

Industrial Division

Transfer Degree

Career Programs

Construction Technology

- Building Trades/Carpentry
- Building Trades/Masonry

Precision Production Technology

- General Machinist Diploma
- Tool and Die Technology Degree
- Welding Certificate

Industrial Program Clusters

Mechanical Technology

- Automotive Service Diploma
- Automotive Service Technology Degree
- Climate Control Mechanics Diploma
- Climate Control Technology Degree

Engineering Related Technology

- Electromechanical Systems
Technology
- Industrial Technology

INDUSTRIAL TECHNOLOGY

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CONSTRUCTION TECHNOLOGY

Building Trades/Carpentry - page 92
Building Trades/Masonry - page 92

MECHANICAL TECHNOLOGY

Automotive Service Diploma - page 91
Automotive Service Technology Degree - page 91
Climate Control Mechanics Diploma - page 93
Climate Control Technology Degree - page 93

PRECISION PRODUCTION TECHNOLOGY

General Machinist Diploma - page 95
Tool and Die Technology Degree - page 95
Welding Certificate - page 97

ENGINEERING RELATED TECHNOLOGY

Electromechanical Systems Technology - page 94
Industrial Technology - page 96



INDUSTRIAL DIVISION

University of Northern Iowa

NIACC's Industrial Division and the University of Northern Iowa's Department of Industrial Technology have teamed up to provide excellent transfer and articulation agreements for students wishing to pursue a four-year degree. These four-year programs include: Construction Management, Electrical and Information Engineering Technology, Graphic Communications, Technology Management, Technology Education, and Manufacturing Technology.

The transfer options include both the Associate in Arts (A.A.) and Applied Science (A.A.S.) Degrees from NIACC. Differences in liberal arts and technical courses with these degrees will affect the remaining four-year degree requirements at UNI.

The articulation agreement, sometimes referred to as a 2+2 agreement, has been developed for many of the technology-related A.A.S. programs at NIACC. The agreement provides details on transfer of A.A.S. credits into Technology Management as well as other majors in the Department of Industrial Technology at UNI.

For more details on these transfer options, please refer to the College Transfer Programs section of the NIACC catalog or contact our academic advisor.

Automotive Service Technology

Automotive Service Technology is a 4 1/2 semester Associate in Applied Science (A.A.S.) Degree Program. The program is ASE/NATEF Master Certified. All eight instructional areas meet industry and educational standards as identified by Automotive Service Excellence and evaluated by the National Automotive Technicians Education Foundation:



- Engine Repair
- Automatic Transmission/Transaxle
- Manual Drive Train and Axles
- Suspension and Steering
- Brakes
- Electrical/Electronic Systems
- Heating and Air Conditioning
- Engine Performance

A.A.S. Degree Requirements:

Completion of required curriculum, with a cumulative grade point average of 2.00 (C).

Diploma Option Requirements:

An Automotive Service diploma is granted to a student who has completed the first three terms of the automotive curriculum and SDV-135, Job Seeking Skills. A minimum cumulative grade point average of 2.00 (C) is required. Developmental courses are not used in calculating the cumulative grade point average for graduation.

Entrance Advising:

Due to the highly technical nature of the Automotive programs and NIACC's commitment to giving students the best possible opportunity for success, students will be scheduled for advisement sessions with counselors and program personnel. In these sessions, the student's career plans, previous background, transcriptions, test scores, life experiences, and motivation will aid in designing a positive educational experience.

Career Opportunities

Technicians are employed at automotive dealerships and independent service/repair facilities as general (line) technicians or as specialty technicians.



2004 National Winner of ASE Award of Excellence

Required Courses/Suggested Schedule

First Year

First Term (Fall Semester)

AUT-104	Introduction to Automotive Technology	3 s.h.
AUT-115	Automotive Shop Safety	1 s.h.
AUT-403	Automotive Suspension and Steering	3 s.h.
AUT-503	Automotive Brake Systems	3 s.h.
ELT-115	Electronic Concepts	3 s.h.
MAT-770	Applied Math	2 s.h.
MAT-771	Applied Math II	2 s.h.
		17 s.h.

Second Term (Spring Semester)

AUT-163	Automotive Engine Repair	3 s.h.
AUT-303	Automotive Manual Drive Train & Axles	3 s.h.
AUT-612	Automotive Electrical Systems I	3 s.h.
ELT-745	Maintenance Shop Operations	3 s.h.
ENG-701	Communications I	3 s.h.
		15 s.h.

