James Clemens High School
11306 County Line Road
Madison, AL 35756

Phone: 256-216-5313
Extension: 95119
Email: aeepperson@madisoncity.k12.al.us

Course Syllabus
Principles of Engineering Fall 2022
Instructor: Allison Epperson

Dear Parent/Guardian,

Welcome to Principles of Engineering!

My name is Allison Epperson and I will be your student's PoE teacher this semester. It is my second year at JC, and I am so happy to be teaching PoE again! This engineering class is full of math, science, and creativity. If you have any questions or concerns at any point during the semester, please feel free to reach out to me. Please submit this page of the syllabus on Schoology by Friday, August 5th.

Thank you,
Allison Epperson

My child and I have read and discussed the classroom syllabus.

Student Name (Print) _____ Date _____

Student Signature _____ Date _____

Parent/Guardian Name (Print) _____ Date _____

Parent/Guardian Signature _____ Date _____

Email Address(es) _____

Phone number(s) _____   _____   _____
  Cell   Home   Work

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Course Description: Designed for 10th or 11th grade students, this survey course exposes students to major concepts they'll encounter in a post- secondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, document their work and communicate effectively.

Pre-Requisites:
Introduction to Engineering Design

Co-Requisites:
Algebra II with Statistics or Algebra II with Trigonometry

Credentialing:
Students become familiar with VEX V5 software and LoggerPro in this course. Student progress is tested with the PLTW EOC Exam.

Grading and Assessment: Test grades will account for 70% of the 9-weeks grade, with the remaining 30% being determined by quiz/daily grades. The grading scale is as follows: A (90-100%), B (80-89), C (70-79), D (65-69), and F (below 65). Grades will be a reflection of mastery of the standards. Make sure all absences are excused as class work can be made up and graded for excused absences only. The final exam counts for 20% of the final grade

Not all assignments will be graded, but students must complete all work. Students will take notes via guided notes, graphic organizers, and other methods in this course. If a student is absent, their missed printed materials will be kept with Ms. Epperson. Students are responsible for checking Schoology when absent. Students complete pre-tests in most units for participation grades and post-tests for accuracy test grades.

Professionalism Points Procedure:
- Students get 5 professionalism points a week in the TEST category. Students are subject to lose them if they break classroom procedures or rules. I can take 1 or all of them away, depending on the offense.
- Generally, if students are respectful and behave, this is nothing to worry about.

Late/ Make-Up Work: Per JCHS Policy. All late work is to be submitted within 7 days of absence. Students must submit their late work online to the proper Schoology Assignment AND submit a "Late Work Form" Submission to receive credit. The late work form is checked every 2 weeks and student grades are updated then.

TSA (Technology Student Association) CTS Integration: Technology Student Association is a National Career Technical organization where students can use knowledge gained from Engineering courses. JCHS's team competes at Alabama TSA convention every year and builds a robot based on the VEX robotics competition at state convention.

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Embedded Numeracy Anchor Assignment: Students will calculate moment of inertia and research values for modulus of elasticity, then use those values to calculate beam deflection. Students will use their knowledge of proportions in mathematics to describe how modulus of elasticity and moment of inertia affect beam deflection.

Embedded Literacy Anchor Assignment: Throughout the semester, students will complete career-focused assignments. At the end of the semester, students will use knowledge gained to conduct independent research on their chosen engineering discipline, and write a reflection paper on this field.

Accommodations: Requests for accommodations for this course or any school event are welcomed from students and parents.

Turnitin Notice: The majority of writing assignments in this course will be submitted to Turnitin via the Schoology learning platform. The primary focus of this software is to help students become better writers and scholars. Turnitin generates a report on the originality of student writing by comparing it with a database of periodicals, books, online content, student papers, and other published work. This program will help students discern when they are using sources fairly, citing properly, and paraphrasing effectively - skills essential to all academic work.

Students will have the opportunity to review their Turnitin originality report and will have the opportunity to make revisions before submitting their work for grading. Once their work is submitted, teachers have the opportunity to view the student's originality report and grade accordingly.

Supplies:

School Chromebook	1 or 1.5 Inch Binder
Provided Engineering Paper	Pencils

Procedures
My Rules:
1. ALWAYS TREAT OTHERS WITH RESPECT. WE DO NOT MAKE OFFENSIVE JOKES IN CLASS.
2. DO NOT THROW THINGS ACROSS THE ROOM.
3. DO NOT WASTE VEX MATERIALS.
4. DO NOT SPEAK OVER ME WHEN I AM TEACHING.
5. DO NOT LEAVE MATERIALS OR YOUR THINGS ON MY TABLES WHEN YOU LEAVE.
   Any breaking of rules can result in deduction of professionalism points.

