TECHNICAL & INDUSTRIAL DIVISION

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Programs in the Technical and Industrial Division provide students with the technical knowledge, specialized skills, proper attitudes and safe work habits to enter the labor market. Programs are structured to accommodate the goals of students seeking entry-level employment, career advancement, or career change. Students work with the equipment and theoretical concepts used in their trade. The Division's programs monitor current industry needs to anticipate future changes and instructional requirements. Most faculty in the Division have achieved mastery level recognition in their trades and hold national certification.

Employers are requiring increased communication skills, personal and public relations skills, and computation skills. These competencies are taught in the General Education Core courses required for an AAS degree and delivered with relevancy to technical training.

Program Admission Requirements

Each Technical and Industrial Division Program has individual program entrance requirements, please carefully review the program degree information for which you are seeking.

Placement Test Scores

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Writing Placement Exam</th>
<th>ALEKS Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Mechanics Technology</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>CNC Machining Technology</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Collision Repair Technology</td>
<td>1</td>
<td>14</td>
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<tr>
<td>Diesel Technology</td>
<td>1</td>
<td>14</td>
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<tr>
<td>Engineering Technology</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Heating, Venting, Air Conditioning Technology</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Industrial Electronics Technology</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Industrial Maintenance Millwright</td>
<td>1</td>
<td>30</td>
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<tr>
<td>Information Systems</td>
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<td>30</td>
</tr>
<tr>
<td>Welding Technology</td>
<td>1</td>
<td>30</td>
</tr>
</tbody>
</table>

Prior Learning Assessment

Students who have a strong background of work experience or education may challenge courses with the permission of program advisors.

Assessment

The Division emphasizes skills which are critical to functioning on the job, and instruction is based on specific competencies. Input from the Advisory Committees aids in ensuring that programs are current with the needs of business and industry. All programs in the Technical and Industrial Division undergo program reviews as required by LCSC. An annual follow-up assessment is performed to determine the employment of graduates.

Advising

Advising of students is a high priority. Once the student is admitted into the program, he/she will be advised by faculty in that program for the duration of their course of study.

Attendance Policy

Technical and Industrial Division standards for attendance reflect those policies adhered to in each program’s related business and industry. Compliance with the attendance policy is the student’s responsibility. The effect of attendance on the student’s grade is determined by the faculty member teaching the course.
No distinction will be made between an “excused” and “unexcused” absence. It is the student’s responsibility to arrange with the instructor for the completion of assigned classroom and laboratory work. Absences in a program are counted in hours and are inclusive of all time missed in the program, including tardies. In the case of courses set up in eight-week rotations, absences by students will be cumulative between courses in the same semester.

The Division’s policy includes three steps in the following sequence:

- **Step One: 12 hours absence**
  When the student reaches 12 hours of absence, the Division sends a letter to the student to express concern about the student’s ability to successfully complete the required coursework. A recommendation is made that the student schedule an appointment to meet with the advisor/faculty member to discuss the attendance.

- **Step Two: 20 hours absence**
  When the student reaches 20 hours of absence, the Division sends a letter to the student requiring the student to schedule an appointment with the advisor/faculty member and the Division Chair to discuss the attendance problem. The purpose of the meeting is to discuss any extenuating circumstances relating to the absences and to inform the student of his/her responsibilities required to remain in the program. Additional terms may be developed which are required of the student due to excessive absences, and will be written in the division’s absences-contract. A copy of the contract will be provided for signatures of the student, advisor/faculty member, and Division Chair. If the student refuses to sign the contract, indicating noncompliance, he/she will not be allowed to re-enroll in courses in the Technical and Industrial Division for at least one semester.

- **Step Three: 30 hours absence**
  When the student reaches 30 hours of absence and/or fails to comply with arrangements made in step two, the Division sends a notice to the Registrar barring the student from registration in courses in the Technical and Industrial Division the following semester.

If the student meets the terms of the contract, is allowed to re-enroll and the attendance problem recurs, the advisor/faculty member may recommend that the student not be enrolled in a Technical and Industrial program for at least one semester. If the student wishes to appeal decisions reached through this procedure, he/she may

1. request a review by the Vice President of Student Affairs, and/or
2. request a review by the Student Hearing Board.

### Drug - Alcohol Policy

The Technical and Industrial Division abides by Lewis Clark State College’s drug and alcohol policy. Please refer to the Student Code of Conduct (http://www.lcsc.edu/student-counseling/substance-abuse-assistance/alcoholdrug-information) webpage.

### Clubs

Student clubs are active in Auto Mechanics Technology; CNC Manufacturing Technology; Collision Repair Technology; Diesel Technology; and HVACR; and Information Technology play a major role in the students’ learning experience.

**AMFTI-110 MACHINING THEORY I 2.00 Credits**

This course is designed to impart technical knowledge and skills for the use of manufacturing equipment and procedures. The knowledge and skills mastered in this class are an introduction to design and production in the machining operation process to include lathe operations. Introduction to history, theory and uses of simple cutting tools, hand tools, hand held power tools, grinders, and machine tools with focus on lathes. Measuring and layout of parts using precision scales, squares, calipers and micrometers. Material knowledge of metals and synthetics to relate to the machining process. Machine cutting tools and their designed use including speeds and feeds. Knowledge of work holding as it relates to machine shop equipment which include jigs and fixtureing and correct machining order.

**AMFTI-111 MACHINING THEORY 3.00 Credits**

Introduction to the machine shop environment to include but not limited to safety in work place and use of tools safely. Introduction to history, theory and uses of simple cutting tools, hand tools, hand held power tools, machine tools with focus on lathes, milling machines and grinders. Measuring and layout of parts using precision scales, squares, calipers and micrometers. Material knowledge of metals and synthetics to relate to the machining process. Machine cutting tools and their designed use including speeds and feeds. Knowledge of work holding as it relates to machine shop equipment which include jigs and fixtureing and correct machining order.

**AMFTI-112 MACHINING THEORY II 2.00 Credits**

Machine Tool Theory II is designed to impart technical knowledge and skills for the use of manufacturing equipment and procedures. The knowledge and skills mastered in this class are an extension of Machining Theory I, to design and produce in the machining process to include milling operations. Uses of simple cutting tools, hand tools, hand held power tools, grinders, and machine tools with focus on milling. Measuring and layout of parts using precision scales, squares, calipers and micrometers. Material knowledge of metals and synthetics to relate to the machining process. Machine cutting tools and their designed use including speeds and feeds. Knowledge of work holding as it relates to machine shop equipment which include jigs and fixtureing and correct machining order.
AMFTI-121 INTRODUCTION TO CAD 3.00 Credits
An introduction to the engineering graphic principles and the use of drafting tools to include; line work, lettering, applied geometry, dimensioning and orthographic projections. The student will, upon completion of this course, be able to create, using Computer Aided Drafting (CAD), 2-D construction, using advanced commands, sketching and orthographic views. Pre-requisite/Co-requisite: MTHPT 103/123.

AMFTI-122 ENGINEERING GRAPHICS WITH AUTOCAD 4.00 Credits
Applying engineering graphic principles using CAD for sectional views, auxiliary views, dimensions, tolerances, threads, fasteners, working drawings, gears, bearings, and cams. This course in CAD will emphasize visualization and spatial relations. The student will define and draft orthographic isometric projections other pictorial drawings; develop auxiliary views; determine points of intersections; draft developments and working drawings. Construction principles, input schemes, command structures and data management will be studied and combined into a design project at course conclusion. Pre-requisite: MTHPT 103 or appropriate math placement score.

AMFTI-123 ENGINEERING GRAPHICS USING AUTOCAD 3.00 Credits
Applying engineering graphic principles using CAD for sectional views, auxiliary views, dimensioning, tolerancing, geometric tolerances, threads and fasteners, working drawings, and gears, bearings and cams. This course in CAD will emphasize visualization and spatial relations. Construction principles, input schemes, command structures and data management will be studied and combined into a design project at course conclusion. Pre-requisite: MTHPT 103.

AMFTI-124 APPLIED BLUEPRINT READING 2.00 Credits
Interpreting Blueprints in an introduction to identifying blueprint information, needed to produce a machined part, through the interpretation of lines, symbols, and numbers as shown on two and three view orthographic drawings. During the discussion of tolerances, Geometric Dimensioning and Tolerancing will be introduced. Pre-requisite: MTHPT 103.

AMFTI-125 ENGINEERING GRAPHICS APPLICATIONS 3.00 Credits
An advanced course using engineering graphic principles with AutoCAD to include: fundamentals of 3D drawing, surface modeling, solid modeling, and descriptive geometry. Upon completion of this course, the student, using CAD will be able to create the fundamental concepts to produce 3D drawings and create 3D objects using surface modeling and solid modeling. The student will be able to apply precision dimensioning and development to working drawings and technical illustrations. Pre-requisite/Co-requisite: MTHPT 103/123.

AMFTI-141 MACHINING LAB I 3.00 Credits
This course provides practical hands-on application of manual machine processes: drilling, tapping, milling, grinding, turning, boring and the study of material machining methodology. The second section provides the students with the knowledge for lab operation of machining special attachments, bench work, layout, heat-treating, hardness testing, layout inspection, jig and fixture setup, and tool design. Pre-requisite: AMFTI 110.

AMFTI-143 MACHINING LAB II 3.00 Credits
This course provides the students with the knowledge for lab operation of machining, special attachments, bench work, layout, heat-treating, hardness testing, layout inspection, jig and fixture setup, tool design. The final section of this course is designed to provide the students with the development of machining plans for the efficient machining of moderately complex parts. Individualized laboratory practice will integrate the textbook, reference manuals and technical tools placing emphasis on the production of moderately complex products using production machines, setups, and fixtures. Pre-requisite: AMFTI 112.

AMFTI-145 INTRODUCTION TO NC AND CNC 3.00 Credits
This course will cover the introduction to numerical controls for x, y, and z-axis application, tool controls for hole and milling operations, blueprint reading for NC and CNC programming, and Geometric Dimensioning and Tolerancing for NC programming. Programming will include hole operation, linear profiles, circular profiles, cutter diameter compensation, and programming with subprograms. Pre-requisite: AMFTI 143.