Third Term (Summer)

AUT-703	Automotive Heating & Air Conditioning	3 s.h.
AUT-840	Automotive Computerized Controls	3 s.h.
		6 s.h.

Second Year

Fourth Term (Fall Semester)

AUT-205	Automotive Automatic Trans & Transaxles	5 s.h.
AUT-657	Automotive Electrical Systems II	5 s.h.
AUT-832	Automotive Fuel Delivery Systems	3 s.h.
BUS-161	Human Relations	3 s.h.
		16 s.h.

Fifth Term (Spring Semester)

AUT-857	Advanced Engine Performance	6 s.h.
AUT-865	Automotive Engine Performance Testing	5 s.h.
ENG-702	Communications II	3 s.h.
SDV-135	Job Seeking Skills	1 s.h.
		15 s.h.

Total Program Hours

69 s.h.

Automotive Program Goal

Prepare individuals for employment in the automotive service industry by:

- Maintaining an environment that is conducive to learning.
- Offering curriculum that reflects current industry requirements.
- Delivering classroom instruction that encourages analytical thinking.
- Providing laboratory experience that utilizes technical and problem-solving skills.
- Promoting workmanship that meets or exceeds industry standards.

Building Trades

Building Trades is a diploma program designed for individuals interested in a career in residential, commercial, or industrial building construction. Residential construction involves the building or remodeling of houses, condominiums, or apartment complexes. These structures are primarily wood frame construction. Commercial construction involves the building of single-story office buildings, stores, or restaurants. These structures often use light gauge metal framing in addition to wood construction. Industrial construction includes the building of factories, hospitals, schools, or multistory office buildings. These structures may be constructed of concrete, masonry, structural steel, or a combination of materials.



Building Trades Program students learn and develop skills through a combination of classroom-structured units, manipulative lab projects, and mentored job experiences. Classroom units provide students with necessary information on safety, blueprint reading, and craft work processes. Manipulative projects provide students the opportunity to learn craft skills at their own pace in a mock job site setting. The Building Trades Lab is a state-of-the-art facility where students learn in an individualized, competency-based setting, mastering skills by constructing manipulative projects. Mentored job experiences provide students the opportunity to apply learned skills as well as develop new skills while working under the guiding supervision of skilled contractors on job sites around North Iowa.

Incoming students are eligible to compete for scholarships through the Tom and Linda Schaefer Endowment Fund, which provides twelve \$ 1,000 scholarships each year for NIACC Building Trades students. Graduating students are eligible to compete for a \$ 500 scholarship awarded each semester by the Contractors' Advisory Association and the North Iowa Area Builders Exchange. The Contractors' Advisory Association has also created a financial assistance agreement to enable a contractor to repay a portion of a student's educational costs after the student has completed the program requirements. In exchange for a commitment to work for a Contractors' Advisory Association member contractor after graduation, a student may receive full or partial tuition assistance from the contractor. A diploma will be awarded upon successful completion of the prescribed curriculum with a grade point average of 2.00 (C) or better.

Courses are structured so that students may enter the Building Trades Program at any semester.

Required Courses/Suggested Schedule

4-Semester Open-Entry Program - Students may enter Summer, Fall, or Spring. Below is the Summer entry course sequence. Fall and Spring entry contain same courses, but sequence may vary slightly.

First Year

First Term (Summer)

BCA-118	Introduction to the PC	1 s.h.
CON-110	Construction Drawing	1 s.h.
CON-211	Carpentry Fundamentals I	3 s.h.
CON-212	Carpentry Fundamentals II	3 s.h.
SDV-210	Cooperative Education Internship	2 s.h.
		10 s.h.

Second Term (Fall Semester)

CON-107	Construction Safety	2 s.h.
CON-144	Carpentry I and Lab	8 s.h.
SDV-135	Job Seeking Skills	1 s.h.
SDV-210	Cooperative Education Internship	2 s.h.
		13 s.h.

Third Term (Spring Semester)

CON-145	Carpentry II and Lab	8 s.h.
ENG-701	Communications I	3 s.h.
SDV-210	Cooperative Education Internship	2 s.h.
		13 s.h.

