Engineering Concepts Syllabus

Academy of Richmond County High School - Room 407

Instructor: Mr. Israel Butler, M.Ed.
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Office Hours: Monday through Friday, 8:00 AM - 9:00 AM and 3:15 PM - 4:00 PM

Course Description

Engineering Concepts is the second course in the Engineering and Technology Pathway. Students will learn to design technical solutions to engineering problems using a whole systems approach to engineering design. Students will demonstrate the application of mathematical tools, teamwork, and communication skills in solving various design challenges while maintaining a safe work environment.

Required Materials

- One-to-one laptops (required in class daily)
- Notebook and writing utensils
- Access to school-provided software and tools (CAD software, Microbits, etc.)

Grading Policy

- **Major Assignments (40%)**: Projects, Presentations, and Exams
- **Minor Assignments (60%)**: Quizzes, Lab Activities, Coding Activities, Journals

Classroom Policies

Attendance and Participation

Regular attendance and active participation are crucial for success in this course. Students are expected to be on time and prepared for each class.

Cell Phone Policy

Per district guidelines, cell phones and other mobile devices are not allowed during class time. Devices should be turned off and stored away. Any violation of this policy will result in disciplinary action as outlined by the district.

Laptop Use

Students are required to bring their one-to-one laptops to class every day. Laptops should be charged and ready for use at the beginning of each class. Students will use laptops for research, coding activities, and project work.

Course Outline

Unit 1: Introduction to Engineering Design

- Overview of engineering disciplines and career pathways
- Engineering design process and safety standards
- Problem identification, brainstorming, and research

Unit 2: Materials Science

- Properties of materials
- Material selection and testing
- Practical applications in engineering

Unit 3: Mechanics and Structures

- Principles of mechanics: force, work, energy
- Structural analysis and design
- Hands-on activities with structural kits

Unit 4: Electronics and Circuits

- Basic electrical concepts: voltage, current, resistance
- Circuit design and programming with Microbits
- Real-world applications and projects

Unit 5: Computer-Aided Design (CAD)

- Introduction to CAD software
- Creating technical drawings and 3D models
- 3D printing and prototyping

Unit 6: Robotics and Automation

- Basics of robotics and automation

- Building and programming robots
- Drone technology and applications

Unit 7: Energy and Power

- Principles of energy conversion
- Renewable energy sources
- Projects using smart home kits and Bluetooth speaker kits

Unit 8: Project-Based Learning and Capstone Project

- Group projects solving real-world engineering problems
- Applying design, analysis, and testing
- Presentation and documentation of projects

Communication

Feel free to reach out to me via email at Butleis@richmond.k12.ga.us. I will respond to emails within 24 hours on weekdays. For in-person discussions, please visit me during office hours.

Note to Parents and Students: This syllabus serves as a guide for the course and may be subject to changes. Any changes will be communicated in class and via email.

This syllabus outlines the key components and expectations for the Engineering Concepts course. Please let me know if you need any additional information or adjustments.