

INDUSTRIAL & ENGINEERING SYSTEMS CAREER LEARNING AREA

Overview

A career in the field of Industry & Engineering (I&E) is rewarding and provides opportunities in Construction and Engineering. Completion of this coursework provides the student insight and experience into I&E, and potential pathways in the skilled trades, Engineering and Architecture.



College Connections

Blue Mountain CC
Columbia Basin CC
Lane Community College

Industry Partners

Hendon Construction
IRZ Engineering
ProtoParadigm

Careers in I & E Programs

Plumber, electrician, carpenter, millwright, plasterer, laborer, civil and structural engineering, architect, program, management, bricklayer, cabinet maker, mason, heavy equipment operator, HVAC & refrigeration, roofer, theatre technician, welder.

CLUSTER Skill Sets

Engineering

John Fisher

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Construction

Doug Gallagher

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Curt Berger

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Required Courses

	Credits
Computer-Aided Design 1A*	0.5
Computer-Aided Design 1B*	0.5
Computer-Aided Design 2*	1.0
Computer-Aided Design 3	1.0

	Credits
Introduction to Construction Technology and Woodworking (CST111)	0.5
Construction Tech 1 –	1.0
Construction Tech 2 –	1.0
Construction Tech 3 – CBSHP (CST118)	2.0
Advanced Woodworking	0.5

*Denotes course is offered for college credit.

HERMISTON HIGH SCHOOL



INDUSTRIAL & ENGINEERING SYSTEMS

CLA Course Descriptions

Program Description

The Career and Technical Education (CTE) cluster skill sets available in Industrial & Engineering Systems Program of Study are designed to showcase and honor those students who make the most of their opportunities in these programs. The Program of Study is intended to prepare students for transition into higher education, and successful careers in the chosen field of study.

★ Dual Credit is also available for many of these classes. Check the class listing.

Courses

5700HS Computer-Aided Design 1A (CAD 1A) ★

Elective Grades 9, 10, 11, 12

Credits: 0.5 Honors Credit, Dual Credit opportunity

Prerequisite: None

This course is designed to develop confidence with AutoCAD, Rhinoceros 3D, and SOLIDWORKS through hands on experience in generating mechanical drawings. The following subjects are covered: drafting problem solving, sketching, pictorial drawings, drafting constructions, section views, dimensioning, product planning, blueprint reading, career information, and drafting mathematics. Problem solving will be encouraged through special projects with individual and group activities. BMCC dual credit is available for students who successfully (A or B grade) complete: Both CAD 1A and CAD 1B.

Available to all CAD students will be manufacturing equipment to take an idea or concept to the completed product. Manufacturing equipment available: 3D printers, vinyl cutter, and laser engraver. Students will be encouraged to use these machines to produce projects.

5705HS Computer-Aided Design 1B (CAD 1B) ★

Elective Grades 9, 10, 11, 12

Credits: 0.5

Prerequisite: CAD 1A

This course is designed to develop confidence with AutoCAD, Rhinoceros 3D, and SOLIDWORKS through hands on experience in generating architectural drawings. The following subjects are covered: drafting problem solving, sketching, site development plans, floor plans, wall section views, elevation plans, architectural history and styles, fundamentals of design, blueprint reading, career information, and drafting scales. Problem solving will be encouraged through special projects with individual and group activities. Students will be encouraged to use the 3D printers, vinyl cutter, and laser engraver to produce projects.

BMCC dual credit is available for students who successfully (A or B grade) complete: Both CAD 1A and CAD 1B.

5710HS Computer-Aided Design 2A (CAD 2A) ★

Elective Grades 10, 11, 12

Credits: 0.5 Honors Credit, Dual Credit opportunity

Prerequisites: CAD 1A and CAD 1B

This course is intended to be a more detailed study of many of the aspects of the CAD 1 course. This course will emphasize CAD knowledge using AutoCAD, AutoCAD Architecture, and SOLIDWORKS to produce both mechanical and architectural drawings. This is a more in-depth look at all aspects of CAD. Problem solving will be encouraged through all assignments and projects. Students will be encouraged to use the 3D printers, vinyl cutter, and laser engraver to produce projects.