AMFTI-241 INTRODUCTORY CAD AND CAM 3.00-4.00 Credits
This course will teach the elementary principles of Computer Aided Machining (CAM) and Computer Numerical Controlled (CNC) machining. The course introduces the manufacturing or engineering student to the world of turning a virtual object into an actual object, (going from Art to Part). Students taking the course for 4 credits will be required to complete a 2-D project and written report. Pre-requisite: AMFTI 145.

AMFTI-243 ADVANCED CAD AND CAM 3.00-4.00 Credits
A continuation in the study of G and M codes from AMFTI 241. The emphasis will be in transforming 3-D models (including wire frame, surface, and solid models) into 3-D tool path definitions. Students taking the course for 4 credits will be required to complete a 3-D project and written report. Pre-requisite: AMFTI 241.

AMFTI-245 CNC MACHINING PROCESSES 3.00 Credits
This course will cover techniques and fixed cycles for CNC lathe programming, modern computer-aided parts programming, elements of the computer-controlled factory, and verifying part programs. Pre-requisite: AMFTI 241.

AMFTI-261 QUALITY CONTROL 3.00 Credits
This class explores methods of ensuring quality in manufacturing through application of codes and standards, sampling techniques, control charts and implementation of documented quality assurance programs. Pre-requisite: MTHPT 103 or Instructor's permission.

AMFTI-263 PROJECT PLANNING 3.00 Credits
Analysis and planning of manufacturing procedures in the development of a project plan, schedule and control of the project. This will include material and process for manufacturing utilizing ISO 9000 guidelines for documentation of the part(s) developed for the project. Pre-requisite/Co-requisite: AMFTI 261.
AMFTI-265 MANUFACTURING PROJECT 6.00 Credits
A project emphasizing the initiative of the student. Decisions by the student/manufacturing entity are made after evaluation of all factors related to the project. The role of the instructor is that of a consultant after each proposed project is approved. Pre-requisite/Co-requisite: AMFTI 261.

AMFTI-290 DS:AUTOMATING TECHNOLOGY 1.00-10.00 Credits
This course offers the opportunity to learn advanced skills in an area mutually agreed upon and related to the manufacturing field by the student and instructor. The student and instructor will develop a set of objectives and time guidelines to complete a specialized project or course of study and a plan to achieve these objectives.

AMFTI-292 DIRECTED SPECIAL PROJECTS 1.00-10.00 Credits
Opportunity to learn additional skills in specific area of study for the manufacturing technology program. Student and instructor develop a set of objectives and time guidelines to complete advanced skills in the course registered for and a plan to achieve these objectives. Pre-requisite: Instructor’s permission.

AMFTI-294 IN: AUTOMATING TECHNOLOGY 12.00 Credits
Work experience in business related to student career goal. Student is under the supervision of the employer and program coordinator. Registration only with instructor’s approval. Pre-requisite: Instructor’s permission.

AMFTI-390 DIRECTED STUDY IN AUTOMATING TECHNOLOGY 12.00 Credits
AMFTI-394 IN:AUTOMATING TECHNOLOGY 12.00 Credits
Work experience in business related to the student career goal. Student will be working under the supervision of employer and program coordinator. Registration only with instructor’s approval. Pre-requisite: Instructor’s permission.

AMFTI-490 DIRECTED STUDY IN AUTOMATING TECHNOLOGY 1.00-12.00 Credits
AMFTI-492 DIRECTED SPECIAL PROJECTS 1.00-10.00 Credits
Opportunity to learn additional skills in specific area of study for the manufacturing technology program. Student and instructor develop a set of objectives and time guidelines to complete advanced skills in the course registered for and a plan to achieve these objectives. Pre-requisite: Instructor’s permission.

AMFTI-494 INTERNSHIP IN AUTOMATING TECHNOLOGY 1.00-12.00 Credits
AUTMC-190 DIRECTED STUDY IN AUTO MECHANICS TECHNOLOGY 1.00-6.00 Credits
Individually prescribed instruction and self-study to meet specific training objectives. May be repeated. Credits earned may not directly apply to degree or certificate.

AUTMC-209 AUTOMATIC TRANSMISSION REPAIR/DIAGNOSIS 6.00 Credits
In-depth study of theory, service, and repair of modern automatic transmission, and tools and instruments required. Automotive practices used in automatic transmission, and drive train diagnosis, repairs, and rebuilding.

AUTMC-212 AUTOMOTIVE TUNE-UP AND DRIVABILITY 6.00 Credits
Consists of theory of automotive tune-up. Students obtain in-depth knowledge of engines and related systems, control systems, and relationship to overall engine performance. Drivability diagnosing emphasized to develop orderly process of locating faults and analysis of various electronics systems. Live shop process where acquired skills from theory portion are practiced. Use of electronics testing tools and automobile manufacturers’ service manuals emphasized to guide each job to a successful completion. Successful completion of all jobs verified by instructor.

AUTMC-218 AUTOMOTIVE AIR CONDITIONING/ACCESSORIES 6.00 Credits
In-depth study of automotive air conditioning systems, cruise controls, power seats, power windows and other convenience equipment. System repair of air conditioners and related systems of automobile included. Care and use of proper tools stressed. Other projects may be assigned to fit individual needs.

AUTMC-224 DIRECTED STUDY IN AUTO MECHANICS 1.00-6.00 Credits
Individualized instruction and self-study to meet specific training objectives. Provides specialized training. Occupational objectives established with advisor at registration. Credits earned based on difficulty and scheduled clock hours. Minimum two hours per school week required for each credit. Final grade based on effort, project results, and project report.

AUTMC-225 ADVANCED COMPUTERIZED FUEL SYSTEMS 6.00 Credits
Provides technical information necessary to diagnose and maintain computerized fuel systems. Consists of half theory, lecture, and demonstrations, and half internship placement at local business to complete assigned competency list.

AUTMC-227 AUTOMOTIVE PARTS COUNTER PERSON 1.00-6.00 Credits
Obtain an understanding of parts management; store operation and personal duties; catalog use and the importance of the computer in the parts industry. Students will learn how to deal with customers one-on-one as well as the use of proper telephone etiquette, inventory control, and parts pricing. Students will be expected to process parts requisitions, control incoming inventory, and order parts using the computer and the telephone.

AUTMC-290 DIRECTED STUDY IN AUTO MECHANICS TECHNOLOGY 1.00-6.00 Credits
Directed Study in Auto Mechanics Technology.

AUTMC-294A IN:AUTOMATIC TRANSMISSION REPAIR 6.00 Credits
Advanced on-the-job training in automatic transmissions. Student is a paid employee under employer’s immediate supervision. Program coordinator works with employer to establish and maintain educational goals.
AUTMC-294B IN: AUTOMOTIVE MECHANICS 6.00 Credits
Advanced on-the-job training with emphasis on automobile electronics. Program coordinator works with employer to establish and maintain training goals.

AUTMC-294C IN: AUTOMOTIVE AIR CONDITIONING 6.00 Credits
On-the-job training in automotive accessories and electrical circuits. Student is employee of local business and under their immediate supervision. Program coordinator works with employer to establish and maintain training goals.

CRPTI-110 INTRODUCTION TO COLLISION REPAIR 6.00 Credits
Provides a good understanding of the basic operations of a collision repair facility, and the development of safe work habits. The student will understand vehicle design and be familiar with the tools, equipment, and fasteners used in the repair of damaged vehicles.

CRPTI-110A SAFETY & POLLUTION PREVENTION 2.00 Credits
The orientation and application of tool safety, shop practices, and shop equipment theories. Industry needs and standards will be addressed. Students will gain knowledge of proper use of equipment, tools, and safety that meet or exceed industry standards. Pre-requisite: Must have a valid driver's license and permission from the instructor.

CRPTI-110B MINOR COLLISION REPAIR THEORY/LAB 3.00 Credits
Basic theory in metal finishing and minor body repair. This includes straightening and prepping sheet metals, the proper use of plastic body fillers, abrasives, sanding techniques and air tools. Remove and install necessary trim and hardware to facilitate repair procedures. Practical application of metal finishing and minor body repair. Pre-requisite: Must have a valid driver's license and permission from the instructor.

CRPTI-110C BASIC COLLISION REPAIR LAB 1.00 Credit
This course is designed to build a frame-work of basic knowledge to help the student fully understand more advanced units taught later in the program. It provides more lab time for the student to apply basic skills for prepping vehicles for repair. Successful completion of CRPTI 110A and CRPTI 110B are required to take this course.

CRPTI-120 NON-STRUCTURAL REPAIRS I 6.00 Credits
The student will be able to demonstrate basic metal straightening techniques, proper use of body fillers, correct procedures used to replace, align, and bolt-on body panels, and a knowledge of working with trim and hardware. The student will learn to perform these tasks at industry standard levels.

CRPTI-140 NON-STRUCTURAL REPAIRS II 6.00 Credits
The student will be able to demonstrate the basic steps used to replace welded and bonded body panels. The student will have a thorough understanding of working with movable glass and its hardware, and be able to create a repair estimate on damaged vehicles.

CRPTI-150 STRUCTURAL REPAIRS I 6.00 Credits
Analyze structural damage through proper measuring techniques. The student will be able to anchor vehicles to frame equipment and straighten or realign structural members and will perform all welding tasks that are used in collision repair, to industry standards.

CRPTI-160 STRUCTURAL REPAIRS II 6.00 Credits
Individualized instruction and self-study to meet specific training objectives. Projects are provided to give specialized training for advanced students. Objectives are established with advisor at registration. Credits are earned based on difficulty and scheduled clock hours. A minimum of two hours per week is required for each credit. Final grades are based on effort, project results, and detailed written report of project.

CRPTI-170 DIRECTED STUDY IN COLLISION REPAIR 1.00-6.00 Credits
Individually prescribed instruction and self-study to meet specific training objectives. May be repeated.

CRPTI-210 STRUCTURAL REPAIRS II 6.00 Credits
Apply knowledge of replacing complete or partial structural members of damaged automobiles. The student will demonstrate how to restore factory corrosion protection, and how to replace and service stationary glass, and passenger restraint systems to industry standards.