Fourth Term (Summer)

CON-112	Blueprint Reading and Estimating	3 s.h.
CON-117	Building Codes and Standards	2 s.h.
MAT-763	Building Trades Math	3 s.h.
SDV-210	Cooperative Education Internship	2 s.h.
		10 s.h.

Total Program Hours **46 s.h**

Recommended Elective Masonry Courses

The Masonry courses listed below are designed to teach cross-craft masonry skills to construction workers. Masonry skills are a valuable and necessary additional skill in many North Iowa contractors' operations. Courses include working with block, brick, stone, and manufactured materials, learning to mix and handle mortar, and developing and practicing skills to build walls and other solid and veneered masonry structures.

MAS-111	Masonry Lab I	3 s.h.
MAS-211	Masonry Lab II	3 s.h.

Career Opportunities

Completion of this program prepares graduates to enter the construction industry as carpenters, with the basic skills to work in residential, commercial, or industrial construction. You will learn the skills necessary to perform work processes in:

- Concrete Formwork
- Framing
- Exterior Finish
- Interior Finish
- Interior Systems

For specific information contact the Career Center or the NIACC Industrial Division.

Climate Control Technology

Climate Control (Residential/Commercial Heating and Air-Conditioning)

Today's Climate Control Technician installs, maintains, analyzes, and modifies heating and air-conditioning systems. The Climate Control curriculum provides opportunities to develop the skills necessary for entry into the HVAC (heating, ventilation, air-conditioning) industry.

The Climate Control curriculum allows the students to choose between completing a program in Climate Control Mechanics, which leads to a diploma with an emphasis in residential heating and air-conditioning or a program in Climate Control Technology, which leads to an Associate in Applied Science degree with an emphasis in commercial heating and air-conditioning. Both programs are designed around a common group of courses. A diploma will be awarded upon successful completion of the prescribed curriculum with a grade point average of 2.00 (C) or better. This recognition is granted to a person who has completed the first two terms of the Climate Control curriculum and SDV-135, Job Seeking Skills.

The Climate Control Mechanics diploma program is designed to provide graduates with the basic knowledge and skills necessary for installing and servicing residential heating and air-conditioning systems. Theory of operation, as well as installation and service techniques, for several types of residential heating and air-conditioning systems is covered.

The Climate Control Technology Program prepares students for entry into the commercial and industrial heating, ventilation, and air-conditioning industry.

The program does this by training the student in the following areas: designing, testing, troubleshooting, and servicing residential, commercial, institutional, and industrial heating, ventilation, and air-conditioning systems.

Entrance Advising

Due to the highly technical nature of this program and NIACC's commitment to giving students the best possible opportunity for success, students will be scheduled for advisement sessions with counselors and program personnel. In these sessions, the student's career plans, previous background, transcripts, test scores, life experiences, and motivation will aid in designing a positive education experience.

Career Opportunities

Completion of the diploma program prepares graduates to enter the Climate Control Technology degree program or to enter the following occupations:

- Residential Heating/Air-Conditioning Service Mechanic
- Heating/Air-Conditioning Installer
- Heating/Air-Conditioning Parts Salesperson

Completion of the degree program prepares graduates to enter the following occupations:

- Commercial Heating/Air-Conditioning Service Technician
- Heating/Air-Conditioning Lab Technician
- Heating/Air-Conditioning Sales Engineer
- Heating/Air-Conditioning Parts Manager
- Manufacturer's Field Service Representative

For specific information contact the Career Center or the NIACC Industrial Division.



Required Courses/Suggested Schedule

First Year

First Term (Fall Semester)

ELT-115	Electronic Concepts	3 s.h.
ENG-701	Communications I	3 s.h.
HCR-115	Residential Heating Systems	4 s.h.
HCR-155	Troubleshooting Heating Systems	3 s.h.
MAT-770	Applied Math	2 s.h.
MAT-771	Applied Math II	2 s.h.
		17 s.h.

Second Term (Spring Semester)

HCR-205	Air-Conditioning Principles	2 s.h.
HCR-210	Residential Air-Conditioning Systems	4 s.h.
HCR-240	Troubleshooting Air-Conditioning Systems	3 s.h.
PHY-720	Career Physics	4 s.h.
		13 s.h.

Second Year

Third Term (Fall Semester)

BCA-215	Computer Business Applications	3 s.h.
	OR BCA-101 Introduction to Computers and Information Systems (3 s.h.)	
HCR-150	Commercial Heating Systems	5 s.h.
HCR-510	Sheet Metal Fabrication	2 s.h.
HCR-705	Technical Graphics	2 s.h.
HCR-806	Controls I	3 s.h.
HCR-807	Controls II	3 s.h.
		18 s.h.

