence-based nursing care. Content includes but is not limited to: coordinator/manager of care, perfusion, oxygenation, infection, inflammation, tissue integrity, nutrition, elimination, mobility/immobility, cellular regulation, acid/base balance, and fluid/electrolyte balance.

Prerequisites: NUR112 Fundamental Concepts of Nursing, BIO201 Human Anatomy & Physiology I, MTH100 Intermediate College Algebra (or higher level math)

NUR114 Nursing Concepts II (8 credit hours)

This course teaches foundational knowledge of nursing concepts and clinical decision making to provide evidence-based nursing care. Content includes but is not limited to: coordinator/manager of care, sexuality, reproduction and childbearing, infection, inflammation, sensory perception, perfusion, cellular regulation, mood disorders and affect, renal fluid/electrolyte balance, and medical emergencies.

Prerequisites: NUR113 Nursing Concepts I, ENG101 English Composition I, BIO202 Human Anatomy & Physiology II, PSY210 Human Growth and Development

NUR115 Evidence Based Clinical Reasoning (2 credit hours)

This course provides students with opportunities to collaborate with various members of the health care team in a family and community context. Students utilize clinical reasoning to assimilate concepts within the individual, health, and nursing domains.

Prerequisites: NUR113 Nursing Concepts I, ENG101 English Composition I, BIO202 Human Anatomy & Physiology II, PSY210 Human Growth and Development
Co-Requisites: NUR114, SPH106 or SPH107

NUR211 Advanced Nursing Concepts (7 credit hours)

This course provides opportunities for students to integrate advanced nursing care concepts within a family and community context. Content includes but is not limited to: manager of care for advanced concepts in safety, fluid/electrolyte balance, cellular regulation, gas exchange, psychosocial well-being, growth and development, perfusion, and medical emergencies.

Prerequisites: NUR114, NUR115, SPH106/107
Corequisite: BIO220

NUR221 Advanced Evidence Based Clinical Reasoning (7 credit hours)

This course provides students with opportunities to demonstrate graduate competencies through didactic and preceptorship experiences necessary to transition to the profession of nursing. Content in nursing and health care domains includes management of care, professionalism, and healthcare delivery systems.

Prerequisites: BIO220, NUR211
Corequisite: Humanities elective (Ethics preferred)

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MBA – Troy University

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