

## CAREER AND TECHNICAL EDUCATION DEPARTMENT SEQUENCES

### Apprenticeship Courses

#### Year 1

<b>Course Title</b>	<b>Length</b>	<b>Meeting Time</b>	<b>Grades</b>
Introduction to Engineering Technology	Semester	Daily	9-12
Engineering Graphics and Design	Semester	Daily	9-12

#### Year 2

Welding Blueprint Reading	Semester	Daily	9-12
ACDC Fundamentals	Semester	Daily	9-12

Students must also take ENG105--Composition I (585 BH) and SPC112--Public Speaking (590BH) to complete the courses needed for the apprenticeship.

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### Agricultural Education

#### General Agricultural Career Pathway

<b>Course Title</b>	<b>Length</b>	<b>Meeting Time</b>	<b>Grades</b>
Introduction to Agriculture	Semester	Daily	9-12
Horticultural Science I	Semester	Daily	10-12
Horticultural Science II	Semester	Daily	10-12
Food Science	Semester	Daily	10-12
Crop Science	Semester	Daily	10-12
Animal Science	Semester	Daily	11-12
Introduction to Agribusiness	Semester	Daily	11-12

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**Power, Structure, and Technology Systems Pathway**

Ag Structures 1	Semester	Daily	9-12
Ag Structures 2	Semester	Daily	10-12
Ag Structures 3	Semester	Daily	11-12
Ag Structures 4	Semester	Daily	12
Ag Metals	Semester	Daily	11-12
Mentoring	Semester	Daily	12

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**CAREER AND TECHNICAL EDUCATION  
DEPARTMENT**

**PHILOSOPHY**

Career and Vocational classes provide students with opportunities to gain exploration and exposure in career fields while also developing skills and training in a specific field of study. Course offerings in this department support careers in manufacturing, agronomy, animal husbandry, engineering, construction and welding and fabrication.

**STANDARDS**

THE STUDENT WILL:

- 1) Use tools appropriate to the task and area of study and demonstrate competency in accordance with given grade level.
- 2) Understand, apply and demonstrate safe and ethical operation of tools appropriate to the area of study.
- 3) Demonstrate and apply conceptual skills appropriate to the task.
- 4) Design projects and allocate sufficient time, materials and resources to achieve project goals.
- 5) Work effectively with diverse individuals and in diverse situations to contribute to overall effort of the group.
- 6) Self evaluate the success and quality of projects and goals.

**CAREERS IN THE CAREER AND VOCATIONAL FIELD**

Drafting  
Carpenter  
Construction  
Computer Aided Drafting  
Welding  
CNC Operator  
Agricultural Business  
Mechanical Engineering  
Agricultural Engineering  
Civil Engineering  
Agronomy

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<b>NUMBER:</b>	349	<b>TITLE:</b>	Introduction to Engineering Technology
<b>GRADE(S):</b>	9, 10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**GUIDELINE:** Students must be enrolled in at least one semester of apprenticeship classes each semester to participate in the apprenticeship program.

**COURSE SUMMARY:** A course that helps explore the different areas of engineering and engineering technology. This course gives students a basic understanding of how to create and read engineering drawings. This course will develop perceptual and visual skills using CAD drawing.

**Major Course Objective:**

Students will learn to apply engineering standards to document their work.

**Primary Common Learning Outcome Assessed:** Critical Thinking

**Educational Learning Outcomes:**

- Students will be able to apply the design process to develop a solution to an open-ended problem.
- Students will be able to communicate their design in a graphic format
- Students will be able to utilize CAD software to create technical drawings

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<b>NUMBER:</b>	350	<b>TITLE:</b>	Engineering Graphics and Design
<b>GRADE(S):</b>	9, 10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**GUIDELINE:** Students must be enrolled in at least one semester of apprenticeship classes each semester to participate in the apprenticeship program.

**COURSE SUMMARY:** Integration of fundamental graphics, computer modeling, and engineering design. Techniques for visualizing, analyzing and communicating 3D geometries are used in the application of the design process.