Fourth Term (Spring Semester)

BUS-161	Human Relations	3 s.h.
ENG-702	Communications II	3 s.h.
HCR-235	Commercial Air-Conditioning Systems	5 s.h.
HCR-923	Systems Design	3 s.h.
SDV-135	Job Seeking Skills*	1 s.h.
SDV-210	Cooperative Education Internship	2 s.h.
		17 s.h.

Total Program Hours **65 s.h.**

Electromechanical Systems Technology

Electromechanical Systems Technology is an Associate in Applied Science Degree Program designed to prepare the graduate for immediate employment as electronic, electrical, and mechanical maintenance personnel in manufacturing settings.

Entrance Requirements

Students must either have completed Essentials of Math or higher OR score 16 or higher on ACT math OR have a COMPASS score at the Beginning Algebra level.

Self-Paced Courses

Several courses in the Electromechanical Systems Technology Program are offered in an instructor-supervised/student-paced format. See course descriptions for details concerning specific course status. Much of the instruction in these courses is computer-based using software available only in the Electromechanical Systems Technology Labs on campus. Students enrolled in such courses should expect to spend 25-30 hours in the Electromechanical Systems Technology Lab for each semester hour of the course. For example, ELT-382, Electronic Circuit Analysis is a 3-semester-hour course. The student enrolled in that course should expect to spend 75-90 hours (5-6 hours per week) in the Electromechanical Systems Technology Lab to complete the course. While a suggested schedule appears on this page, the use of instructor-supervised/student-paced course work allows the student much more flexibility in scheduling.

College Transfer Option

Through an articulation agreement with the University of Northern Iowa, graduates of the Electromechanical Systems Technology Program may continue their education by transferring to baccalaureate programs in such industrial technology fields as manufacturing, electromechanical systems, engineering technology, or supervision and management. Help of a NIACC counselor or program instructor is advised.



Required Courses/Suggested Schedule

First Year

First Term (Fall Semester)

BUS-161	Human Relations	3 s.h.
	OR PSY-111 Introduction to Psychology (3 s.h.)	
ELT-190	Introduction to Tech Computing & CAD	3 s.h.
ELT-382	Electronic Circuit Analysis	3 s.h.
ELT-790	Fluid Power	3 s.h.
ENG-701	Communications I	3 s.h.
	OR ENG-105 Composition I (3 s.h.)	
MAT-770	Applied Math	2 s.h.
MAT-771	Applied Math II	2 s.h.
	OR MAT-121 College Algebra (4 s.h.)	
		19 s.h.

Second Term (Spring Semester)

ELT-210	Motor Control Circuits	3 s.h.
ELT-550	Analog Devices	4 s.h.
ELT-309	Digital Circuits	3 s.h.
ENG-702	Communications II	3 s.h.
	OR ENG-106 Composition II (3 s.h.)	
		13 s.h.

Third Term (Summer)

ELT-895	Electromechanical Internship	2 s.h.
		2 s.h.

Second Year

Fourth Term (Fall Semester)

ELT-124	Advanced PLCs and System Integration	3 s.h.
ELT-133	Electric Motor Drives	2 s.h.
ELT-170	Introduction to PLC's	3 s.h.
ELT-734	Industrial Instrumentation	4 s.h.
PHY-162	College Physics I	4 s.h.
	OR PHY-106 Survey of Physics (4 s.h.)	
	OR CHM-122 Introduction to General Chemistry (4 s.h.)	
		16 s.h.

Fifth Term (Spring Semester)

ELT-710	Computer Automated Manufacturing	3 s.h.
ELT-745	Maintenance Shop Operations	3 s.h.
ELT-750	Facilities Maintenance	4 s.h.
PHY-172	College Physics II	4 s.h.
	OR PHY-106 Survey of Physics (4 s.h.)	
	OR CHM-122 Introduction to General Chemistry (4 s.h.)	
SDV-135	Job Seeking Skills	1 s.h.
		15 s.h.

Total Program Hours **65 s.h.**

Career Opportunities

Completion of this program prepares graduates to enter the following occupations:

- Electromechanical Technician
- Industrial Maintenance Technician
- Electronics Technician
- Industrial Process Control Technician
- Instrumentation Technician
- Control Systems Technician
- Computer Automated Process Control Technician

For specific information contact the Career Center or the NIACC Industrial Division.