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Technology in the Classroom:
- Bring your school Chromebook or personal computer and charger EVERY DAY. WE WILL USE IT EVERY DAY.
- You should know when it is appropriate to use your phone and when it is not.
- No phones out during presentations, but you can use them for quick googling.
    - CONSEQUENCE: I have phone jails to give you. If you get one, you must wrap your phone in it and tape it shut until the end of class.

Computer/Internet Appropriate Use Policies: Student laptops should not be hard-wired to the network or have print capabilities. 2. Use of discs, flash drives, jump drives, or other USB devices will not be allowed on Madison City computers. 3. Neither the teacher, nor the school is responsible for broken, stolen, or lost laptops. 4. Laptops and other electronic devices will be used at the individual discretion of the teacher.

Instructional Delivery Plan

| **18 Week Plan***| | |
Week	**Section(s)**	**Topic**
Week 1	1.1.0-1.1.2	Introduction/ Engineering Career/ Simple Machines
Week 2	1.1.2-1.2.2	Simple Machines/Energy Sources
Week 3	1.2.2- 1.2.6	Electricity/ Circuits/ Efficiency and Power
Week 4	1.3.1-1.3.3	Solar Hydrogen Systems/Fuel Cell Technology/Thermodynamics
Week 5	1.3.4-1.4.4	Renewable Insulation/Energy and Power Design Projects
Week 6	2.1.1-2.1.3	Statics: Centroids/ Beam Deflection/ Free Body Diagrams
Week 7	2.1.3-2.1.6	Free Body Diagrams/Moments
Week 8	2.1.7-2.3.2	Trusses/Material Properties/Material Testing
Week 9	2.4.1	Structural Design (Design Problem)
Week 10	3.1.1-3.1.3	Programing Basics
Week 11	3.1.3-3.1.7	Programming Cont.
Week 12	3.1.7-3.2.3	Programming Cont. /Fluid Power
Week 13	3.2.4-3.3.1	Fluid Power/ Control Systems (Design Problem)
Week 14	3.3.1	Fluid Power/ Control Systems (Design Problem)
Week 15	4.1.1-4.2.2	Statistics/ Kinematics
Week 16	4.2.2-4.2.3	Kinematics/ Final Design Problem
Week 17		Review/ Tie up loose ends EOC
Week 18		Review/Final Exam

**These dates are subject to change at any point in the semester.

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Course Goals/ Objectives

Computational and Analytical Skills
• Sketch a free body diagram with more than one pair of forces
• Justify the validity of entries in a given decision matrix
• Solve for unknown variables in a combination circuit given other components
• Calculate the location of a shape's centroid
• Solve for the magnitude of a vector
• Solve for external and internal forces in a given truss
• Determine the modulus of elasticity and elastic limit from tensile test data
• Determine the yield, tensile, and ultimate strengths from tensile test data
• Analyze graphical data from beam deflection
• Use Kirchhoff's Law to calculate current, resistance, and voltage in a circuit
• Write programming code for a project involving a sequence or system of tasks
• Use a variety of methods for identifying and correcting bugs in a program code
• Calculate the unknown variable for a system that has been subject to a change of state using the gas laws
• Use Bayes' theorem to calculate the probability of an event based on past events
• Calculate the initial velocity of a projectile and the angle it is launched
• Determine an unknown quantity in a formula when most of the other variable values are provided and one value requires an additional calculation such as addition, unit conversion, or rearrangement of the formula

Professional Skills
• Team collaboration
• Project management
• Problem-solving
• Communication skills
12.2020
• Presentation skills
• Technical writing

Tools and Software
• VEX Robotics platform
• Logger Pro- Data collection and analysis software
• ROBOTC- Robot programming language

Course Knowledge
• Careers
• Engineering disciplines
• STEM careers related to engineering
• Professional ethics
• Energy and Power
• Mechanisms and simple machines
• Mechanical advantage
• Energy sources and applications
• Materials and Structures
• Vectors, forces, and statics
• Trusses
• Material properties
• Centroids
• Tensile testing
• Control Systems
• Machine control
• Programming
• Sensors and motors
• Fluid Power – hydraulics and pneumatics
• Statistics and Kinematics
• Statistics
• Kinematics

Engineering Design Experience
• Exhibit professional skills needed to successfully contribute to work in a team
• Determine how to proceed through possible alternate routes of a design process
• Improve a system design that converts electrical energy to mechanical energy
• Modify the design of a fuel cell project to increase the efficiency of the system
• Defend an insulation design considering the three modes of heat transfer
• Interpret data to make conclusions about insulation design effectiveness
• Justify material choice in the design of a solution
• Improve the efficiency of a solution by modifying hardware and software
• Justify the use of either a hydraulic or pneumatic system in a problem