

CAREER AND TECHNICAL EDUCATION DEPARTMENT SEQUENCES

Industrial Technology

Course Title	Length	Meeting Time	Grades
Manufacturing I	Year	Daily	9-12
Manufacturing II	Year	Daily	10-12
Metals	Semester	Daily	11-12
Industrial Enterprise	Semester	Daily	11-12
Senior Industrial Tech	Year	Daily	12
Mentoring	Semester	Daily	12

Project Lead the Way

Course Title	Length	Meeting Time	Grades
Introduction to Engineering	Year	Daily	9-12
Principles of Engineering	Year	Daily	10-12
Computer-Integrated Manufacturing	Year	Daily	11-12

Agricultural Education

Course Title	Length	Meeting Time	Grades
Introduction to Agriculture	Semester	Daily	9-12
Crop Science	Semester	Daily	10-12
Animal Science	Semester	Daily	11-12
Introduction to Agribusiness	Semester	Daily	11-12
Mentoring	Semester	Daily	12

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

NUMBER:	321/322	TITLE:	Manufacturing 1
GRADE(S):	9,10,11,12	MEETING TIME	Daily
LENGTH:	YEAR	CREDIT:	5 per semester

COURSE SUMMARY:

The student will:

1. Plan and construct product from start to finish.
2. Demonstrate safe and proper tool usage.
3. Examine which areas of industrial technology he/she would like to pursue in the future.
4. Explore possible careers related to carpentry.

The course introduces students to safe use of power tools. Students will develop wood projects.

NUMBER:	331/332	TITLE:	Manufacturing 2
GRADE(S):	10,11,12	MEETING TIME	Daily
LENGTH:	YEAR	CREDIT:	5 per semester

COURSE SUMMARY:

The student will:

1. Set up and use power tools and fixtures.
2. Measure using standard precision measuring devices.
3. Demonstrate safe and proper tool usage.
4. Continue wood related theme of Manufacturing 1.
5. Demonstrate fastening techniques used with various materials.
6. Explore possible career related to carpentry and technology

The course is intended to introduce students to technology found in the machine tool industry and continue woods skill development.

NUMBER: 343 **TITLE:** Metals
GRADE(S): 11,12 **MEETING TIME:** Daily
LENGTH: Semester **CREDIT:** 5 per semester
GUIDELINE: Instructor approval or Manufacturing 1 & Manufacturing 2

COURSE SUMMARY: Major Units of Instruction include:

1. Gas metal arc welding equipment
2. Welding Applications
3. Welding Safety
4. Welding Techniques

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

The 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.

NUMBER: 343 **TITLE:** Metals II
GRADE(S): 11,12 **MEETING TIME:** Daily
LENGTH: Semester **CREDIT:** 5 per semester
GUIDELINE: Instructor approval and completion of Metals I.

COURSE SUMMARY: Major Units of Instruction include:

Gas metal arc welding equipment

1. Welding Applications
2. Welding Safety
3. Welding Techniques

Metals II is a project-based class that allows students to show mastery of Short Circuit Gas Metal Arc Welding (GMAW) and other related processes. Topics such as process variation, welding in various positions, principle of operation, shielding gases, and wires will be studied. Safety and practical application of these welding processes will be stressed.

NUMBER: 341 **TITLE:** Industrial Enterprise
GRADE(S): 11,12 **MEETING TIME:** Daily
LENGTH: Semester **CREDIT:** 5 per semester
GUIDELINE: Instructor approval or Manufacturing 1 & Manufacturing 2

COURSE SUMMARY:

The student will:

1. Demonstrate safe and proper tool usage.
2. Research, develop, produce and market a product for profit.
3. Do basic maintenance and set up on machines and tools.
4. Develop job getting and job keeping skills.
5. Recognize possible careers related to manufacturing.

This course is intended to give students a first-hand experience of running a business from start to finish. Each student will have a chance to participate as an executive officer in the company.