CRPTI-210A INTRO TO WELDING FOR COLLISION REPAIR 3.00 Credits
After completing this unit of instruction, the student will be able to apply his/her knowledge of replacing complete or partial structural members using industry approved welding techniques. Prepare students to perform basic welding processes and techniques including the application of mild steel, wire feed welding, automotive sheet metals, basic oxyacetylene, MIG welding, plasma air arc cutting. Students will gain knowledge and proper use of equipment, tools, and safety that meet or exceed industry standards. Pre-requisite: CRPTI 110 or CRPTI 110A/110B and valid driver’s license.

CRPTI-210B STRUCTURAL INTEGRITY 3.00 Credits
Apply knowledge of replacing complete or partial structural members of damaged automobiles. The student will demonstrate how to restore factory corrosion protection, and how to replace and service stationary glass, and passenger restraint systems to industry standards. Pre-requisite: CRPTI 210A and a valid driver’s license.

CRPTI-220 MECHANICAL REPAIRS 6.00 Credits
Provides the basic knowledge to diagnose and replace or repair automotive mechanical systems including, steering and suspension, electrical systems, brake systems, air conditioning and cooling systems, drive trains, fuel, intake and exhaust systems, and passenger restraint systems.

CRPTI-230 REFINISHING I 6.00 Credits
Properly prepare a vehicle surface for undercoat and topcoat systems, apply knowledge in using and maintaining paint booths, spray guns and related finishing equipment, and demonstrate proper spraying techniques.
CRPTI-240 REFINISHING II 6.00 Credits
After completion of this unit of study, the student will be able to properly prepare a vehicle surface for undercoat and topcoat systems, apply knowledge in using and maintaining paint booths, spray guns and related refinishing equipment, and will demonstrate proper spraying techniques.

CRPTI-240A DETAILING AND POLISHING 2.00 Credits
This course covers the practical application of detailing and polishing fundamentals including that of pre-wash, paint defect identification, exterior polishing, interior renovation, environmental hazards, proper use of detailing equipment and PPE. Gain knowledge of general safety and health practices, including the use of chemicals and detailing products. Pre-requisite: CRPTI 110 or CRPTI 110A and CRPTI 110B, valid driver’s license, and permission from the instructor.

CRPTI-240B COLOR MATCHING 4.00 Credits
After completion of this unit of study, the student will be able to properly prepare a vehicle surface for undercoat and topcoat systems, apply knowledge in using and maintaining paint booths, spray guns and related refinishing equipment, and will demonstrate proper spraying techniques. Pre-requisite: CRPTI 240A valid driver’s license, and permission from the instructor.

CRPTI-290 DIRECTED STUDY IN COLLISION REPAIR 1.00-6.00 Credits
CRPTI-292 SPECIAL TOPICS IN COLLISION REPAIR 1.00-6.00 Credits
CRPTI-294 IN: COLLISION REPAIR 6.00 Credits
Individually prescribed instruction and self-study to meet specific training objectives. May be repeated.

DSLTC-101 INTRODUCTION TO DIESEL TECHNOLOGY 2.00 Credits
Introduction of basic skills needed to perform many repair tasks in a diesel-related repair environment. The student will complete tasks, in a competency-based program, that entry-level technicians will perform in the workplace.

DSLTC-102 ELECTRICAL SYSTEMS 6.00 Credits
The student will be introduced to basic electrical theory and practice as it applies to the heavy equipment and transport technology industries. The student will complete tasks in a competency based program that emulate the skills performed in the workplace. Topics include basic electricity fundamentals, starting and charging systems, batteries, trouble shooting, and lighting systems.

DSLTC-102A INTRODUCTION TO ELECTRICAL SYSTEMS 1.00 Credit
The student will be introduced to basic electrical theory and practice as it applies to the heavy equipment and transport technology industries. The student will complete tasks in a competency based program that emulate the skills performed in the workplace. Topics include basic electricity fundamentals, starting and charging systems, batteries, trouble shooting, and lighting systems.

DSLTC-102B ELECTRICAL SYSTEMS I 3.00 Credits
The student will be introduced to basic electrical theory and practice as it applies to the heavy equipment and transport technology industries. The student will complete tasks in a competency based program that emulate the skills performed in the workplace. Topics include basic electricity fundamentals, starting and charging systems, batteries, trouble shooting, and lighting systems. Pre-requisite: DSLTC 102A.

DSLTC-102C ELECTRICAL SYSTEMS II 2.00 Credits
Troubleshooting and repair procedures for heavy-duty electrical systems, including electrical principles as they relate to the components used in trucks and heavy equipment, writing schematics, and lighting along with the associated testing and repair procedures for each system. Topics include basic electricity fundamentals, starting, and charging systems, batteries, troubleshooting, and lighting systems. Pre-requisite: DSLTC 102B.

DSLTC-105 DIESEL ENGINES 6.00 Credits
Teaches the basics on how to identify, repair, and/or replace diesel engines. The student will learn two-stroke and four-stroke combustion engine theory as well as engine performance criteria. The student will learn proper disassembly, measuring, and reassembly procedures and will gain understanding in the operation and basic principles of the various engine components and their respective systems on a diesel engine.

DSLTC-200 SHOP SKILLS AND CLIMATE CONTROL 6.00 Credits
Basic shop skills including basic climate controls, welding and fabrication practices as applied to the heavy equipment and transport technology industries. The student will complete tasks in a competency based program that emulates the skills performed in the workplace. Topics include basic air conditioning fundamentals, stick, MIG and acetylene welding techniques along with acetylene/plasma torch cutting techniques. Students will acquire a Class B CDL through class study as well as a driving competency-based evaluation.

DSLTC-210 HYDRAULICS 6.00 Credits
Introduction to basic hydraulic principles and theory. The student will complete a task list in a competency-based program that emulates the skills performed in the workplace. Topics include hydraulic system maintenance, fluid analysis, system familiarization, and troubleshooting procedures will be outlined as it applies to modern diesel equipment.

DSLTC-220 DIESEL ENGINE FUEL SYSTEMS AND TUNE-UP 6.00 Credits
Introduction to diesel engine fuel system theory and practice as it applies to modern diesel equipment repair. The student will apply the principles introduced in the classroom in the format of laboratory sessions. The student will complete tasks in a competency-based program that emulates the skills performed in the workplace. Topics include diesel engine maintenance, direct and indirect fuel injection systems, testing, adjusting and troubleshooting diesel engine fuel systems.
DSLTC-230 POWER TRAINS 6.00 Credits
Provides instruction and practice on the interrelationship and the operation of various heavy-duty power train systems of agricultural, industrial, and on-highway vehicles. Topics include transmissions, clutches, differentials, final drives, drive lines, testing, adjusting and troubleshooting of power train systems.

DSLTC-240 CHASSIS, SUSPENSION AND AIRBRAKES 6.00 Credits
Introduces basic theory and practice of chassis, suspension, and airbrake systems of all types of diesel equipment, on-highway trucks, and agriculture equipment. Laboratory sessions will reinforce and apply the knowledge learned in the classroom.

DSLTC-290 DIRECTED STUDY IN DIESEL TECHNOLOGY 1.00-6.00 Credits

DSLTC-292 DIRECTED SPECIAL PROJECTS 1.00-6.00 Credits

DSLTC-294 INTERNSHIP IN DIESEL TECHNOLOGY 6.00 Credits
Advanced on-the-job training in diesel technology.

DSLTC-394 INTERNSHIP IN DIESEL TECHNOLOGY 6.00 Credits
Advanced on-the-job training in diesel technology.

ENGTE-105 DRAFTING PRINCIPLES 9.00 Credits
Includes line work, lettering, applied geometry, dimensioning, orthographic projection, and the use of drafting tools. Emphasis on various methods of drafting views of objects including auxiliary views, revolutions, intersections, developments, technical illustration, precision dimensioning, working drawings and reproductions of drawings. Traditional and CAD drafting tools used.

ENGTE-130 COMPUTER AIDED MACHINE DRAFTING 9.00 Credits
Application of computer aided drafting skills using AutoCAD software on increasingly complex drawings. Emphasis is on drafting technician's position as a designer and detailer for support of engineered and manufactured products. Techniques of dimensioning and tolerancing detail drawings for manufacturing covered. Current manufacturing techniques and engineering product design processes also covered. Pre-requisite: ENGTE 105.

ENGTE-135 APPLIED PHYSICS 3.00 Credits
Combines lectures, classroom discussion and problem solving to teach fundamentals of physics. Topics include uniform linear and circular motion, uniform acceleration, projectiles, Newton's First, Second, and Third Laws of Motion, curvilinear motion, forces in rotation, elasticity, friction, work, momentum, rotational motion, mechanical properties of materials, vibrations and waves, sound and fluid mechanics, energy, and properties of materials. Pre-requisite: MTHPT 137.

ENGTE-154 INTRODUCTION TO COMPUTER DRAFTING 4.00 Credits
Teaches basic computer skills using various CAD software. Learning centers around these components and how they send and receive information. Basic understanding of computer hardware, software, and disk operating systems. Uses basic drafting skills learned from traditional drafting courses to create simple dimensioned drawings.

ENGTE-190 DIRECTED STUDY IN ENGINEERING TECHNOLOGY 10.00 Credits
Opportunity to learn advanced skills in areas agreed upon by student and instructor. Objectives developed to complete a specialized project or course of study and a plan to achieve these objectives.

ENGTE-204 CIVIL TECHNOLOGY 9.00 Credits
Covers basics of mapping including contours, symbols, topography, curve geometry, and curve data. Methods of calculating angles, bearings, distances, areas, quantities, and grades studied. Maps drawn from survey field notes. Practical problems given in cross-sections and profiles, cuts and fills, grades, earthwork, and horizontal and vertical curve layout. CAD used for some projects. Use and maintenance of survey equipment. Concepts of survey, leveling procedures, stadia work, traverse closures and areas, triangulation, construction surveys, computations by various methods, and route surveying studied. Mastery of correct methods of note-taking and drafting surveys from these field notes. Pre-requisites: ENGTE 105, ENGTE 154, and MTHPT 137.