**Major Course Objective:** Students will apply the design process.

**Primary Common Learning Outcome Assessed:** Critical Thinking

**Educational Learning Outcomes:**

- Students will be able to design a solution to a problem.
- Students will be able to evaluate a solution to a problem.
- Students will be able to utilize tools and technologies to document the design process

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<b>NUMBER:</b> 347		<b>TITLE:</b>	Welding Blueprint Reading
<b>GRADE(S):</b>	9, 10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** Introduces students to the concept and practice of blueprint interpretation as needed by welders in an industrial setting. Emphasis is on the basics of interpretation and application in specific situations.

**Major Course Objective:** To provide the students with the knowledge of welding symbols and blueprint reading.

**Primary Common Learning Outcome Assessed:** Critical Thinking

**Educational Learning Outcomes:**

- The students will be able to apply welding symbols to the industrial setting.
- The students will be able to apply welding blueprints to the industrial setting.

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<b>NUMBER:</b>	348	<b>TITLE:</b>	ACDC Fundamentals
<b>GRADE(S):</b>	9, 10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** An introduction to AC/DC theory; The student is introduced to the concepts of electricity and its sources, basic circuits, schematics, motor theory and laws that govern circuits.

**Major Course Objective:** Acquire the necessary safety practices, electrical concepts, measurement techniques, and troubleshooting procedures used in the everyday industrial environment.

**Primary Common Learning Outcome Assessed:** Critical Thinking

**Educational Learning Outcomes:**

- The student will be able to discuss basic electrical terms.
- The student will be able to discuss sources of Electricity.
- The student will be able to explain conductors and insulators.
- The student will be able to explain resistors and capacitors.
- The student will be able to discuss laws that govern circuits.
- The student will be able to discuss series, parallel, and series/parallel.
- The student will be able to interpret AC and DC circuits.
- The student will be able to explain meter usage.
- The student will be able to discuss motor theory.
- The student will be able to explain basic controls.

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<b>NUMBER:</b>	366	<b>TITLE:</b>	Introduction to Agriculture
<b>GRADE(S):</b>	9, 10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**GUIDELINE:** Students must be enrolled in at least one semester of an agriculture class each year to participate in the FFA program.

**COURSE SUMMARY:** Introduction to Agriculture, Food and Natural Resources is a **FALL** semester course that is highly recommended as a prerequisite to and a foundation for all other agriculture classes. The nature of this course is to provide students with an introduction to the fundamentals of agriculture science and business. Topics to be covered include: animal science, plant and soil science, food science, horticultural science, agricultural business management, landscape management, natural resources, agriculture power, structure and technology, leadership development, FFA Basics, supervised agriculture experience and career opportunities in the area of agriculture, food and natural resources.

**The course will cover the following concepts:**

1. Agricultural Education – Agriculture, FFA, and SAE
2. Communication Methods
3. Science Processes
4. Natural Resources
5. Plants and Animals
6. Agricultural Mechanics

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<b>NUMBER:</b>	387	<b>TITLE:</b>	Horticultural Science
<b>GRADE(S):</b>	10-12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

Horticultural Science is a course designed to give students a background in the field of horticulture and floriculture. It addresses the biology and technology involved in the production, processing, and marketing of horticultural plants and products. Topics covered include: reproduction and propagation of plants, plant growth, growth media, management practices for field and greenhouse production, marketing concepts, production of herbaceous, woody and nursery stock, fruit, nut and vegetable production, and pest management.

<b>NUMBER:</b>	389	<b>TITLE:</b>	Horticultural Science II
<b>GRADE(S):</b>	10-12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

This course presents the management of greenhouse crops. Common commercial crops are addressed and techniques used in the production of greenhouse crops are demonstrated. In addition students will potentially manage the spring plant sale.

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<b>NUMBER:</b>	<b>370</b>	<b>TITLE:</b>	Crop Science
<b>GRADE(S):</b>	11,12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**GUIDELINE:** Students must be enrolled in at least one semester of an agriculture class each year to participate in the FFA program.

**COURSE SUMMARY:** *\*Potential College Credit via NICC AGS114 & AGS 101*

Plant and Soil Science is a semester course that provides students with opportunities to participate in a variety of activities including laboratory work. Topics covered include: the taxonomy of plants, the various plant components and their functions, plant growth, plant reproduction and propagation, photosynthesis and respiration, environmental factors affecting plant growth, integrated pest management plants and their management, biotechnology, the basic components and types of soil, calculation of fertilizer application rates and procedures for application, soil tillage and conservation, irrigation and drainage, land measurement, grain and forage quality, cropping systems, precision agriculture, principles and benefits of global positioning systems and new technologies, harvesting, and career opportunities in the field of plant and soil science.

