

To: USD 261 BOE and Dr. Burke

From: Brett Marrs- Industrial Tech. Department Head

Re: Engineering Pathway

Date: November 13, 2018

**History/Relevance:** As a department we have had an interest in engineering and we don't have the classes for these students. Also using the career cruising we also see a need for these classes. This is a proposal to finish this pathway. Last year we started the pathway with the robotics class.

**What:** We are asking for approval to create 3 classes to finish the engineering pathway. Introduction to engineering, Engineering design and development, Workplace Experience

**Why:** We have started the pathway and need to finish it so that students can complete the pathway and get further training/information in the engineering field.

**Where:** Campus High School

**When:** This will begin in the 2019-2020 school year.

**How:** Once classes are approved we will start putting them into our curriculum guide, purchase materials and make them available for students to take.

**Who:** The intro class can be taught by current staff. In order to teach the upper division classes, we will need to hire another instructor to teach them or another area.

**How much:** the cost for these classes would be textbooks, and material for in class projects.

If you have any questions, please contact me at [bmarrs@usd261.com](mailto:bmarrs@usd261.com) or 554-2236.

Thank you for your consideration!

# New Course Proposal

**Proposed Course Name:** Intro to Engineering

**School:**CHS

**Target Audience:** Freshman

**Career Pathway (If applicable):** Engineering

**Funded Course:** n

**Dual Credit:** n

**Kansas Course Code:**41310

**Course Length (Sem/Yr)**1 yr

**Credits:**1

**Prerequisite:** none

**Purpose:** Creating an engineering pathway

**Justified Need:** y

**Course Description:** this is an introductory class into the engineering pathway. Students will learn the basics in the engineering process, electrical, simple machines and conclude with the building of an electro magnet.

**Expenditures:** class books and materials for projects

**Any Additional Documentation (if needed):**

41310

Introduction to Engineering(1 credit)

3 2 1 0 1. Demonstrate use of PPE including safety glasses and ear protection.

3 2 1 0 2. Understand the steps in the engineering design process.

3 2 1 0 3. Describe the effects of resistance in mechanical, electrical, fluid, and thermal systems.

3 2 1 0 4. Recognize various tools, fasteners, and joining systems employed in selected engineering processes.

3 2 1 0 5. Identify and use both standard and metric systems of measurement.

3 2 1 0 6. Recognize and follow safety rules for using lab tools and machines.

3 2 1 0 7. Describe the elements of design and apply this concept to the design process using CAD software.

3 2 1 0 8. Use sketches as a communication tool, including thumbnail, perspective, isometric, and orthographic sketches.

3 2 1 0 9. Understand Manufacturing and its processes

3 2 1 0 10. Distinguish between concepts of invention and innovation.

3 2 1 0 11. Describe engineering and explain how engineers participate in or contribute to the invention and innovation of products

3 2 1 0 12. Describe the purpose and importance of working in a team to solve an engineering problem.

3 2 1 0 13. List benefits of robot use in today's world and their impact on society.

- 3 2 1 0 14. Experience principles of flight using: kites, whirly gigs, model airplanes, hot air balloons, and/or model rockets.
- 3 2 1 0 15. State the history and development of flight exploration.
- 3 2 1 0 16. Explore how Nano-products are used in society today.
- 3 2 1 0 17. Identify the six simple machines and explain their applications.
- 3 2 1 0 18. Distinguish between the three classes of levers.
- 3 2 1 0 19. Identify the parts of an atom: protons, neutrons, and electrons.
- 3 2 1 0 20. Express how electrons transfer from one atom to another to create electron flow.
- 3 2 1 0 21. Define current, voltage, and resistance.
- 3 2 1 0 22. Clarify the properties of a magnet.

Build an electromagnet to demonstrate its characteristics and functions.

## Proposed Course

**Proposed Course Name:** Engineering, Design & Development

**School:** Campus High School

**Target Audience:** Juniors, Seniors

**Career Pathway (If applicable):** Engineering (ENGINEERING CAREER CLUSTER)

**Funded Course:** Yes

**Dual Credit:** possible

**Kansas Course Code:** 21007

**Course Length:** 2 Semester or Year

**Credits:** 1

**Prerequisite:** None

**Purpose:** Creating Engineering Pathway

**Justified Need:** Yes

**Course Description:** A comprehensive course designed to instruct students in the use of CAD design and software.

**Expenditures:** Class books and materials for projects

**Any Additional Documentation (if needed):**

21107 Drafting / CAD (1 credit)

- 4 3 2 1 0 1. Identify and demonstrate the use of CAD commands and system peripherals.
- 4 3 2 1 0 2. Demonstrate the ability to dimension drawings on the CAD system.
- 4 3 2 1 0 3. Demonstrate proficiency in setting limits and scale on the CAD system.
- 4 3 2 1 0 4. Demonstrate proficiency in setting, turning on and turning off layers.
- 4 3 2 1 0 5. Create standard drawings for templates.
- 4 3 2 1 0 6. Demonstrate the ability to create drawings in 3D.
- 4 3 2 1 0 7. Demonstrate the ability to load, store files, and transport files via Internet.
- 4 3 2 1 0 8. Place text on a drawing and be able to change to different font styles, sizes and angles.
- 4 3 2 1 0 9. Be proficient in the use of printer/plotter operations.
- 4 3 2 1 0 10. Demonstrate ability to place text on a drawing and change to different font styles, sizes and angles.
- 4 3 2 1 0 11. Demonstrate ability to dimension drawings on the CAD system.
- 4 3 2 1 0 12. Demonstrate proficiency in setting limits and scale on the CAD system.
- 4 3 2 1 0 13. Construct drawings using straight line, circle, and hidden line statements, etc.
- 4 3 2 1 0 14. Construct isometric and 3D drawings.
- 4 3 2 1 0 15. Set grid and snap specifications.
- 4 3 2 1 0 16. Define and use commands to modify a drawing.
- 4 3 2 1 0 17. Use symbols (from a symbol library) in a drawing.

## New Course Proposal

**Proposed Course Name:** Work place Experience

**School:** Campus High School

**Target Audience:** Juniors, Seniors

**Career Pathway (If applicable):** Engineering (ENGINEERING CAREER CLUSTER)

**Funded Course:** Yes

**Dual Credit:** possible

**Kansas Course Code:** 21048

**Course Length:** 2 Semester or Year

**Credits:** 1

**Prerequisite:** technical level class

**Purpose:** Creating Engineering Pathway

**Justified Need:** Yes

**Course Description:** This is a course design to let the students get on the job training in the engineering field.

**Expenditures:** none

**Any Additional Documentation (if needed):**

21048

Workplace Experience

3 2 1 0 1. Employ effective listening skills when working with client.

3 2 1 0 2. Employ customer service principles when working with consumers.

3 2 1 0 3. Evaluate and follow-up on customer service provided.

3 2 1 0 4. Employ safety skills and equipment usage in appropriate ways.

3 2 1 0 5. Be aware of MSDS (Material Safety Data Sheets) and other safety resources and employ those resources as required for the workplace.