ENGTE-205 ADVANCED CIVIL DRAFTING AND DESIGN 5.00 Credits
The student will learn fundamental civil drafting and design techniques and electronic survey data management functions. Pre-requisite: Take ENGTE 105, ENGTE 130, ENGTE 145, and ENGTE 204.

ENGTE-208 ARCHITECTURAL AND STRUCTURAL DRAFTING 9.00 Credits
Fundamental architectural drafting methods taught. Site plans, foundation plans, floor plans, elevations, construction details, lighting and wiring, stair details, floor and roof framing plans, interior elevations drafted, and window and door schedules developed. Prepares students to draft structural steel, precast and poured-in-place concrete, and structural wood projects. Includes engineering drawings and shop drawings. Pre-requisite: ENGTE 154 or instructor's permission.

ENGTE-209 SURVEYING 5.00 Credits
The student will learn and use fundamental surveying concepts and practices utilizing electronic, land-based, surveying equipment to solve real world surveying problems.

ENGTE-225 3-D CAD MODELING 5.00 Credits
This is a study in advanced CAD concepts and procedures to develop three-dimensional wireframe models. Emphasis will be on the creation and use of 3-D primitives, surface modeling, basic solids modeling, shading techniques, and the use of rendering and animation software. Pre-requisite: ENGTE 154 or instructor's permission.
ENGTE-227 CAD/CAM PROJECT 5.00 Credits
This course will be a "senior" project class where the students will work in teams to design and build a project. The projects will be based on "real world" problems from local area businesses that require assistance in implementing solutions to their production problems due to a lack of time/ability. Typically, 1/2 of the semester focuses on the CAD design of the project with the last 1/2 of the semester focusing on the CAM fabrication of that project.

ENGTE-237 APPLIED PHYSICS II 3.00 Credits
Covers basic engineering principles necessary for a draftsman to communicate on a technical level with designers. Covers temperature and heat, thermal properties of materials, fundamentals of thermodynamics, electrostatics, capacitance and dielectrics, current resistance, power, basic DC circuits, magnetism, electromagnetic induction, basic AC circuits, electrons and solid state physics, light and illumination, mirrors and lenses, and vision and optical instruments. Pre-requisite: ENGTE 135 or GENTC 133.

ENGTE-241 INTRODUCTION TO MACHINING 4.00 Credits
Introduction to the machine shop environment to include but not limited to safety in work place and use of tools safely. Introduction to history, theory and uses of simple cutting tools, hand tools, hand held power tools, machine tools with focus on lathes, milling machines and grinders. Measuring and layout of parts using precision scales, squares, calipers and micrometers. Material knowledge of metals and synthetics to relate to the machining process. Machine cutting tools and their designed use including speeds and feeds. Knowledge of work holding as it relates to machine shop equipment which include jigs, fixturing, and correct machining order. Pre-requisite: ENGTE 154.

ENGTE-243 ADVANCED MACHINING 4.00 Credits
This course provides the engineering students with the knowledge for lab operation of machining, special attachments, bench work, layout, heat-treating, hardness testing, layout inspection, jig and fixture setup, tool design. This course is designed to provide the students with the development of manufacturing plans for the efficient manufacturing of moderately complex products. Individualized laboratory practice will integrate the textbook, reference manuals and technical tools placing emphasis on the production of moderately complex products using production machines, setups, and fixtures. Introduction to numerical controls for x, y, and z-axis application, tool controls for hole and milling operations, blueprint reading for NC and CNC programming, and Geometric Dimensioning and Tolerancing for NC programming. Pre-requisite: ENGTE 241.

ENGTE-246 CONSTRUCTION AND MANUFACTURING TECHNOLOGY 2.00 Credits
Gives students an understanding of legal aspects and practical applications of surveying techniques. Civil engineering terminology, engineering methods in the construction of roads, bridges, and other structures, practical understanding of methods industry uses to work metals, basic metallurgy and effects of heat treatment, methods of forging and casting, followed by overview of general metal working and inspection techniques.

ENGTE-290 DIRECTED STUDY IN ENGINEERING TECHNOLOGY 1.00-10.00 Credits
Opportunity to learn advanced skills in areas agreed upon by student and instructor. Objectives developed to complete a specialized project or course of study and a plan to achieve these objectives.

ENGTE-292 SPECIAL TOPICS IN ENGINEERING TECHNOLOGY 1.00-10.00 Credits
Offers opportunity to learn advanced skills for students who are progressing at faster than normal pace.

ENGTE-294 IN:ENGINEERING TECHNOLOGY 10.00 Credits
Work experience in business related to the student's career goal. Student is a paid, part-time employee working under supervision of employer and program coordinator. Registration only with the approval of program coordinator.

ENGTE-305 ADVANCED SURVEYING DRAFTING & DESIGN 5.00 Credits
Consists of lecture and lab work pertaining to typical highway, bridge, storm drainage, sewer, and land development design. Lab work performed by CAD, field trips made to observe on-going projects. Pre-requisite: ENGTE 204.

ENGTE-306 STRENGTH/MATERIAL/MECH 4.00 Credits

ENGTE-310 SURVEYING LAW AND BOUNDARY DESCRIPTIONS 3.00 Credits
This course was designed to give the student a basic understanding of the different types of boundary descriptions in common use and the correct way to prepare a boundary description. They will acquire basic knowledge in many of the problems they will encounter in description. The student will gain a basic knowledge in Survey Law and how to apply it to their job. Pre-requisites: ENGTE 204, ENGTE 205, and ENGTE 209.

ENGTE-312 PUBLIC LAND SURVEYING 3.00 Credits
This course was designed to give the student a basic understanding of the different types of surveys done in the United States. They will cover metes and bounds surveys done by the English, French, and Spanish along with the current Public Land Survey Systems (PLSS); be able to explain each type of survey and understand where to look for information on the different types of surveys. Pre-reqs: ENGTE 204, ENGTE 205, and ENGTE 209.

ENGTE-313 SURVEYING AND SOFTWARE APPLICATIONS 3.00 Credits
This course was designed to give the student a basic understanding of different survey programs and how to use each one. The student will use these programs to develop surveying projects and preparing final drawings. Pre-requisites: ENGTE 204, ENGTE 205, and ENGTE 209.

ENGTE-314 SURVEYING RESEARCH AND EVIDENCE 3.00 Credits
This course was designed to give the student a basic understanding of survey research and evidence. Student will become familiar with places to research, where to start, what to collect, how to evaluate what is found, and how to evaluate evidence. Pre-requisites: ENGTE 204, ENGTE 205, and ENGTE 209.
ENGTE-315 SURVEY ADJUSTMENTS 3.00 Credits
Studies matrix inverse; solution of linear equation by matrices, theory, and computation of least squares adjustments, coordinate transformation, error ellipses, and statistical testing. Pre-requisite: AAS degree.

ENGTE-317 SUBDIVISION PLANNING & PLATTING 3.00 Credits
This course deals with land use planning; governmental regulations and permits as applied to subdivisions; subdivision planning, computations and preparation of subdivision plats. Pre-requisites: AAS degree.

ENGTE-390 DIRECTED STUDY IN ENGINEERING TECHNOLOGY 1.00-5.00 Credits
Opportunity to learn advanced skills in areas agreed upon by student and instructor. Objectives developed to complete a specialized project or course of study and a plan to achieve these objectives.

ENGTE-394 IN:ENGINEERING TECHNOLOGY 10.00 Credits
Work experience in business related to the student's career goal. Student is a paid, part-time employee working under supervision of employer and program coordinator. Registration only with the approval of program coordinator.

ENGTE-409 ADVANCED SURVEYING 5.00 Credits
Expands on topics taught in the basic survey course. Consists of lectures, lab and field trips. Topics presented on plane surveying, topographies, public land, construction staking, geodetic, hydrographic and land development. Discussion presented on geographics information and global position systems. Pre-requisite: ENGTE 204.

ENGTE-410 PROJECT MANAGEMENT 4.00 Credits
Lecture and field trips to construction projects. Estimating, contracts, contract administration, construction materials, and equipment management and productions covered.

ENGTE-411 GEODESY 3.00 Credits
The objective of this course is to give the student an introduction to the principles of geodesy, particularly geometric geodesy, astronomic geodesy, and principles of map projections. Pre-requisites: ENGTE 204, ENGTE 205, and ENGTE 209.

ENGTE-415 SURVEY OFFICE PRACTICE 3.00 Credits
The student will have a basic understanding of how the business operates and many of the considerations that a business manager must deal with. They will get an appreciation of the problems encountered by the managers and will be able to understand their problems and help make work a better place. Pre-requisites: ENGTE 204, ENGTE 205, and ENGTE 209.

ENGTE-490 DIRECTED STUDY IN ENGINEERING TECHNOLOGY 1.00-12.00 Credits
Opportunity to learn advanced skills in area agreed upon by student and instructor. Objectives developed to complete a specialized project or course of study and a plan to achieve these objectives.

ENGTE-492 SPECIAL TOPICS IN ENGINEERING TECHNOLOGY 1.00-5.00 Credits
ENGTE-494 IN:ENGINEERING TECHNOLOGY 10.00 Credits
Work experience in business related to the student's career goal. Student is a paid, part-time employee working under supervision of employer and program coordinator. Registration only with the approval of program coordinator.

GENMC-102 ELECTRICAL 6.00 Credits
Instruction covers basics of components and the technical aspects of repair and overhauling instrumentation, ignition, charging, and starting systems. Demonstration and hands-on experience to diagnose and repair automotive electrical systems and wiring diagrams will be covered in a laboratory environment. Components will be tested and repaired to manufacturers' specifications. Quality, cleanliness, and work attitude are stressed.

GENMC-102A BASIC ELECTRICAL 3.00 Credits
Basic electrical theory, wiring diagrams, test equipment, diagnosis, repair, replacement of electrical components, including battery, starting, charging, and lighting systems. Upon successful completion, the student should be able to properly use wiring diagrams and test equipment to diagnose, test, and repair wiring and lighting in accordance with Automotive Service Excellence (ASE) standards.