General Machinist

General Machinist is a two-semester diploma program designed to provide in-depth study and considerable hands-on skills in the machine processing of a variety of metals. This one-year program provides the foundation for the Associate in Applied Science Program, Tool & Die Technology.

Students become proficient in the operation of manual mills, lathes, grinders, drills, and saws as they complete increasingly complex projects while holding tight tolerances. Various pieces of precision measuring equipment (optical comparator, coordinate measuring machine, etc.) are used to check quality. Additional work in blueprint reading, heat-treating, and computer numerical controlled (CNC) machining is required to complete the General Machinist Program.

Upon satisfactory completion of this program, students are awarded a NIACC diploma. Program graduates have the option to continue into the A.A.S. Tool and Die Technology Program or immediately begin employment in an area of machine shop or manufacturing facility producing a wide variety of machine parts.



Tool and Die Technology

Tool and Die Technology is a five-semester degree program which is a continuation of the General Machinist Diploma Program. The Tool and Die Technology Program builds upon the previous studies with an in-depth study of high-precision industrial dies and die components, progressive dies, and plastics industry molds. A portion of the program is devoted to producing computer-aided drawings (CAD) of molds and dies, and then using computer-aided manufacturing (CAM) software to generate computer numerical control (CNC) machine language. Students operate CNC machine tools to produce many of their second year projects.

Upon satisfactory completion of this program, students are awarded an Associate in Applied Science Degree. Program graduates are prepared to work in the "tool room" of area manufacturers or to work for a specialty tool and die shop producing dies and molds for a large variety of production machines in our area.

Entrance Advising

Due to the highly technical nature of this program and NIACC's commitment to giving students the best possible opportunity for success, students are scheduled for advisement sessions with counselors and/or program personnel. In these sessions, the student's career plans, previous background, transcripts, test scores, life experiences, and motivation aid in designing a positive educational experience.

Required Courses/Suggested Schedule

First Year

First Term (Fall Semester)

BCA-119	Computer Orientation.....	1 s.h.
ENG-701	Communications I.....	3 s.h.
MAT-770	Applied Math.....	2 s.h.
MAT-771	Applied Math II.....	2 s.h.
MFG-120	Machine Trade Print Reading I.....	1 s.h.
MFG-245	Machine Theory and Operations I.....	9 s.h.
		18 s.h.

Second Term (Spring Semester)

MFG-130	Machine Trade Print Reading II.....	1 s.h.
MFG-248	Machine Theory and Operations II.....	7 s.h.
MFG-302	CNC Fundamentals.....	3 s.h.
PHY-720	Career Physics.....	4 s.h.
		15 s.h.

Third Term (Summer)

MFG-108	Computer-Aided Drafting (CAD).....	2 s.h.
MFG-110	3-D Modeling.....	2 s.h.
MFG-380	EDM Fundamentals.....	2 s.h.
MFG-423	Jig and Fixtures.....	5 s.h.
MFG-500	Statistical Process Control (SPC).....	1 s.h.
		12 s.h.

Second Year

Fourth Term (Fall Semester)

BUS-161	Human Relations.....	3 s.h.
MFG-320	Computer-Aided Manufacturing (CAM).....	3 s.h.
MFG-408	Basic Die Making.....	8 s.h.
SDV-135	Job Seeking Skills.....	1 s.h.
WEL-334	Trade and Industry Welding.....	2 s.h.
		17 s.h.

Fifth Term (Spring Semester)

ENG-702	Communications II.....	3 s.h.
MFG-312	Advanced CNC.....	2 s.h.
MFG-459	Injection Mold Making.....	9 s.h.
MFG-460	Plastics Materials.....	1 s.h.
		15 s.h.

Total Program Hours

77 s.h.

Career Opportunities

General Machinist

- Operate and set up CNC mills and lathes
- Maintenance work
- Operate and set up manual equipment

Tool and Die Technology

- Mold builder
- Operate/set up complex CNC equipment
- Tool maker
- Die maker
- CNC programmer
- Quality Control Inspector
- Gage maker
- Instrument maker
- CAD/CAM technician

Industrial Technology



The A.A.S. degree graduate in Industrial Technology provides a broad technical background in a variety of disciplines related to industry. Industrial technologists work with management teams, entry-level supervisors, and technicians in providing manufacturing process and production solutions to ensure the success of our industries. The broad-based programming further provides the student the mobility to move throughout a variety of industrial areas. Graduates of this program have the option of employment upon graduation or articulation of the program to a four-year institution.

