

Technology Department Syllabi

Department Members

Ryan Swope

Highland High School
5942 – Technology Concepts
2009 – 2010 Course Syllabus

Instructor: Ryan Swope

Grade: 9th

Credit: 1

Prerequisites: None, however, students who have taken General Drafting/Introduction to CAD will be given preference when filling the class.

Description

This course is an exploratory study of product manufacturing, power, energy systems and related occupations. Some of the activities used in learning these systems are: Small wood and metal projects, CO2 cars, rockets, magnetic levitation vehicles and designing and building a bridge. These activities will involve student involvement and collaboration, problem solving, and brainstorming.

Course Standards

Students will:

- Gather information and communicate by creating, measuring, reading, and analyzing drawings.
- Evaluate the consequences of production-related technological inventions and innovations on people, society, culture, and the environment.
- Develop and use problem solving and decision making skills to invent, design, and modify production and transportation devices and systems.
- Identify opportunities, characteristics, and preparation requirements for current and emerging occupations in production and transportation-related industries.
- Demonstrate employability and social skills relative to careers.
- Describe intended and unintended consequences of the application of technological solutions to a variety of problems and identify appropriate and inappropriate applications of transportation technology.
- Apply core knowledge and technological concepts to solve technical problems in transportation.
- Effectively and safely use tools, machines, and materials.
- Understand that computers and software are versatile tools used to collect, organize, process, and communicate information and ideas.
- Interact effectively and work cooperatively with persons from diverse ethnic and cultural backgrounds.
- Develop strategies and work habits that will lead to success and prepare the student for a future in a technological world.
- Effectively use interpersonal and productive team member skills.
- Apply concepts from mathematics, science, and communications in the context of technology education.
- Identify and analyze transportation-related technological systems and sub-systems and their interaction.
- Evaluate the consequences of transportation-related technological inventions and innovations on people, society, culture, and the environment.
- Identify and become aware of ways transportation-related technology has been used to meet human needs in the home, at school, in the community, and at the workplace.

210110 – Conceptual Engineering Technology
Credit: 1
Prerequisite: CADD I: Technology Design & Applications I
Grade(s): 11, 12

Teacher Info:

Ryan Swope

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Description

This is a combination course including Computer Integrated Manufacturing and Civil Engineering and Architecture. Computer Integrated Manufacturing is course that applies principles of robotics and automation. The course builds on computer solid modeling skills developed in Introduction to Engineering Design, and Design and Drawing for Production. Students use CNC equipment to produce actual models of their three-dimensional designs. Fundamental concepts of robotics used in automated manufacturing, and design analysis are included. Civil Engineering and Architecture is a course that provides an overview of the fields of Civil Engineering and Architecture, while emphasizing the interrelationship and dependence of both fields on each other. Students use state of the art software to solve real world problems and communicate solutions to hands-on projects and activities. This course covers topics such as: The Roles of Civil Engineers and Architects, Project Planning, Site Planning, Building Design, and Project Documentation and Presentation.

Course Standards

Students will:

- Demonstrate the ability to store, retrieve copy, and output drawing files depending upon system setup.
- Utilize instructor identified 2D computer sketching functions.
- Incorporate various coordinate systems in the construction of 2 D geometrical shapes.
- Calculate the x and y coordinates given a radius and angle.
- Identify the axis relative to various CNC machines.
- Contrast open and closed loop control systems.
- Identify the types of drive systems used in CNC machines.
- Use the CNC control program to indicate the machine position and then contrast that position to the relative position of the part origin (PRZ).
- Identify and explain the function of the major components of a CNC machine tool.
- Examine and apply various work holding devices commonly used for CNC machining.
- Identify various types of tool changers used in CNC machine tools.
- Define the three primary axes used in CNC machining and explore the remaining axes used in advanced machining.
- Explain the importance of cutting tool materials and how they affect the speed and feed rates used by machine tools.
- Examine different types of tool holding devices used in CNC machine tools.

Highland High School
598503 – Special Topics in Technology Education:
Manufacturing
2008 – 2009 Course Syllabus

Instructor: Ryan Swope, 815-2661, ryan.swope@fortthomas.kyschools.us
Grade: 10, 11, 12
Credit: 1
Prerequisites: None

Description

Manufacturing Technology is a broad based course in the technical/vocational fields. The course requires experience in both metals and woods laboratory as well as time in the CAD lab during a unit on production design. The content includes the study of and use of the materials, processes, tools and machines associated with manufacturing systems. The content also includes product research, design and engineering, as well as organization, operation, and management of a manufacturing enterprise. Opportunities are provided to apply problem solving and critical thinking skills through the development of various products. Although not required it would be beneficial to take the Production, Power and Energy course prior to taking Manufacturing Technology.