GENMC-102B ADVANCED ELECTRICAL 3.00 Credits
Instruction covers basics of components and the technical aspects of repair and overhauling instrumentation, ignition, charging, and starting systems. Demonstration and hands-on experience to diagnose and repair automotive electrical systems and wiring diagrams will be covered in a laboratory environment. Components will be tested and repaired to manufacturers' specifications. Quality, cleanliness, and work attitude are stressed. This is the applied portion of this course. Pre-requisite: GENMC 102A.

GENMC-103 POWER TRAINS LECTURE AND LAB 6.00 Credits
Study of various types of manual transmissions and transaxles, drivelines, clutches, flywheels, rear axles, and differentials found in modern automobiles and light trucks. Operation and repair of various components of power trains and their interrelationships provided.

GENMC-105 ENGINES LECTURE AND LAB 6.00 Credits
Study of principles and practical application in the repair and overhaul of the engine block, cylinder heads and valve train including camshaft, timing gears and chains, identification and replacement of defective parts, and operation of related machine tools. Technical materials are related to components used in engine blocks, cylinder heads, valve trains or similar mechanized applications.
GENMC-105A BASIC ENGINES 3.00 Credits
Theory, construction, inspection, diagnosis, and repair of internal combustion engines and related systems. Topics include fundamental operating principles of engines and diagnosis, inspection, adjustment, and repair of automotive engines using appropriate service information. Upon successful completion, student should be able to perform basic diagnosis, measurement and repair of automotive engines using appropriate tools, equipment, procedures and service information in accordance with Automotive Service Excellence (ASE) standards.

GENMC-105B ADVANCED ENGINES 3.00 Credits
Study of principles and practical application in the repair and overhaul of the engine block, cylinder heads and valve train including camshaft, timing gears and chains, identification and replacement of defective parts, and operation of related machine tools. Technical materials are related to components used in engine blocks, cylinder heads, valve trains or similar mechanized applications. This is the applied portion of the course. Pre-requisite: GENMC 105A.

GENMC-107 COOPERATIVE/INTERNSHIP ENGINE 1.00-6.00 Credits
Advanced on-the-job training in engines. Program coordinator works with the employer to establish and maintain training goals.

GENMC-108 COOPERATIVE/INTERNSHIP POWER TRAINS 1.00-6.00 Credits
Advanced on-the-job training in power trains. Coordinator works with the employer to establish and maintain training goals.

GENMC-115 CHASSIS, SUSPENSION, AND BRAKES LEC/LAB 6.00 Credits
Chassis, suspension alignment and repair, theory and service of power and manual steering gears, wheel and tire diagnosis and balance, and all types of brakes and controls found in the modern automobile and light truck. Shop experience in suspension and steering adjustment, repair and alignment, power steering service, tire and wheel balancing, brakes and controls, and the care and use of related tools, instruments and equipment. Other shop projects may be assigned to fit individual needs.

GENMC-126 SAFETY 2.00 Credits
General principles are needed to foster a safe attitude and work environment. Topics covered include hazardous materials, safe use of equipment and tools, an introduction to the occupation, and health and safety concerns in the work place. Students are required to take first aid and CPR training.

GENMC-190 DIRECTED STUDY IN GENERAL MECHANICS 1.00-12.00 Credits
Individual instruction and self-study established to meet specific training objectives. May be repeated. Credits earned may not be directly applicable to degree or certificate.

GENMC-194A INTERNSHIP IN ENGINE 6.00 Credits
Advanced on-the-job training in engines. Program coordinator works with the employer to establish and maintain training goals.

GENMC-194B INTERNSHIP IN POWER TRAINS 6.00 Credits
Continuation of GENMC 194A. Advanced on-the-job training in power trains. Coordinator works with the employer to establish and maintain training goals.

GENMC-194C INTERNSHIP IN CHASSIS SYSTEMS AND BRAKE 6.00 Credits
Continuation of GENMC 194B. Advanced on-the-job training in auto mechanics in chassis/suspension and brakes. Coordinator works with the employer to establish and maintain training goals.

GENTC-132 APPLIED BIO-CHEMISTRY 3.00 Credits
Introductory course designed to provide students with the fundamental principles of biology and chemistry with specific application to workplace settings such as hazardous materials and waste management.

GENTC-133 APPLIED PRINCIPLES OF TECHNOLOGY 3.00 Credits
An introductory course in general physics, emphasizing technical and workplace applications. Explores the principles of force, work, rate and resistance in the four energy systems. Pre-requisite: MTHPT 103 or MTHPT 137.

GENTC-134 APPLIED PRINCIPLES OF TECHNOLOGY II 3.00 Credits
Explores the application of physics principles such as energy, power, force, transformers, waves and wave-motion, sound, and light to technical workplace settings. Pre-requisite: GENTC 133.

GENTC-190 DIRECTED STUDY IN GENERAL TECHNOLOGY 1.00-12.00 Credits

GENTC-191 WORKSHOP IN GENERAL TECHNOLOGY 1.00-3.00 Credits

GENTC-192 SPECIAL TOPICS IN GENERAL TECHNOLOGY 1.00-3.00 Credits

GENTC-290 DIRECTED STUDY IN GENERAL TECHNOLOGY 3.00 Credits

GENTC-291 WORKSHOP IN GENERAL TECHNOLOGY 1.00-3.00 Credits

GENTC-292 SPECIAL TOPICS IN GENERAL TECHNOLOGY 1.00-6.00 Credits

HACAT-115 BASIC ELECTRICITY 5.00 Credits
The student will learn basic electricity principles including how to measure voltage, current, resistance, and wattage. Troubleshooting various types of motors (single-phase and three phase) along with capacitance and inductance measures will be taught. Further, the course will explain how various controls are used in HVAC, appliances and their applications.
HACAT-135 AUTOMATIC DRYERS 2.00 Credits
Students will learn the operation and repair of electric and gas dryers. The student will be taught to properly diagnose and repair all current models of dryers. Instructional areas are installation requirements, repair drive systems, repair seal mechanisms, replace console panels, replace seals, replace motor assemblies, replace start switches, replace door switches, diagnose timer assemblies, diagnose electronic controls, replace drum supports, service electric heating systems, and service gas heating systems.

HACAT-145 AUTOMATIC WASHERS 4.00 Credits
Training in the operation and service of washing machines. The student will be instructed in the proper diagnosis and repair of all current models. The course outline includes installation, repairing timers, replacing water level switches, replacing safety switches, diagnosing various solenoids, replacing drive motors, replacing pumps, replacing filters, replacing pump guards, replacing dispensers, replacing inner/outer tubs, repairing transmissions, repairing clutch mechanisms, installing/adjusting belts, diagnosing electrical problems, and repairing damaged cabinets.

HACAT-155 DISHWASHERS/COMPACTORS 3.00 Credits
Training in the operation and service of dishwashers and compactors. The student will be instructed on how to properly diagnose and repair all current models. The course outline includes installation requirements, repairing wash systems, replacing door seals, replacing timer assemblies, diagnosing various electrical problems, replacing drive mechanisms, and repairing safety switches.

HACAT-165 RANGES/MICROWAVE OVENS 3.00 Credits
Training in the operation and services of ranges and microwave ovens. The student will be taught to properly diagnose and repair all current models. The course outline includes installation, repairing surface cooking systems, repairing oven systems, replacing safety switches, repairing door assemblies, repairing interlock systems on microwave ovens, repairing protection mechanisms on microwave ovens, repairing high-voltage components, and diagnosing electrical and mechanical problems.

HACAT-215 HVAC PRINCIPLES 5.00 Credits
Teaches the proper handling procedures of refrigerants, brazing techniques, the evacuation and charging processes, the proper usage of tools specific to this trade, installation requirements, HVAC controls, and familiarizes the student with various kinds of motors used in the HVAC products. Requires first aid. Students learn how to work with customers, and find parts for repair of HVAC and appliance products.

HACAT-225 REFRIGERATION THEORY 6.00 Credits
Study of the operation and service of commercial refrigeration systems to include evaporators, condensers, compressors, and metering devices. Defrost systems and commercial ice making are also covered. Electrical control systems, pressure control systems, and other devices specific to refrigeration systems will be taught. The course will also prepare students to take the ESCO Refrigerant Certification for handling all refrigerants as required by the EPA.

HACAT-235 AIR CONDITIONING THEORY 11.00 Credits
Service and operation of air conditioning systems to include evaporators, condensers, compressors, and metering devices. Air distribution and comfort/psychrometrics will be taught. All-weather systems will be worked on including heat pumps. Defrost systems will also be taught. Requirements to prepare students for the low voltage certification as required by Washington State will also be covered.

HACAT-245 DOMESTIC PRODUCTS 3.00 Credits
Provides basic understanding on domestic refrigeration products and icemakers for refrigerators and freezers; to train on repair of most major brands. The student will learn basic troubleshooting processes and the controls used in these products.

HACAT-255 HEATING SYSTEMS 8.00 Credits
Learn basic operation and service of heating systems to include electric, gas, oil, hydronic, solar, and heat pump systems. Study of the controls used in these systems and troubleshooting techniques will be taught as well as venting and piping requirements as used on these products.

HACAT-265 WATER HEAT SYSTEMS 2.00 Credits
Provides basic knowledge of water heating systems to include gas, and electric hot water heaters as well as gas and oil hydronic heating systems. The student will learn basic operation and service of water heating systems, study controls used in these systems, trouble-shooting techniques, and determine venting/piping requirements as used on these products.

HACAT-290 DIRECTED STUDY IN HEATING AIR CONDITIONING AND APPLIANCE TECHNOLOGY 1.00-8.00 Credits
HACAT-294 IN: HEATING, AC AND APPLIANCE TECH 8.00 Credits
Advanced on-the-job training in servicing laundry, refrigeration, and heating products. The student is a paid, part-time employee supervised by an employer. The coordinator works with the employer to establish and maintain goals. May be repeated. Instructor's permission needed - second year only.

IETTI-101 BASIC DC CIRCUIT THEORY 4.00 Credits
The principles of basic electricity and DC circuit theory will be covered. Topics covered will include related technical math, safety procedures, components, and the principles of electrical circuit analysis including voltage, current, resistance, and related laws. Students will be required to demonstrate competency with working in groups and demonstrating appropriate interpersonal relationships.

