

SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS CAREER CLUSTER

5220 INTRODUCTION TO ENGINEERING DESIGN

Grade: 9 - 12

Credit: 1

Prerequisite: None

Counts as college credit – see Tech Prep section (pg. 104)



Performing scientific research and professional technical services.

This course teaches problem-solving skills using a design development process. Models of product solutions are created analyzed and communicated using solid modeling computer design software. Emphasis is placed on technical illustrations. Examples of equipment used are: technical drafting instruments, computers, CAD software, printing equipment, 3-D printing and prototyping. This course is recommended for students pursuing engineering major. This course is a part of a national pre-engineering “Project Lead The Way” curriculum.

5215 PRINCIPLES OF ENGINEERING

Grade: 9 - 12

Credit: 1

Prerequisite: Recommended Introduction to Engineering Design



Performing scientific research and professional technical services.

This course helps students understand the field of engineering/engineering technology. Exploring various technology systems and manufacturing processes help students learn how engineers and technicians use math, science and technology in an engineering problem solving process to benefit people. The course also includes concerns about social and political consequences of technological change.

5205 DIGITAL ELECTRONICS

Grade: 10-12

Credit: 1

Prerequisite: Algebra I & Introduction to Engineering Design

Counts as college credit – see Tech Prep section (pg.104)



Performing scientific research and professional technical services.

This course is designed to teach you about applied logic, which introduces you to the basics of electronics and digital systems – the building blocks to many products you use. The course is designed to expose students to engineering design and troubleshooting techniques that are used in the electronics field. Computer simulation software is used to design and test digital circuitry prior to actually constructing them in order to see if the circuits work. The projects are traditional, such as those found in watches, digital cameras, and calculators to combinational logic using SSI chips to small subsystem implementation in programmable devices, in which you will learn how machines “think.” You will also learn a systematic approach that engineers use to design the electronics that is used every day.

5230 CIVIL ENGINEERING AND ARCHITECTURE

Grades: 10-12

Credit: 1

Prerequisite: Introduction to Engineering Design, or Principles of Engineering

This course provides an overview of the fields of Civil Engineering and Architecture, while emphasizing the interrelationship and dependence of both fields of 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:

- o The Roles of Civil Engineers and Architects
- o Project Planning
- o Site Planning
- o Building Design
- o Project Documentation and Presentation



Performing scientific research and professional technical services.

5255 COMPUTER INTEGRATED MANUFACTURING

Grades: 10-12

Credit: 1

Prerequisite: Introduction to Engineering Design

This course builds on computer solid modeling skills developed in Introduction to Engineering Design course and applies principles of robotics, automation and CAD design. Students use CNC equipment to produce actual models of their three dimensional designs, while incorporating fundamentals concepts of robotics used in automated manufacturing, and design analysis.



Performing scientific research and professional technical services.

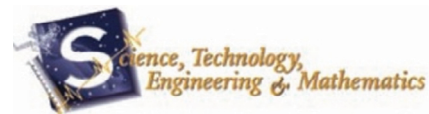
5240 ENGINEERING D & D

Grades: 11-12

Credit: 1

Prerequisite: Civil Engineering and Architecture, and/or Computer Integrated Manufacturing: Must have teacher approval.

This is an engineering research course in which students work in teams to research, design and construct a solution to an open-ended engineering problem. Students apply principles developed in the four preceding courses and are guided by a community mentor. They must present progress reports, submit a final written report and defend their solutions to a panel of outside reviewers at the end of the school year.



Performing scientific research and professional technical services.

5245 ENGINEERING DESIGN AND PRESENTATION

Grades 10-12

Credits: 1 (*Counts as science credit*)

Prerequisite: Introduction to Engineering Design



Performing scientific research and professional technical services.

Students enrolled in this class will demonstrate knowledge and skills of the process of design as it applies to the engineering fields. Students will utilize both the engineering design process as well as the scientific process to develop drawings, solid models, and prototypes. Students will transfer advanced academic skills to designs, as well as explore career opportunities in the engineering, technology and drafting fields with the ability to communicate what is needed to gain and maintain employment in these areas.