Course Standards

Students will:

- Apply concepts from mathematics, science, communication, social studies, and the arts in the context of contemporary manufacturing technology.
- Develop competencies in the safe and efficient use of the tools, machines, materials, and processes of manufacturing.
- Identify opportunities, characteristics, and preparation requirements for the current and emerging occupations in manufacturing.
- Engage in meaningful, hands-on and conceptual technology-based activities.
- Become discriminating consumers of products and services.
- Demonstrate proficiency in the safe and efficient use and care of equipment and materials.
- Use problem solving and critical thinking skills to identify, evaluate and product appropriate solutions to specific manufacturing problems.
- Demonstrate and understand of the design and production processes related to manufacturing.
- Demonstrate skill in reading and applying information contained in technical drawings.

Textbook

Metalwork, Technology and Practice, 9th Edition, Glencoe/McGraw-Hill, 2004

Highlands High School
598503 – Technology Design and Applications II
2008-2009 Course Syllabus

Instructor: Ryan Swope
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Grades: 11-12

Credit: 1

Prerequisite: None, however, students who have taken General Drafting/Introduction to CAD will be given preference to filing for this class.

Description: In this course students will build upon existing computer skills through daily use of Computer Aided Drafting software. This course is an advanced level course using the AutoDesk Inventor software. 3-D drafting techniques are used in all fields of design, and this course provides the student with a very desirable skill. Topics include learning to think in three dimensions, the creation of 3-D objects, as well as standard drafting versus 3-D techniques. Students will complete this course with the ability to design and create 3-D objects, then present them as picture images and design prints. Students will apply mathematics, writing, drafting and detailed dimensioning in the design of various products for the use in a manufacturing or architectural setting. Students will also learn how to design an automated presentation using special automation software.

Highlands High School and the Computer Aided Drafting Program at Gateway Community and Technical College have entered into an articulation agreement. The agreement states that a student taking the Engineering and Design II course with Ryan Swope, completes with a B proficiency level, and enrolls at Gateway Community and Technical College within three years of high school graduation, will be eligible to receive 4 college credits for DFT 122 Introduction to Computer Aided Drafting.

This is a total tuition savings of \$484 and 4 credit hours within the following programs at Gateway:

Computer Aided Drafting Program: Associates Degree- Mechanical Drafter Option
Diploma- Mechanical Drafter Option

Course Standards:

Students will:

- Apply knowledge and understanding of basic computer aided drafting.
- Develop knowledge and understanding of concepts of CAD mechanical and architectural drawing techniques.
- Engage in conceptual based computer aided drafting activities.
- Demonstrate skill of gleaning information from working drawings.
- Apply concepts from mathematics, science, and communications in the context of computer-aided drafting.
- Demonstrate employability and social skills relative to CAD careers.

Textbook: *AutoCAD LT[®] 2004: A Problem-Solving Approach*, 2004, First Edition, Sham Tickoo, autodesk Press, ISBN 1-4018-5134-7.

Highlands High School
5980 –Technology Design and Applications I
2008 - 2009 Course Syllabus

Instructor: Ryan Swope (859) 815-2661, ryan.swope@fortthomas.kyschools.us
Grade: 10th, 11th, 12th
Credit : 1
Prerequisites: none

Description

In this course, students will learn the fundamental principles of mechanical and architectural drawing. They will begin the year doing assignments on a mechanical drafting machine and will progress to drawing projects on a computer using CAD software. This is the first year to combine General Drafting and CAD, so it is a transition year. This course introduces basic drafting skills, equipment, and applications. Topics include sketching, measurements, lettering, dimensioning, geometric construction, orthographic projections and pictorials drawings, sections, and auxiliary views. Upon completion, students should be able to understand and apply basic drawing principles and practices.

Highlands High School and the Computer Aided Drafting Program at Gateway Community and Technical College have entered into an articulation agreement. The agreement states that a student taking the Introduction to Engineering and Design I course with Ryan Swope, completes with a B proficiency level, and enrolls at Gateway Community and Technical College within three years of high school graduation, will be eligible to receive 4 college credits for DFT 102 Drafting Fundamentals.

This is a total tuition savings of \$484 and 4 credit hours within the following programs at Gateway:

Computer Aided Drafting Program: Associates Degree- Mechanical Drafter Option
Diploma- Mechanical Drafter Option

Course Standards

Students will:

- Define specific drafting terms.
- Sketch and letter according to established drafting standards.
- Draw using mechanical drafting tools.
- Dimension all drawings to proper size and location.
- Solve spacial design problems graphically.
- Open, set up and run a CAD system.
- Print drafting size drawings.

Textbook

MECHANICAL DRAWING, Board and CAD Techniques, 13TH Edition, Glencoe/McGraw-Hill, 2007