IETTI-102 DIGITAL ELECTRONICS 4.00 Credits
Industrial electronics technicians work with many types of digital electronic systems. This course introduces the student to the theories and applications of digital electronic devices, circuits and systems. The learner will be required to demonstrate mastery of all the course objectives.
IETTI-103 INTRODUCTION TO MICROCOMPUTERS 4.00 Credits
The learner will study and apply the fundamentals of stand-alone computer systems and applications in the Industrial Electronics field, and will learn to install and configure Windows XP and Windows 7. Current media technologies will be applied to specified settings. Network-based communications will be investigated. The course will provide basic competence in supporting microcomputers. Effective communications techniques will be used in all job-related situations.

IETTI-104 ADVANCED ELECTRICAL PRINCIPLES 4.00 Credits
Students learn a variety of advanced AC electrical and electronic topics including AC power generation and distribution, three phase systems, and high power transformers. The learner will be required to demonstrate mastery of all the course objectives. A good understanding of basic algebra is needed to be successful in this course.

IETTI-105 SOLID STATE DEVICES 4.00 Credits
Solid state devices, also known as semiconductors, comprise most known integrated circuits; they are also found as discrete devices on printed circuit boards and other electronic equipment. This course introduces the student to the theories and applications of solid state devices as they are used in these applications. The learner will be required to demonstrate mastery of all the course objectives.

IETTI-106 EMBEDDED SYSTEMS 4.00 Credits
Microcontroller applications and programming.

IETTI-108 INTRODUCTION TO PLC'S 4.00 Credits
Today's electronic technicians must be familiar with programmable logic controllers (PLC's) as they are widely used in the industry. The course begins with an introduction to programmable logic controller hardware, memory, I/O modules, numbering systems, and programming devices. The learner will then gain experience working with PLC wiring diagrams, PLC setup configuration, and ladder logic programming.

IETTI-110 BASIC DC CIRCUIT LAB 2.00 Credits
Students will construct, analyze, predict and measure DC circuits while selecting and using appropriate test equipment. Project reports require design concepts, theoretical application, and demonstration of principles and practices learned in math, field practice and laboratory. Students will learn to adhere to safe work practices and demonstrate the proper techniques of soldering and de-soldering circuit components. Students will be required to demonstrate competency with working in groups and demonstrating appropriate interpersonal relationships. Pre-requisite: IETTI 101.

IETTI-112 AC CIRCUIT ANALYSIS 3.00 Credits
This course is designed to provide students with a foundation in the use of phasor and vector analysis for analyzing alternating current circuits. This course will also introduce logarithms, binary number systems, and Boolean algebra. Pre-requisite: MTHPT 103 or MATH 025, or permission of instructor.

IETTI-201 INTRO TO INSTRUMENTATION 4.00 Credits
Industrial electronics technicians work with equipment that sense and control pressure, temperature, flow and level. These technicians must also calibrate and service these systems. This course also covers OP-AMPS, analog-digital conversion circuits, and PID controllers.

IETTI-204 PROGRAMMING HUMAN MACHINE INTERFACES 4.00 Credits
This course will introduce the student to software and hardware that allows machine operators to interface with PLC control systems.

IETTI-205 ELECTRIC MOTORS, DRIVES AND CONTROLS 4.00 Credits
This course will give the student information and practical experience on motors, drives, and controls. The following topics will be covered: motors, control circuits, drive programming, installation fundamentals, start-up procedures, and maintenance and troubleshooting techniques.

IETTI-206 ELECTRIC MATERIALS AND TECHNIQUES 4.00 Credits
Introduces the student to electrical wiring methods and materials; safety practices and the National Electrical Code; installation of conduit and raceways; use of electrical test equipment and tools; and basic wiring techniques and theory for video, network, telephone, and fiber-optic systems. Provides the student with troubleshooting techniques and information about preventative maintenance.

IETTI-207 PROGRAM AND TROUBLESHOOT PCL'S 4.00 Credits
Today's electronic technician must be familiar with programmable logic controllers (PLC's) as they are widely used in industry. This course continues the ladder logic programming stared in IETTI 108. The learner will also be exposed to the types of PLC communications and troubleshooting with a PCL.

IETTI-208 PCL'S SYSTEMS APPLICATIONS 4.00 Credits
Today's electronic technician must be familiar with programmable logic controllers (PLC's) as they are widely used in industry. This course will give the learner additional training in programming and networking PLCs. It will also introduce him/her to motion control and operator interface devices and provide him/her with more hands-on experience.

IETTI-211 ADVANCED INSTRUMENTATION 4.00 Credits
This course will continue to present the theories, applications and procedures for process control and instrumentation introduced in IETTI 201. Instrument technicians calibrate and service equipment that sense and control pressure, temperature, flow, and level for process control systems. Pre-requisite: IETTI 201 with a grade of C or better and permission from the instructor.

IETTI-220 ADVANCE DIGITAL DESIGN 4.00 Credits
Electronics Engineering Technicians work with many digital electronic systems. Electronic Engineering Technician students continue their studies of digital devices and logic at an advanced level. The students will be introduced to Boolean logic, and combinatorial, sequential, and state machine digital circuits. The learner will be required to demonstrate mastery of all the course objectives.
IETTI-221 C COMPUTER PROGRAMMING 4.00 Credits
Electronic Engineering Technician students need to have a minimum understanding of a high level computer language. Since students entering this program will have already completed the course in Embedded Systems, they will have a suitable understanding of binary and hexadecimal numbers, and assembly language. C language is an excellent addition to the students knowledge of computer programming, and is the foundation of understanding higher computer languages such as C++ and C#. Pre-requisite: Instructor permission.

IETTI-222 ADVANCED ELECTRONICS I 4.00 Credits
Electronics Engineering Technicians work with many analog electronic systems. Electronic Engineering Technician students continue their studies of solid state devices at an advanced level. The learner will be required to demonstrate mastery of all the course objectives. Pre-requisite: Instructor permission.

IETTI-223 ADVANCED ELECTRONICS II 4.00 Credits
This course builds on IETTI 102 and 105. Electronic Engineering Technician students will continue their studies of solid state devices and digital electronics at an advanced level. Circuit design is introduced for integrated circuits that include active filters, oscillators, Schmitt trigger circuits, integrated-power amplifiers, and voltage regulators. The learner will be required to demonstrate mastery of all the course objectives. Prerequisite: MATH 170 and instructor approval.

IETTI-224 ADVANCED ELECTRONICS III 4.00 Credits
This course is an introduction to the transient response analysis of RLC circuits. First, the computation of the transient response through classical differential equation techniques is covered. Next, Laplace transform techniques are studied, unifying both the transient and frequency response techniques. Then, Fourier analysis techniques are introduced to familiarize the students with the fundamentals of signal analysis. Finally, the State Variable technique is used to compute the transient response of RLC networks. Throughout the course, the lectures are supported by experimental work that make use of the hardware and computer-aided facilities available in the program. Prerequisite: MATH 170 and instructor approval.

IETTI-225 INTRODUCTION TO PROGRAMMABLE DEVICES 4.00 Credits
Students must design, construct, and program an electronic project which includes a Field Programmable Logic Gate Array (FPGA) as approved by the instructor. Upon completion of the project, each student will present the project to the class. Pre-requisite: IETTI 106.

IETTI-226 ELECTRONIC CIRCUIT TROUBLESHOOTING 3.00 Credits
Electronics Engineering Technicians work with analog and digital electronic systems. In this course, students will learn what to do when these systems don't work. Students will be introduced to basic troubleshooting techniques including test equipment, component identification, fault isolation, and documentation. The learner will be required to demonstrate mastery of all the course objectives.

IETTI-290 DIRECTED STUDY IN INDUSTRIAL ELECTRONICS TECHNOLOGY 1.00-10.00 Credits
Required study in area agreed upon by the student and the instructor. Might include specialized devices, new products, or advanced troubleshooting.

IETTI-292 DIRECTED SPECIAL PROJECTS 3.00 Credits
IETTI-294 INTERNSHIP IN INDUSTRIAL ELECTRONICS 12.00 Credits
Work experience in business related to student's career goals. Student is a paid part-time employee working under the supervision of the employer and program coordinator.

ISATI-125 COMPUTER ESSENTIALS 4.00 Credits
A first course for beginning computer users designed to introduce students who have never used a computer to the basic elements of running a computer in a comfortable, structured manner with significant instructor support in the lecture/demonstration mode. Students are exposed to computer hardware, operating systems, software, multimedia technology, communications, networking, mobile devices, acronyms, and additional computer related insights.

ISATI-126 SECURITY AWARENESS IN YOUR WORLD 4.00 Credits
An introductory course to provide students with the knowledge needed to protect computers and networks from increasingly sophisticated attacks, web applications attacks, mobile attacks, and personal security identity theft.

ISATI-127 COMPTIA SECURITY + 4.00 Credits
This course is primarily targeted at individuals with limited exposure to security concepts. It encompasses the basic body of information and skills which are required to understand the technologies which can be implemented to improve basic security. It is not the intention of the course to delve deeply into the various technical standards which impact network and operating systems security.

ISATI-204 CCNA 1: NETWORKING BASICS 4.00 Credits
This course requires full systems analysis of Local Area Networks in various hardware configuration, topologies, protocols, and operating systems environments. Installation, maintenance, and operation of all hardware and software presented is an integral part of this course. Integration of the various hardware and software components into operational systems will be required. Students will troubleshoot and repair operational systems with hardware/software faults and/or configuration problems. Data communications using TCP/IP protocol will be covered and the student will be required to display a working proficiency of these communication schemes. Operating systems supporting network protocols including XP Professional will be presented.