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<b>NUMBER:</b>	<b>369</b>	<b>TITLE:</b>	Animal Science
<b>GRADE(S):</b>	11,12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester
<b>GUIDELINE:</b>	Students must be enrolled in at least one semester of an agriculture class each year to participate in the FFA program.		

**COURSE SUMMARY:**

*\*Potential College Credit via NICC AGS114 & AGS 101*

Animal Science is a course that provides students with an overview of the field of animal science. All areas that the students study can be applied to large and small animals. Topics to be addressed include: anatomy and physiology, genetics, reproduction, nutrition, aquaculture, careers in animal science, common diseases and parasites, social and political issues related to the industry, and management practices for the care and maintenance of animals.

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<b>NUMBER:</b>	<b>388</b>	<b>TITLE:</b>	Food Science
<b>GRADE(S):</b>	10, 11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** Food science is a course that provides students with an overview of food science and its importance. Introduction to principles of food processing, food chemistry, nutrition, food packaging, food commodities, food regulations, and careers in the food science industry help students understand the role which food science plays in the securing of a safe, nutritious, and adequate food supply.

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<b>NUMBER:</b>	<b>368</b>	<b>TITLE:</b>	<b>Introduction to Agribusiness</b>
<b>GRADE(S):</b>	11, 12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester
<b>GUIDELINE:</b>	Students must be enrolled in at least one semester of an agriculture class each year to participate in the FFA program.		

**COURSE SUMMARY:** *POTENTIAL College Credit NICC: AGB330 NICC*

Agribusiness Management is a course that presents the concepts necessary for managing an agriculture-related business from a local and global perspective. Concepts covered in the course include: exploring careers in agribusiness, event planning, global visioning, applying E-commerce, risk management, understanding business management and structures, entrepreneurship, the planning, organizing, financing, and operation of an agribusiness, economic principles, credit, computerized record keeping, budgeting, fundamentals of cash flow, insurance, cooperatives, purchasing, the utilization of information technology in agribusiness, marketing agricultural products, developing a marketing plan, advertising and selling products and services, understanding consumers and buying trends, agricultural law applications, ethics, etiquette and employability skills.

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<b>NUMBER:</b>	378	<b>TITLE:</b>	Ag. Structures 1
<b>GRADE(S):</b>	9,10,11,12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

Basic Construction Skills is a SEMESTER course where the student will learn woodworking fundamentals as they are introduced to a core set of skills necessary in the Construction Industry such as: Basic Safety, Construction Math, Use and Care of Hand and Power Tools, Blueprint Reading, Rigging, and Basic Communication and Employability Skills. The student will learn to use a variety of hand tools and power tools through the construction of a class project. A substantial amount of time is devoted to project construction allowing the student to demonstrate his/her skill and understanding of the material covered in the classroom. This introductory course will provide students with a basic background to the construction industry. Students will gain a better understanding of the skills, knowledge and abilities required to be a successful crafts person.

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<b>NUMBER:</b>	<b>383</b>	<b>TITLE:</b>	Ag. Structures 2
<b>GRADE(S):</b>	12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester
<b>Guideline:</b>	Instructor Approval or Ag Structures 1		

**COURSE SUMMARY:**

Ag Structures II is a course designed for students to construct large wood projects containing more than sixteen board feet of lumber or one-half sheet of plywood. Students are given the opportunity to construct needed home projects while developing basic woodworking skills.

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<b>NUMBER:</b>	385	<b>TITLE:</b>	Ag. Structures 3
<b>GRADE(S):</b>	11,12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester
<b>Guideline:</b>	Instructor Approval or Ag Structures 1		

**COURSE SUMMARY:**

Ag Structures III is a advanced project oriented course requiring the student to build a major woodworking project at his/her expense. Laboratory time will be devoted to project construction. Class time will be spent using technology tools to manage personal schedules, prepare reports and other business communication, and develop skills related to word processing and spreadsheet management.