NUMBER: 361/362 **TITLE:** Senior Industrial Technology
GRADE(S): 12 **MEETING TIME:** Daily
LENGTH: YEAR **CREDIT:** 5 per semester
GUIDELINE: Manufacturing 1, Manufacturing 2 or Instructor Approval

COURSE SUMMARY:

The student will:

1. Develop an advanced project utilizing past course experiences.
2. Produce a complex project based on Manufacturing 1 & 2 skills.
3. Formulate a post-graduation plan for future employment or education.

Students will fine-tune their individual abilities and interests to prepare for life after graduation. Each student will research job possibilities and educational programs to gain a realistic picture of what the world has to offer them.

NUMBER:	353/354	TITLE:	Introduction to Engineering Design
GRADE(S):	9,10,11,12	MEETING TIME:	Daily
LENGTH:	Year	CREDIT:	5 per semester
GUIDELINE:	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.

NUMBER:	355/356	TITLE:	Principles of Engineering
GRADE(S):	10,11,12	MEETING TIME:	Daily
LENGTH:	YEAR	CREDIT:	5 per semester
GUIDELINE:	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 10th, 11th, or 12th 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.

NUMBER: 370 **TITLE:** Crop Science
GRADE(S): 10,11,12 **MEETING TIME:** Daily
LENGTH: SEMESTER **CREDIT:** 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:

The course will cover the following units:

Crop Plant Anatomy	Crop Plant Identification	Crop Physiology	Weeds
Climate	Soils	Soil Water	Insects
Tillage and Seeding	Plant Breeding	Seed and Grain Quality	Crop Harvesting & Storage
Crop Disease			

This course introduces students to the basic concepts in crop growth and physiology. The course follows the curriculum of NICC's Principles of Agronomy (AGA014). Students taking this course have the option to articulate the credit to several of NICC's degree programs. A student must earn a C- or better in the course, articulate credit within one year of graduation from Beckman, complete the required paperwork, complete 12 semester credits in your program before the credit is put on the transcript, and pass an NICC Agriculture Department proficiency exam.

NUMBER: 369 **TITLE:** Animal Science
GRADE(S): 11,12 **MEETING TIME:** Daily
LENGTH: SEMESTER **CREDIT:** 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:

The course will cover the following units:

1. Importance and history of the livestock industry
2. Animal breeding and reproduction
3. Nutrition and feeding
4. Life Cycle Production
5. Animal Health
6. Marketing of Animal Products
7. Issues in the Animal Industry

This course introduces students to the various species and breeds of livestock and gives them an appreciation for the principles of livestock production and product marketing. The course parallels NICC'S Survey of Animal Industry (AGS014). Students taking this course have the option to articulate the credit to several of NICC's degree programs. A student must earn a C- or better in the course, articulate credit within one year of graduation from Beckman, complete the required paperwork and pass a NICC Agriculture Department proficiency exam and taking the following at your high school.

NUMBER:	366	TITLE:	Introduction to Agriculture
GRADE(S):	9, 10, 11, 12	MEETING TIME:	Daily
LENGTH:	SEMESTER	CREDIT:	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 introduces students to the range of agricultural opportunities and the pathways of study they may pursue. Students will explore career and post-secondary opportunities in each area of the course. The course is intended to serve as the introductory course. Students will investigate, experiment, and learn about documenting a project, solving problems, and communicating their solutions to their peers and members of the professional community.

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

NUMBER:	368	TITLE:	Introduction to Agribusiness
GRADE(S):	11, 12	MEETING TIME:	Daily
LENGTH:	SEMESTER	CREDIT:	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:

Topics include a comparison of agriculture and agribusiness, agribusiness types, planning and operation. There is also an examination of post-production processing and agricultural products.

The course will cover the following concepts:

1. Explain the difference between agriculture and agribusiness.
2. Discuss the role of agribusiness industry in the US economy.
3. Articulate the role of entrepreneurship, small business, and agricultural production in the agribusiness industry.
4. Identify the different forms of business ownership.
5. Demonstrate a working knowledge of agribusiness inputs and market structures.
6. Explicate the personnel, marketing and financial management challenges facing agribusiness.

NUMBER:	398/399	TITLE:	Mentoring
GRADE(S):	12	MEETING TIME:	Daily
LENGTH:	SEMESTER	CREDIT:	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.