ISATI-205 CCNA 2: ROUTER BASICS 4.00 Credits
This course requires full systems analysis of Wide Area Networks in various hardware configuration, topologies, protocols, and operating systems environments. Installation, maintenance, and operation of all hardware and software presented is an integral part of this course. Students will troubleshoot and repair operational systems with hardware/software faults and/or configuration problems. Data communications using TCP/IP protocol will be covered and the student will be required to display a working proficiency of these communication schemes. Operating systems supporting network protocols including XP Professional will be presented.
ISATI-207 CCNA 3: SWITCHING BASICS AND INTERMEDIATE ROUTING 4.00 Credits
This course provides the learner with the knowledge and skills to design, configure, maintain, and scale a switched network. This course focuses on using Cisco switches connected in LANs and WANs typically found at medium-to-large network sites. A broad range of technical details on topics related to switching, including classless routing, single area OSPF, EIGRP, switching concepts and LAN design, switching configurations, Spanning Tree protocol, VLAN’s and VTP. Upon completion of this course, the student will be able to select and implement the appropriate IOS services required to build scalable, routed and switched networks.

ISATI-208 CCNA 4:WAN TECHNOLOGIES 4.00 Credits
Provides a continued application of the concepts and skills acquired in ISATI-207. Applied exercises lead the student through the implementation process which is required to establish and maintain a scalable routed network. In addition, the course presents applications of scaled IP addresses, WAN technologies, point-to-point protocol, ISDN and DDR, Frame Relay and network administration.

ISATI-226 VIRTUALIZATION TECHNOLOGIES 5.00 Credits
This course presents an overview of Microsoft virtualization technology as well as VMware vSphere. The course objectives include installing, configuring and troubleshooting post-installation system settings, configuring virtual machines, and configuring applications on virtual machines.

ISATI-229 COMPUTER SECURITY & PENTESTING 4.00 Credits
Expose a student to the world of penetration testing - pentest. This is a method of evaluating computer and network security by simulating an attack on a computer system or network from external and internal threats. The process involves an active analysis of the system for any potential vulnerabilities that could result from poor or improper system configuration, both known and unknown hardware or software flaws, and operational weaknesses in process or technical countermeasures. This analysis is carried out from the position of a potential attacker and can involve active exploitation of security vulnerabilities.

ISATI-230 NOVELL/LINUX OPERATING SYSTEMS 4.00 Credits
Provide the student with the skills and knowledge to effectively install, configure, administer, and use Local Area Network hardware and software. Novell 6.0 and Red Hat LINUX will be used as the network operating systems. Ethernet topologies will form the hardware environment that supports the LAN offerings. A systems approach will be followed in the installation, support and operation of the systems and their related applications.

ISATI-231 WINDOWS CLIENT 4.00 Credits
This course presents an overview of Windows 7. The main objectives for the course include, installing and upgrading Windows 7, configuring and troubleshooting post-installation system settings, configuring Windows security settings, configuring network connectivity, configuring applications included with Windows 7, maintaining and optimizing systems that run Windows 7, and configuring and troubleshooting mobile computing. This course prepares the student for the 07-680 certification examination.

ISATI-232 WINDOWS SERVER 4.00 Credits
This course presents an overview of the of the Windows Server operating system. It includes technologies that reduce the total cost of ownership and provides for scalability from a small network to a large enterprise network. Students will be required to install, upgrade, and troubleshoot Windows Server operating system. In addition, management of hardware devices, user accounts, group accounts, file access, disk and data storage, printers, group policy as well as server administration, server performance, implementing backups, Web administration, virtualization, and security will be required. Active Directory will emphasized.

ISATI-290 DIRECTED STUDY 1.00-10.00 Credits
Required study in area agreed upon by the student and the instructor. Topics might include specialized devices, new product experiments, or advanced troubleshooting.

ISATI-292 DIRECTED SPECIAL PROJECTS 1.00-10.00 Credits
Opportunity to learn advanced skills for students who are progressing at a faster than normal pace.

ISATI-294 INTERNSHIP IN INFORMATION SYSTEMS SYSTEMS ANALYSIS 10.00 Credits
Work experience in business related to student career goals. Student is a paid part-time employee working under the supervision of the employer and program coordinator.

ISATI-310 FUNDAMENTALS OF CISCO WIRELESS LANS 4.00 Credits
The learner will demonstrate required knowledge of wireless technologies and the implementation of these technologies in wireless networks. Emphasis is placed on the areas of design, planning, implementation, operation, and troubleshooting. The course expands knowledge of and provides practical experience with wireless networks. This course prepares the student for the Wireless LAN Association certification exam CWNA (Certified Wireless Network Administrator).

ISATI-312 CCNP 1:BUILDING SCALABLE CISCO INTERNETWORKS 4.00 Credits
Designed to enhance the learner’s prospects of successfully completing the CCNP certification process. In addition, this course provides preparation for the exam Building Scalable Cisco Internetworks BSCI, Prometric #642-801.

ISATI-314 CCNP 3:BUILDING CISCO MULTILAYER SWITCHED NETWORKS 4.00 Credits
A preparatory course which leads the learner through the Prometric test taking process. Designed to enhance the learner’s prospects of successfully completing exam BCMSN 642-811 Building Cisco Multilayer Switched Networks.

ISATI-321 COMPTIA SECURITY 5.00 Credits
This course is primarily for individuals with limited exposure to security concepts. It encompasses the basic body of information and skills which are required to understand the technologies which can be implemented to improve basic security. It is not the intention of the course to delve deeply into the various technical standards which impact network and operating systems security.
ISATI-322 WIN SRV 2008 NTKW INFRASTRUCTURE CONFIG 4.00 Credits
This course provides the student with the critical skills and knowledge needed to prepare for the Windows Server 2008 Network Infrastructure Configuration examination (70-642). Windows Server 2008 is a multipurpose operating system with integrated support for client/server networks. It incorporates technologies that reduce the total cost of ownership (TCO) and provides for scalability from a small network to large enterprise networks. Students will be required to design, install, and troubleshoot Windows Server 2008 in a network environment. This includes configuring IP addresses and service, DNS, network access, file and print services, as well as monitoring and managing a network infrastructure.

ISATI-323 WINDOWS SERVER 2008 ACTIVE DIR CONFIG 5.00 Credits
This course equips students with the critical skills and knowledge needed to prepare for the Windows Server 2008 Active Directory Configuration examination (70-646). Windows Server 2008 is a multipurpose operating system with integrated support for client/server networks. It incorporates technologies that reduce the total cost of ownership (TCO) and provides for scalability from a small network to a large enterprise network. Students will be required to design, install and troubleshoot Windows Server 2008 Active Directory. Additionally, the student will learn about the various methods used to implement the tools and features of Windows Server 2008 based upon business and technical requirements.

ISATI-324 CCNP 4: OPTIMIZING CONV. CISCO NETWORKS 4.00 Credits
The new Cisco Intelligent Information Network (IIN) model and the Cisco Service-Oriented Network Architecture (SONA) as architectural frameworks for converged networks will be introduced. The student be required to review Voice over IP (VoIP) network essentials and focus on the VoIP-related challenges in such networks. To ensure quality in a converged network, the student will deal with concepts and implementation methods for Quality of Service (QoS). In addition, the evolution of wireless security standards and the elements of the Cisco wireless LAN (WLAN) will be studied. Case studies and activities based on Cisco Integrated Service Routers (ISRs) and the converged network topics will be an integral part of this course. To successfully complete this course, the student must pass the Cisco ISCW examination number 642-845.

ISATI-325 CCNP 2: IMPLEMENT SECURE CONVERGED WANS 4.00 Credits
This course will expand the reach of the enterprise network to teleworkers and remote sites. The theme of implementing a highly available network with connectivity options, such as VPN and wireless, is highlighted. To successfully complete this course, the student must pass the Cisco ISCW examination number 642-825.

ISATI-326 MS EXCHANGE SERVER 2007 4.00 Credits
This course provides information about and experience working with Microsoft Exchange Server 2007. The goal is to provide a prospective networking professional with coverage of the various tasks with which an Exchange server administrator must be intimately familiar. Students will gain both the knowledge and skills they need to prepare for the Microsoft Certification examination 70-236, Microsoft Exchange Server 2007 Configuration.

ISATI-327 CCNP ROUTE 4.00 Credits
This course is designed to enhance the learner's prospects of successfully implementing complex network solutions utilizing advanced IP addressing schemes and routing protocols which support extremely large networks. To successfully complete this course, the learner must pass the Cisco ROUTE examination #642-902.

ISATI-328 CCNP SWITCH 4.00 Credits
This course will prepare the learner to design, test, implement, and troubleshoot switched network solutions. To successfully complete this course, the learner must pass the Cisco SWITCH examination #642-813.

ISATI-329 CCNP TSHOOT 4.00 Credits
The goal of the TSHOOT course is to assist the learner in passing the CCNP TSHOOT exam. In the process of completing the accompanying materials, the student will gain the ability to effectively troubleshoot advanced Cisco network solutions and identify remedial actions which could be implemented. To successfully complete this course, the learner must pass the Cisco CCNP TSHOOT examination #642-832.

ISATI-336 CWNA: CERTIFIED WIRELESS NETWORK ADMIN 4.00 Credits
This course is designed to enhance the learner's prospects of successfully completing Wireless LAN Association Certification exam CWNA (Certified Wireless Network Administrator). To successfully complete this course, the learner must pass the CWNA Exam #PW0-104.

ISATI-337 CISCO CERTIFIED NETWORK ASSOCIATE, SECURITY (CCNAS) 4.00 Credits
The material in this course prepares the student for successful completion of the 640-553 CCNAS certification exam. The course addresses a range of technologies that facilitate how people work, live, play, and learn by communicating with voice, video, and other data in a secure manner. To successfully complete this course, the learner must pass the CCNAS examination #640-553.

ISATI-338 CISCO CERTIFIED NETWORK ASSOCIATE VOICE (CCNA) 4.00 Credits
The Cisco Certified Network Associate Voice (CCNA Voice) validates associate-level knowledge and skills required to administer a voice network. The Cisco CCNA Voice certification confirms that the required skill set for specialized job roles in voice technologies such as voice technologies administrator, voice engineer, and voice manager. To successfully complete this course, the learner must pass the CCNA Voice examination #640-460.