BMCC dual credit is available for students who successfully (A or B grade) complete: Both CAD 2A and CAD 2B.

5715HS Computer-Aided Design 2B (CAD 2B) ★

Elective Grades 10, 11, 12

Credits: 0.5 Honors Credit, Dual Credit opportunity

Prerequisites: CAD 1A, CAD 1B, and CAD 2A

This course is intended to be a more detailed study of many of the aspects of the CAD 1 and CAD 2A courses. This course will emphasize CAD knowledge using AutoCAD, AutoCAD Architecture, and SOLIDWORKS to produce both mechanical and architectural drawings. This is a more in-depth look at all aspects of CAD. Problem solving will be encouraged through all assignments and projects. Students will be encouraged to use the 3D printers, vinyl cutter, and laser engraver to produce projects.

BMCC dual credit is available for students who successfully (A or B grade) complete: Both CAD 2A and CAD 2B.

5720HS Computer-Aided Design (CAD 3) ★

Elective Grades 11, 12

Credits: 1.0 Honors Credit

Prerequisite: CAD 2A and CAD 2B

Emphasis in this course will be the design of a house. Programs such as AutoCAD Architecture will be used to create house plans and three dimensional models of a home. Emphasis will be placed on the development and planning of professional projects, which include the completion of professional quality CAD drawings and documentation. Students will develop and produce a bill of materials for home constructions, a floorplan, home layout, foundation plans, electrical plans, and plumbing plans. Students will design homes within local and state building codes.

Students' individual interest may present the need for emphasis in a particular area of Computer Aided Design technology to fit into his/her future plans and studies.

5410HS Intro to Robotics

Elective Grades 9, 10, 11, 12

Credits: 0.5

Prerequisite: Completed Algebra 1, "C" grade or higher

This is a beginning course in robotics. The course will introduce engineering concepts, programming, and logic through work with robotic devices built with Legos. Students will learn about various forces, structures, and basic construction methods. These methods will be used to build robotic solutions for problems presented in class. Students will use a graphical programming language to program the robots and, when finished, they'll test and document their work. Most work will be done in teams.

5820HS (CST 111) - Introduction to Construction and Woodworking ★

Elective Grades 9, 10, 11, 12

Credits: 0.5 Honors Credit, Dual Credit opportunity

Prerequisite: None

This class introduces the student to safety policies and procedures for an industrial environment such as general construction and industrial woodworking. This course is required for Industrial & Engineering Program of Study program completers. Small projects are completed in accordance with syllabus and emergent opportunities within the community. Math and writing skills that have been developed in lower grades are emphasized, are applied to emphasize how those skills are important for problem solving in a career-related environments. Employability skills include math and writing essays and reports. Eligible for CRLE. **This course is eligible for dual credit through Lane Community College.*

5800HS Construction Tech 1 – Construction 1

Elective Grades 9, 10, 11, 12

Credits: 1.0

Prerequisite: Grade of C or better in Construction Tech 1

The course is an introduction to construction trades and prepares students for employment in the field. The class emphasizes technology, tools, processes, and methods with emphasis on safe work practices, policies and procedures. This course is a prerequisite for all other Construction course work required for a candidate program of study completer for Industrial & Engineering. Students are encouraged to work collaboratively and cooperatively because it is effective,

efficient, and replicates an authentic work environment. This course is a lecture/lab which means that it shall be done in the classroom and the lab area. Employability skills include math and writing essays and reports. Eligible for CRLE.

5805HS Construction Tech 2 – Construction 2

Elective Grades 10, 11, 12

Credits: 1.0

Prerequisite: Grade of C or better in Construction Tech 1

(Additional fees may be a result of student's choice of project.)

This course is designed to help the student acquire advanced knowledge and skills in construction carpentry. Carpentry skills practiced include form/falsework construction, concrete placement, industrial and commercial metal and stick framing, stair and roof cutting theory, layout and assembly. Course work also includes the process of planning, cutting and assembly, and evaluation of construction projects, this course emphasizes the self-management, productivity, and pride-of-crafts expertise. Students may repeat this course for credit with a grade of C or better, or with teacher approval. Employability skills include math and writing essays and reports. Eligible for CRLE.