Upon satisfactory completion of MAT-770, MFG-195, and eight semester hours of selected industrial electives, students may be awarded a certificate in Industrial Technology. The Industrial Technology certificate provides a basic technical background in a variety of disciplines related to industry. Industrial technologists work with production teams, entry-level foremen, and supervisors in manufacturing facilities. This certificate can apply toward a diploma or degree in Industrial Technology.

Upon completion of the first year of the program, students may be awarded a NIACC diploma. To be awarded a diploma, students must successfully complete a 30-semester-hour program of study, to include English and Mathematics general education requirements.

Upon completion of the two-year curriculum with a grade point average of 2.00 (C), the student is awarded an Associate in Applied Science in Industrial Technology. Students who know they wish to pursue a four-year degree and want to meet general education requirements of transfer institutions should pursue the A.A. degree. This will necessitate a slightly different curriculum.

The schedule shown on this page is a suggested program of study. Students may choose to change the sequence of courses to suit their needs. Please consult with a NIACC Counselor to develop a program of study that works for you.

Career Opportunities

The intent of this program is to provide a flexible framework targeted primarily to individuals interested in or already employed in the manufacturing field. Many individuals taking this course work are focusing their efforts toward employment in the area of Industrial Maintenance and Repair. Others pursue careers in direct manufacturing.

The program enables the individual to tailor a diploma and/or associate degree program based on his/her skill needs and the needs of the company.

Required Courses/Suggested Schedule

First Year

First Term (Fall Semester)

CON-107	Construction Safety.....	2 s.h.
ENG-102	Composition and Speech I.....	4 s.h.
	OR ENG-701 (3 s.h.) and ENG-702 (3 s.h.)	
MAT-121	College Algebra.....	4 s.h.
	OR MAT-770 (2 s.h.) and MAT-771 (2 s.h.)	
MFG-108	Computer-Aided Drafting	2 s.h.
WEL-334	Trade and Industry Welding.....	2 s.h.
		14 s.h.

Second Term (Spring Semester)

ELT-115	Electronic Concepts	3 s.h.
ELT-790	Fluid Power	3 s.h.
MFG-195	Manufacturing Processes I	2 s.h.
PHY-720	Career Physics	4 s.h.
	OR PHY-162 (4 s.h.)	
		12 s.h.

Second Year

Third Term (Fall Semester)

Industrial Technology Electives**	9 s.h.
Electives	8 s.h.
	17 s.h.

Fourth Term (Spring Semester)

Industrial Technology Electives**	9 s.h.
Electives	8 s.h.
	17 s.h.

Total Program Hours 60-62 s.h.

** Industrial Technology Electives to be taken from existing programs in NIACC's Industrial Technology Division. Students must meet existing course prerequisites. Students may also elect a specialization by taking all electives from a single program. Specializations include:

- Electromechanical Systems Technology
- Tool & Die Technology
- Climate Control Technology
- Building Trades
- Automotive Technology

Students must have approval of program faculty for specializations.

Welding - Evening Program



The Welding Program is designed for industry and individuals seeking personal skill development. Students are first exposed to theory and demonstrations, along with laboratory experiences. This is followed with an open lab to allow students additional laboratory experience in order to achieve the program's outlined competencies. Upon satisfactory completion of the prescribed curriculum with an average grade point of 2.00 (C), the student is awarded a certificate.

Required Courses/Suggested Schedule

A student may take the program in either order.

First Year

First Term

WEL-110	Welding Blueprint Reading	2 s.h.
WEL-138	Oxyacetylene Welding/Gas Tungsten Arc Welding	3 s.h. 5 s.h.

Second Term (Spring Semester)

WEL-112	Welding Blueprint Reading Advanced.....	2 s.h.
WEL-153	Shielded Metal & Gas Metal Arc Welding (SMAW and GMAW)	3 s.h. 5 s.h.

Total Program Hours **10 s.h.**

Career Opportunities

Those currently involved in the following areas will benefit from the program:

- Maintenance
- Farm or Ag Related
- Automotive
- Construction
- General Industrial
- Hobbies or Backyard