ISATI-339 COMPUTER VIRTUALIZATION 5.00 Credits
The VMware vSphere class offers an in-depth exploration of virtualization with ESXi Server and vCenter. This course covers all the bases and emphasizes best practice techniques for maintaining a production VMware vSphere environment. Class members will install and configure an ESXi 5 Server and then configure a complete VMware vSphere environment. Once the class has configured the virtual environment, they will cluster the classroom ESXi Servers and explore the more advanced vSphere concepts like Distributed Resource Scheduling, High Availability and Distributed Power Management.
ISATI-367 VISUAL PROGRAMMING 5.00 Credits
Development of tools used in Visual C++ including IDE and several other utilities. Develop Windows applications and demonstrate practical application of Microsoft Foundation Classes including database classes.

ISATI-390 DIRECTED STUDY IN INFORMATION SYSTEMS ANALYSIS 1.00-10.00 Credits
Opportunity to learn advanced skills for students progressing at a faster than normal pace.

ISATI-402 NOVELL/LINUX OPERATING SYSTEMS 5.00 Credits
Introduce the student to the usage and administration of the linux operating system and assist with preparation for the Linux+ certification (XK0-001).

ISATI-410 SQL SERVER ADMINISTRATION 3.00 Credits
Students will program data warehousing employing security, failover clustering, scalability, XML, and digital dashboards in the design of business-driven solutions and prepare for the exam that is required for Microsoft Certified Database Administrator (MCDBA). This self-directed course requires 90 documented in class hours in addition to the required 30 homework/application hours.

ISATI-422 CERTIFIED ETHICAL HACKING 4.00 Credits
This course will immerse the student into an interactive environment where they will be shown how to scan, test, hack, and secure their own systems. The lab intensive environment gives each student in-depth knowledge and practical experience with the current essential security systems. To successfully complete this course, the learner must pass the EC-Council Certified Ethical Hacker exam #312-50.

ISATI-477 SENIOR PROJECTS 4.00 Credits
Students will demonstrate competence in the major through a culminating project which presents a written, oral, pictorial, and computer interactive summary of the work done in the major or of a comprehensive senior-level project.

ISATI-490 DIRECTED STUDY IN INFORMATION SYSTEMS ANALYSIS 1.00-10.00 Credits
Opportunity to learn advanced skills for students progressing at a faster than normal pace.

ISATI-492 DIRECTED SPECIAL PROJECTS 1.00-10.00 Credits
The student will study specialized topics emerging from discipline.

ISATI-494 INTERNSHIP IN SYSTEM ANALYSIS 10.00 Credits

WLDTC-120 INTRODUCTION TO WELDING 1.00-3.00 Credits
This course helps the student develop confidence and skills in the fundamentals of basic welding concepts. This involves welding with the SMAW and GMAW processes, gas welding, brazing, and flame cutting.

WLDTC-150 WELDING POWER SOURCES 1.00-2.00 Credits
Introduces various basic power sources used in welding industry. Students learn construction of power sources, how to obtain optimum performance from a power source, and how to troubleshoot a power source.

WLDTC-151 WELDING CODES FOR CERTIFICATIONS 1.00-2.00 Credits
Teaches working knowledge of various welding codes and welder certifications in common use in industry today. Students work from the AWS D1.1 to write a welding procedure qualification record, a prequalified welding procedure, a welding procedure specification, and a welder qualification record form. This will also assist student to take the Associate Certified Welding Inspector Exam.

WLDTC-152 QUALITY CONTROL FOR WELDING INSPECTION 1.00-2.00 Credits
Introduces students to quality control and inspection techniques common in industry. Quality assurance and quality control are covered from employer and employee points of view. Weld inspection is approached through destructive and non-destructive methods as prescribed in AWS D1.1, Unit 6.

WLDTC-153 BASIC ACETYLENE WELDING LAB 4.00 Credits
Shop practice in basic oxygen acetylene welding.

WLDTC-155 BASIC WELDING PROCESSES LAB 1.00-7.00 Credits
Lab practice in basic oxyacetylene welding and cutting, basic shielded metal arc welding, and basic gas metal arc welding.

WLDTC-155A SMAW PRACTICAL 4.00 Credits
SMA welding to include fillet and groove welds in all positions to the AWS standards. Successfully completing this course may lead to certification.

WLDTC-155B BASIC OXYACETYLENE AND GMAW 3.00 Credits
To develop employable skills for combination welder (DOT 812.844). Lab practice in basic oxyacetylene welding and cutting and basic gas metal arc welding. Application of SMAW learned in WLDTC 155A SMAW Practical. Pre-requisite: WLDTC 155A.

WLDTC-156 BASIC SMAW LAB 4.00-8.00 Credits
Weld with the SMAW process in all positions on mild steel using AC and DC equipment.

WLDTC-157 BASIC GMAW LAB 4.00-8.00 Credits
Weld with the SMAW and FCAW processes in all positions, single and multi pass.

WLDTC-158 ADVANCED SMAW LAB 4.00-8.00 Credits
Weld with the SMAW process in all positions using DC welding equipment. Obtain certifiable skills on a plate of unlimited thickness.

WLDTC-159 BASIC GTAW LAB 4.00-8.00 Credits
Weld with the GTAW process on thin gauge mild steel, stainless steel, and aluminum using both DC and AC equipment.
WLDTC-160 MATHEMATICS I 1.00-2.00 Credits
Working knowledge of basic mathematics as applied in the welding industry.

WLDTC-161 WELDING PROCESSES AND APPLICATIONS 1.00-2.00 Credits
Explores various welding and cutting processes commonly used in industry and provides students with a basic understanding of the principles involved.

WLDTC-162 METALLURGY 1.00-2.00 Credits
Introduces basic metallurgy and gives working knowledge of problems that occur as a result of heating and cooling metal when using the various welding processes.

WLDTC-165 ADVANCED WELDING PROCESSES LAB 1.00-7.00 Credits
Lab practice in basic gas tungsten arc welding and structural welding using the shielded metal arc process.

WLDTC-190 DS:WELDING TECHNOLOGY 1.00-8.00 Credits
Individual instruction and self-study established to meet specific training objectives. May be repeated. Credits earned may not be directly applicable to degree or certificate.

WLDTC-192 SPECIAL TOPICS IN WELDING TECHNOLOGY 1.00-12.00 Credits

WLDTC-250 DRAFTING AND PIPEFITTING 1.00-2.00 Credits
Basic fundamentals of drafting as used in welding trade. Pipefitting section enables students to do basic layout of pipe, figure offsets, runs, and travel distances, and give practical experience in fitting and welding branches or laterals, and blanking off pipe.

WLDTC-251 BLUEPRINT READING 1.00-2.00 Credits
Basic working knowledge of blueprint reading as it applies in today's welding industry. Includes welding symbols, non-destructive testing symbols, and methods of dimensioning drawings.

WLDTC-252 HEAT TREATMENT 1.00-2.00 Credits
Acquaints student with various industrial heat treatment processes and their applications in industry. Teaches in-depth, the properties and strengths of metals in fabrication and technology.

WLDTC-254 PIPE WELDING:SMAW LAB 1.00-7.00 Credits
Develops skills for the welder portion of Pipe Fitter. Involves welding with the SMAW process on mild steel, multi-pass, using E6010 and E7018 electrodes. Welds are performed in the 2G, 5G, and 6G positions. Covers both uphill and downhill techniques.

WLDTC-256 SMAW UPHILL PIPE LAB 4.00-8.00 Credits
Weld in all positions using SMAW process and uphill technique to conform to ASME Section IX.

WLDTC-257 SMAW DOWNHILL PIPE LAB 4.00-8.00 Credits
Weld in all positions using SMAW process and downhill technique to conform to API standard 1104.

WLDTC-258 BASIC ALUMINUM WELDING LAB 4.00-8.00 Credits
Weld aluminum using GTAW and GMAW processes in all positions.

WLDTC-260 MATHEMATICS II 1.00-2.00 Credits
Gives students thorough working knowledge of basic algebra and geometry as applied in industry. Reviews and re-applies basic trigonometry as learned in previous semester course Drafting/Pipefitting.

WLDTC-261 BENCHWORK FOR WELDERS 1.00-2.00 Credits
Familiarizes student with basic hand and machine tools, measuring devices, and shop and tool safety.

WLDTC-262 DISTORTION CONTROL 1.00-2.00 Credits
Trains students in the correct method of distortion control in welded fabrications. Gives basic guidance to assist student in overcoming and understanding some difficulties inherent when working metals where heat input is involved.

WLDTC-263 PIPE WELDING GTAW LAB 1.00-7.00 Credits
Develops employable skills in the gas tungsten arc welding portion of Pipe Fitter I. Involves welding with GTAW process on small diameter thin wall pipe and tubing in all positions. High pressure pipe welding using GTAW on root pass with E7018 fill and cover passes is covered.

WLDTC-266 PROJECT WELDING FROM DRAWING LAB 4.00 Credits
Shop practice in project welding from drawings using all methods and materials.

WLDTC-270 DIRECTED WELDING PROJECTS 1.00-8.00 Credits
This course is designed for students who desire to specialize in one field of the welding industry. The student will learn how to safely operate and optimize the performance of various welding machines and how to operate welding shop equipment. They will also acquire additional knowledge of welding theory concerning specific processes or applications, and welding skills appropriate to the area of interest.
WLDTC-290 DIRECTED STUDY IN WELDING TECHNOLOGY 1.00-8.00 Credits
WLDTC-292 DIRECTED SPECIAL PROJECTS 1.00-8.00 Credits
WLDTC-294 IN:WELDING TECHNOLOGY 8.00 Credits
Advanced on-the-job training in welding.
WLDTC-366 PROJECT WELDING FORM DRAWING LAB 4.00 Credits
Shop practice in project welding from drawings using all methods and materials.
WLDTC-370 DIRECTED WELDING PROJECTS 1.00-8.00 Credits
This course is designed for students who desire to specialize in one field of the welding industry. The student will learn how to safely operate and optimize the performance of various welding machines and how to operate welding shop equipment. They will also acquire additional knowledge of welding theory concerning specific processes or applications, and welding skills appropriate to the area of interest.
WLDTC-390 DIRECTED STUDY IN WELDING TECHNOLOGY 1.00-8.00 Credits
WLDTC-394 IN:WELDING TECHNOLOGY 8.00 Credits
Advanced on-the-job training is welding.