5815HS Construction Tech 3 (CST 118) – Columbia Basin Student Home Building Program (CBSHBP) ★

Elective Grades 11, 12

Credits: 2.0 Honors Credit, Dual Credit opportunity

Prerequisite: Grade of C or better in Construction Tech 3 – Advanced Construction

This year long class provides real world work experience in the construction industry. Students will build a house from the foundation through the finish carpentry. Students will be exposed to all parts of the industry, carpentry, woodworking, print reading, engineering, and site prep. Priority for selection will be given to juniors and seniors who have successfully completed woods and construction classes. This course is a full year commitment for 4th & 5th or 6th & 7th periods. Students should be interested in the home building/construction industry and be highly motivated. Students who complete this course successfully will be eligible to continue on in the Construction and Woodworking program and if they receive a B or higher will be eligible to complete the HHS Industrial & Engineering Program of Study. Eligible for CRLE. **This course is eligible for dual credit through Lane Community College.*

5810HS Advanced Woodworking

Elective Grades 10, 11, 12

Credits: 0.5 Credit,

Prerequisite: Grade of C or better in Construction Tech 2 or Woodworking 1

(Additional fees may be a result of student's choice of project.)

This course builds upon previous knowledge, skills and abilities while focusing on industrial and commercial finish carpentry skills. It is an alternate path requirement for program of study candidates for Industrial & Engineering. Emphasis is placed upon advanced carpentry skills, techniques, and career development. The course is a lecture/lab which means that it shall be done in the classroom and shop area. Eligible for CRLE.

Recommended classes for CST students:

Students are encouraged to actively pursue coursework in CAD/CAE/CAM, Design, Math, Geometry, and Science to develop a stronger background from which to apply the skills and knowledge that they gain in Industrial & Engineering Systems classes.

Application Instructions

1. Pick up application packet from instructors
2. Complete program of study checklist
3. Complete exit interview and review checklist with instructors

Requirements to receive a Completion Certificate, Graduation Stole:

- ✓ Earn an 80% B or higher in all required Engineering and Construction courses within the program.
- ✓ A minimum score on a final performance evaluation. This may be a summative exam, capstone project, or a performance task.
- ✓ A minimum of three required credits, consisting of the required components for each area as well as a number of optional courses.
- ✓ Complete application and turn in prior to deadline of graduation year. **Deadline for 2017 seniors is *March 23, 2017.***
- ✓ Submit a one-page reflection essay on the Industrial & Engineering Systems program and your future plans.

Industrial and Engineering Systems

Applicant _____ Id. No. _____ Graduation Year _____

Application Deadline: March 23, 2017

Cluster Skill Set Name Applying for: *(check all that apply)*

- Engineering **NOCTI** Date Taken _____ Score _____ *(60% passing)*
 Construction **NCCER** Date Taken _____ Score _____

Official transcript required *(attach in a sealed envelope)*.

Additional Requirements Listed Here

Engineering <i>Must complete 3 credits below (required + optional).</i>			
Course Name	<i>Course Credit:</i>	Required or Optional For CTE	List semester and year completed below.
Computer-Aided Design 1A	0.5	REQ	
Computer-Aided Design 1B	0.5	REQ	
Computer-Aided Design 2	1.0	REQ	
Computer-Aided Design 3	1.0	REQ	
Intro to Robotics	0.5	OPT	
Construction <i>Must complete 3 credits below (required + optional).</i>			
Course Name	<i>Course Credit:</i>	Required or Optional For CTE	List semester and year completed below.
Introduction to Construction & Woodworking	0.5	REQ	
Construction Tech 1	1.0	REQ	
Construction Tech 2	1.0	REQ	
Construction Tech 3 – (CBSHBP)	2.0	OPT	
Advanced woodworking	0.5	OPT	

Applicant Signature

Date