



# Walker Career Center

## Engineering Design and Development

DOE# 4828



### Course Description and Outline

Engineering Design and Development (EDD) is an engineering research course in which students work as teams and/or individuals to research, design, test and construct a solution to an open-ended engineering problem. The product development life cycle and a design process are used to guide the team to reach a solution to the problem. The team and/or individual communicates their solution to a panel of stakeholders at the conclusion of the course. As the capstone course, EDD engages students in critical thinking, problem-solving, time management and teamwork skills.

#### Course Outline

See page 3 for more details

### Teacher Information and Student Supports

**Name:** Jim Hanson

**Email:** [jhanson2@warren.k12.in.us](mailto:jhanson2@warren.k12.in.us)

**Phone:** 317-532-6165

#### Additional Supports

- Tutoring is available in S206 on Tuesdays and Thursdays after school until 3pm

### *Journey of a Graduate Skills*

#### Critical Thinking

- Produce working drawings using appropriate drawing styles and techniques.
- Formulate unbiased research questions to collect information/data.
- Apply appropriate investigative strategies.
- Evaluate sources appropriate for academic research.
- Select resources with regards to the identified problem.
- Synthesize information collected during the research process
- Brainstorm to identify problems that exist.
- Justify how the problem exists for a group of stakeholders by analyzing market research.
- Generate multiple potential solutions to a problem.
- Devise a plan for building a prototype.
- Construct an operational prototype.
- Choose testing criteria to evaluate the prototype specifications.
- Develop an unbiased prototype testing plan with qualitative and quantitative measures to test the effectiveness of the design solution.
- Establish safety protocols related to testing of a prototype.
- Justify the validity of the selected test procedures.
- Perform testing on prototype while collecting accurate data.
- Identify potential modifications to the design using collected test data.
- Evaluate proposed modifications to the design solution.
- Implement proposed modifications to the design solution.
- Refine solution until design specifications are met.
- Organize research information and data compiled throughout the design process.
- Generate visual aids to clarify data.

#### Communication

- Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire
- Explain the importance of documentation.
- Communicate design concepts using visual and written documentation.
- Utilize presentation aids to enhance and clarify the communication of a successful design solution.

- Reflect on the design process and create recommendations for possible next steps.

### Resilience

- Refine and optimize conceptual ideas into design drawings.
- Defend the validity of the data collected during testing.

### Collaboration

- Xxx

### Content Knowledge

- Demonstrate relevant safety practices when using tools and equipment as determined by task, materials, environment, and protective attire
- Identify engineering and technology occupations and the roles and responsibilities of each.
- Report job outlook, demand, and projected wages for engineering and technology careers.
- Explore job opportunities that are available in engineering and technology
- Investigate post-secondary training opportunities and industry certifications that are available
- Apply sketching and annotation skills to document work.
- Document project components into an engineering log.
- Define the problem by utilizing a Design Brief with criteria and constraints.
- Utilize a decision matrix to decide which design concepts to pursue.
- Investigate types of materials, manufacturing processes, and assembly procedures for a prototype design.
- Create designs of the proposed solution using 3D modeling software.

### Citizenship

- Discuss the ethical implications of the proposed solution and product development.

## Grade Calculation

### *MSD Warren Township Scale*

Grade	Percentage
A	92.5 - 100
A-	89.5 - 92.4
B+	86.5 - 89.4
B	82.5 - 86.4
B-	79.5 - 82.4
C+	76.5 - 79.4
C	72.5 - 76.4
C-	69.5 - 72.4
D+	66.5 - 69.4
D	62.5 - 66.4
D-	59.5 - 62.4
F	Below 59.5

## Credits/Pathways

### **CORE 40 Diploma**

Course fulfills two credits of the elective requirement for the Core 40 diploma.

### **Academic/Technical Honors Diploma**

Has potential to fulfill academic/technical honors diploma. - see counselor

### **CTE Graduation Pathway**

**Principles** – Introduction to Engineering Design (IED)

**Course A** – Principles of Engineering (POE)

**Course B** – Civil Engineering and Architecture (CEA)

Or

**Course B** – Computer Integrated Manufacturing (CIM)

Or

**Course B** – Digital Electronics (DE)

**Capstone** – Engineering Design & Development (EDD)

<b>Grading Policies</b>	<b>Types of Assignments and Assessments</b>
<p><b>Semester Grade</b> Your semester grade will be calculated in the following way:</p> <p>50% Assessments (Tests, Quizzes, Projects) 40% Labs, Homework and other assignments 10% Final Project/Exam</p> <p><b>Warren Central Grading Policy</b> The high school grading policies will be explained here</p> <p><b>Warren Central Homework Policy</b> The high school homework policies will be explained here.</p> <p><b>Synergy Grades</b> Grades posted in Synergy reflect the students' academic performance in the course.</p>	<p><b>Assignments</b> Assignments will include classwork, homework, labs, and bell work. These items are opportunities for students to practice the concepts learned in class.</p> <p><b>Labs</b> Each unit will have one or more laboratory experiments. Labs are designed to demonstrate “real world” applications of the class concepts and help students develop a deeper understanding of the learning objectives.</p> <p><b>Assessments</b> Tests/projects cover Indiana State Standards, and there will be one test per unit.</p> <p>Quizzes may be given throughout a unit. There may or may not be a quiz for each unit.</p>

<b>Course Outline</b>	<b>Course Supplies</b>
<p>Business Organizations and Management Chapters 8&amp;9</p> <p>Business Operations and Technology Chapters 10-14</p> <p>Personal Financial Management Chapters 15-18</p> <p>Subject to change</p> <p><b><u>COURSE CALENDAR</u></b></p> <p>Use Canvas Home Page</p>	<ul style="list-style-type: none"> <li>● Textbooks</li> <li>● Pencils</li> <li>●</li> <li>● etc</li> </ul>