5250 ENGINEERING MATHEMATICS

Grades 11-12

Credits: 1 (*To be used as 4th year Math credit. Must have completed 3 Math credits*)

Prerequisite- Algebra-I



Performing scientific research and professional technical services.

Engineering mathematics is a course where students solve and model robotic design problems. Students use a variety of mathematical methods and models to represent and analyze problems involving data acquisition, spatial applications, manufacturing processes, materials, engineering mechanical drives, pneumatics, and process control systems through the development of programmable and tethered robotic devices. Refer to page 48 - 50.

4650 TECHNOLOGICAL PRINCIPLES (Analytical Physics)

Grade: 11 - 12

Credit: 1 (*Counts as science credit*)

Prerequisite: Biology, IPC (or Chemistry), Algebra I



Performing scientific research and professional technical services.

This is a laboratory-based course that allows the students to put the principles of physics into laboratory activities. This course is for the student who might not enroll in a traditional physics course but needs to be prepared for a technical degree or career. Students will be involved in laboratory activities at least 40% of the class time. Exercises in using and controlling mechanical systems, fluid systems, electrical systems and thermal system are emphasized.

0030 INDEPENDENT STUDY/MENTORSHIP

Grade: 10-12

Credit: 1 (May count as a science credit)

Prerequisite: Approval and Application Required

Counts for AP grade points and as a 4th year science credit

Seniors may not enroll in ISM during the Spring semester of senior year.



Performing scientific research and professional technical services.

This course known as ISM allows academically advanced junior and senior students an opportunity to conduct career and science research investigations through an independent study mentorship. Student conducts empirical research under the guidance of a teacher facilitator and mentor. Students must be self-motivated and have transportation to visit off-campus mentors.

ISM is currently offered at FHS in two (2) different ways.

1) PreAP Chemistry students may concurrently enroll in ISM during “zero” hour, before school to research a topic. Sophomores taking Pre AP Chemistry may consider this option of ISM.

Independent Study Mentorship (ISM): Science Fair Info Sheet

Rationale

This Independent Study Mentorship (ISM) is designed for self-motivated students with a desire to develop their Independent Science Fair Research Project at a higher level. All Science Fair ISM students will research, design, and present an Independent Science Fair Project in conjunction with their Pre AP Chemistry course. The ISM class allows students to work with experts in various fields, acquiring practical knowledge and hands-on experience. It also presents students an opportunity to accept the type of responsibility that is usually only given to college students and business professionals.

*Facilitator: Theresa Lawrence; Only available to Pre AP Chemistry students during 0 hour

*Students are required to log 140 hours (outside of Pre AP Chemistry class time) as they develop and complete a senior level science fair project under the guidance of a mentor

*Applications are given out in Pre AP Chemistry classes

*Full year science credit (part of 4X4); Not on schedule or report card until class is completed at end of year; Many grades also count in PAP Chemistry class

*If grade of 80+ then one DAP measure is gained; Grade carries AP points for class rank determination

*Students meet with facilitator in a prescheduled one on one meeting for 15 minutes before school once every 2 weeks. Other 45 minute mandatory meetings (general instructions, science fair process, research techniques, etc) are scheduled at 7:30 am throughout the year.

*Before school commitments (Band, Clinical, etc) are scheduled around as much as possible. Usually Friday mornings are clear for band members at 7:30/7:45 during marching season, so band students have Friday ISM meeting times.

*A full listing of ISM requirements and time schedules will be given to Pre AP Chemistry students the first week of school and a parent meeting will be scheduled to discuss the details

2) ISM is also offered as a regular AP course. Choose the course # on the option sheet and follow usual course request procedures. This course meets the requirements for the original research/project of the Distinguished Achievement Plan

***Please Note: An application is required for enrollment. Applications are found in the counseling center.