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<b>NUMBER:</b>	<b>386</b>	<b>TITLE:</b>	Ag. Structures 4
<b>GRADE(S):</b>	12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester
<b>Guideline:</b>	Instructor Approval or Ag Structures 1		

**COURSE SUMMARY:**

Ag Structures IV is the final sequence which allows seniors to mass produce an item and serve as an entrepreneur for the semester which will focus on sales, marketing and producing a quality product.

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<b>NUMBER:</b>	<b>375</b>	<b>TITLE:</b>	Ag. Metals 1
<b>GRADE(S):</b>	11,12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	Semester	<b>CREDIT:</b>	5 per semester
<b>GUIDELINE:</b>	Instructor approval or Ag Structures 1 or 2		

This course is an introductory class studying Short Circuit Gas Metal Arc Welding (GMAW) and other related processes. Topics such as process variation, welding in various positions, principles of operation, shielding glasses, and wires will be studied. Safety and practical application of these welding processes will be stressed.

The Ag Metals course follows the NICC curriculum for Basic Gas Metal Arc Welding (WEL: 412). Students taking this course have the option to articulate the credit to an NICC degree program. A student must earn a C- or better in the course, articulate credit within one year of graduation from Beckman, and complete the required paperwork.

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<b>NUMBER:</b>	<b>353/354</b>	<b>TITLE:</b>	Introduction to Engineering Design
<b>GRADE(S):</b>	9,10,11,12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester
<b>GUIDELINE:</b>	Enrollment in Algebra or higher		

**COURSE SUMMARY:**

The student will complete units in:

1. Design Process
2. Design Exercises
3. Reverse Engineering
4. Open-ended Design Problems

Introduction to Engineering Design is the first course in the Pathway to engineering series .The curriculum for this course is developed through Project Lead the Way. The major focus of IED is the design process and its application. Through hands-on projects, students apply engineering standards and document their work. Students use industry standard 3D modeling software to help them design solutions to solve proposed problems, document their work using an engineer's notebook, and communicate solutions to peers and members of the professional community.

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<b>NUMBER:</b>	<b>355/356</b>	<b>TITLE:</b>	Principles of Engineering
<b>GRADE(S):</b>	10,11,12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	YEAR	<b>CREDIT:</b>	5 per semester
<b>GUIDELINE:</b>	Introduction to Engineering Design		

**COURSE SUMMARY:**

The student will complete units in:

1. Energy and Power
2. Materials and Structures
3. Control Systems
4. Statistics and Kinematics

Principles of Engineering is the second course in the Pathway to Engineering series. This course uses Project Lead the Way curriculum. Designed for 10<sup>th</sup>, 11<sup>th</sup>, or 12<sup>th</sup> grade students, this survey course exposes students to major concepts they'll encounter in a post-secondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, document their work and communicate solutions.

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<b>NUMBER:</b>	<b>463</b>	<b>TITLE:</b>	Computer Science Principles
<b>GRADE(S):</b>	9-12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging, and approachable course that explores many of the foundational ideas of computing so all students understand how these concepts are transforming the world we live in.

The student will complete units in:

1. The internet
2. Digital information
3. Introduction to programming
4. Big data and privacy
5. Building apps

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<b>NUMBER:</b>	<b>398/399</b>	<b>TITLE:</b>	Mentoring
<b>GRADE(S):</b>	12	<b>MEETING TIME:</b>	Daily
<b>LENGTH:</b>	SEMESTER	<b>CREDIT:</b>	5 per semester

**COURSE OBJECTIVES:**

The student will:

1. Communicate and work appropriately and productively with others in the assigned workplace.
2. Adapt to varied roles, responsibilities, and expectations and work flexibly in a work environment.
3. Demonstrate leadership skills, integrity, ethical behavior, and social responsibility in the workplace.
4. Deliver quality job performance on time.
5. Demonstrate accountability for individual performance.

**COURSE SUMMARY:** Mentoring is a school-business partnership designed to provide students with valuable learning situations that could result in a stepping-stone to future careers. This program is for the very serious student who wants to learn more about a certain career by obtaining on-the-job experience. For one semester during the senior year, the students average 4-5 hours per week on the job and earn 5 credits towards graduation. This program is dependent upon available employers.