

THE CENTER FOR ADVANCED TECHNICAL STUDIES



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www.lexrich5.org/CATS



Course Name: IED-INTRODUCTION TO ENGINEERING DESIGN

Length of Course: 1-Semester

Instructor: Mrs. Sherry Clapp

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Number of Credits: 1

Room Number: 309

Web site: www.lexrich5.org/sclapp

Prerequisite: Algebra 1 (C or better)

Course Description:

Introduction to Engineering Design (IED) is a high school engineering course in the PLTW Engineering Program. In IED, students explore engineering tools and apply a common approach to the solution of engineering problems, an engineering design process. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students' progress from completing structured activities to solving open-ended projects and problems that require them to plan, document, communicate and develop other professional skills.

NOTE: This course offers the opportunity to earn dual credit. Upon completion of the course, if your grade in the course and your score on the national end of course assessment meet the criteria set by Project Lead the Way and partnering institutions for college credit, School District Five will automatically change the weighting on your transcript to reflect dual credit. It is the responsibility of the student to contact the partnering institution for college credit. Each post-secondary institution charges a fee for awarding of credit. The student is responsible for any costs associated with the awarding of college credit. The student is also responsible for ensuring that credits earned will transfer to the institution that the student is planning to attend. The instructor of your class will provide you with specific information regarding the criteria for dual credit weighting as well as information about partnering institutions.

Instructional Goals:

Introduction to Engineering Design (IED) is a high school level course that is appropriate for 9th or 10th-grade students who are interested in design and engineering. The major focus of the IED course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards, and technical documentation. IED gives students the opportunity to develop skills and understanding of course concepts through activity, project, and problem-based (APPB) learning. Used in combination with a teaming approach, APPB-learning challenges students to continually hone their interpersonal skills, creative abilities, and their understanding of the design process. It also allows students to develop strategies to enable and direct their own learning, which is the ultimate goal of education.

The course assumes no previous knowledge, but students should be concurrently enrolled in college preparatory mathematics and science. Students will employ engineering and scientific concepts in the solution of engineering design problems. In addition, students use a state of the art 3D solid modeling design software package to help them design solutions to solve proposed problems. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges that increase in difficulty throughout the course. Students will also learn how to document their work, and communicate their solutions to their peers and members of the professional community.

Additional information about PLTW can be found at <https://www.pltw.org/our-programs/pltw-engineering>

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Textbook/ Resources

- IED PLTW curriculum will be provided online at <http://my.pltw.org>
- Assignments and Instructional videos will be provided online in Google Classroom, my.pltw.org, and possibly other resources.
- Materials:
 - Composition notebook will be provided for notes
 - Pen and pencil
 - District issued Chromebook
 - Headphones or earbuds
 - Calculator
 - Mouse will be provided for CAD work
- For home use:
 - Ruler
 - Scissors
 - Glue Stick
 - Tape - Scotch or Masking
- Course Fee: \$50.00

Scope and Sequence:

- Unit 1 Design and Problem Solving
 - 1.1 Design Basics
 - 1.2 Visualization and Solid Modeling
 - 1.3 CAD Fundamentals
 - 1.4 Product Improvement
- Unit 2 Assembly Design
 - 2.1 Put it Together
 - 2.2 Take it Apart
 - 2.3 It's a Material World
 - 2.4 Fix It
- Unit 3 Thoughtful Product Design
 - 3.1 Responsible Design
 - 3.2 More Than Parts
 - 3.3 Solve a Problem
- Unit 4 Making Things Move
 - 4.1 You've Got to Move it May
 - 4.2 The Force Be with You
 - 4.3 Automating Motion
 - 4.4 Make it Move

Assessments/Grading: Types of assessments to be used:

- **Uniform Grading Policy**
 - A= 90-100
 - B= 80-89
 - C= 70-79
 - D= 60-69
 - F= Below 60
- **Quarter Grade Weights**
 - Formative Work: 30% (HW, practice quizzes, classwork, and practice presentations)
 - Summative Assessments: 40% (quiz, exams, and final presentations)
 - Employability: 20%
 - Parent Communication: 10% (Grade sheets, emails, etc.)
 - Final Score: Q1: 40%, Q2: 40%, Final Exam: 20%
- **Formative Work:** A practice quiz regarding the formative work will be provided. Students will have multiple attempts to achieve 100.
- **Summative Assessments:** Quizzes and exams ARE BASED ON FORMATIVE work but are given as a single attempt assessment.
- **Employability** portion of the grade covers:
 - **Attendance** – Email prior to being absent will not count against the employability grade. Late buses will also not apply.
 - **Punctuality** – on time from class. Returns from breaks on time.
 - **Attitude/Cooperation** – Doing what is asked the first time.
 - **Teamwork** – Will work with every student at least once per quarter.

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- **Integrity** – Student’s word is the truth.
- **Timely** – Turns work in on time.
- **Prepared for Class** – has an engineering notebook and pen every class.
- **Respectful** – address the teacher and classmates in a respectful way. Deals with conflict
- **Safety and General Housekeeping** – Dress is appropriate. Leaves class ready for the next one.
- **Self-Management/Initiative** – Starts work without being told. Shows self-control. Is where he/she belongs (no non-class websites or games.)
- Each ½ quarter is assigned 20 points. An infraction is recorded by subtracting 1 point. Assignments marked late will result in a loss of 1 point. For example: Student not emailing before being absent, or any of the other listed objects will also result in the loss of 1 point. A comment to the employability grade will be present for points lost other than late work.
- **Parent Communication:** Approximately every 3-weeks grade sheets should be reviewed by parents with their students. An email, google form, or physical paper report will be sent home for a signature that indicates you have reviewed Powerschool regarding your student’s grades. An assignment with “0” indicates a student was absent and can make up the work without penalty. Work turned in late will be given credit but will be marked late, resulting in a reduction of the employability grade. Please contact me if you have concerns throughout the course.

Additional Information:

- **Makeup Work:** It is the responsibility of the student to make up work missed during absences. Assignments are posted on Google Classroom and shown on the agenda. If a student has an issue with accessing an assignment, they must e-mail or leave a phone message regarding their issue during the time they were to do the assignment.
- **Plagiarism** assessment (see student handbook)
- **Cell Phones** cannot be charged during class. Cell phones may only be used with teacher’s permission.
- **Food:** No food or drink can be consumed during class. Water with a resealable cap may be consumed. A small package of crackers or a small bag of chips is acceptable as a snack.
- **20/20 Rule:** Nobody leaves class within 20 minutes of the start, or end of class.
- **Public speaking** is an essential 21st Century communication skill. To help develop this skill each student will be required to present in an evening forum named “Celebrating Learning at the Center” *on Wednesday, 12/15/21, from 6-8 pm at the Center.* Students in each class will present concepts they’ve learned and projects will be demonstrated. More information to come.
- **Important Dates** –Students are required to participate in these Engineering Design and Development (2nd-year) presentation events to prepare for their future experience.
 - **October 6, 2021 - Piranha Pond (Virtual Evening Event)**
 - **January 26, 2022 - Poster Symposium Presentations (TBD Evening Event)**
 - **May 16, 2022 - EDD Final Presentation (TBD Evening Event)**
 - **Students will have to complete a make-up assignment if he/she misses an event.**
- **Final Exam** is scheduled during the week of 1/10/22. Students are required to take the National PLTW EOC and the Final Exam. Seniors may exempt the Final Exam per District policy. However, Seniors must take the National PLTW EOC.
- **Student Organizations and Competitions**
 - **Technical Student Association (TSA)** – Any student can be a member of the School’s Chapter. Selected students will participate in the competitions.