

# **Engineering Applications Syllabus**

**Academy of Richmond County High School - Room 407**

**Instructor: Mr. Israel Butler, M.Ed.**

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**Office Hours:** Monday - Friday, 8:00AM - 9:00AM and 3:15PM - 4:00PM

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## **Course Description**

Engineering Applications is a third-year engineering course designed to deepen students' understanding and application of the engineering design process. Students will develop solutions to technological problems using a combination of engineering software and prototype production processes. The course includes market research, cost-benefit analysis, and the creation of design, marketing, and business plans. A capstone project will demonstrate students' knowledge and prepare them for future opportunities in engineering.

## **Required Materials**

- One-to-one laptops (required daily)
- Engineering notebook
- Pens, pencils, and a ruler
- Calculator

## **Course Outline**

### **Semester 1:**

- 1. Unit 1: Advanced Engineering Design Process**
  - Introduction and review of the design process
  - Case studies and real-world applications
  - Hands-on projects and iterative design
- 2. Unit 2: CAD and 3D Modeling**
  - Advanced CAD techniques and 3D printing
  - Design challenges and model testing
- 3. Unit 3: Electronics and Circuit Design**
  - Principles of electronics and circuit design
  - Smart home system project
- 4. Unit 4: Robotics and Automation**
  - Robotics principles and programming
  - Autonomous robot design and competition

## **Semester 2: 5. Unit 5: Material Science and Testing**

- Properties and testing of materials
- Material selection for engineering projects
  
- 6. **Unit 6: Advanced Manufacturing Techniques**
  - CNC machining and laser cutting
  - Product design and manufacturing optimization
- 7. **Unit 7: Renewable Energy Systems**
  - Study and design of renewable energy systems
  - Solar-powered device project
- 8. **Unit 8: Capstone Project**
  - Comprehensive project integrating course concepts
  - Final presentation and demonstration

## **Grading Policy**

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

## **Cell Phone Policy**

In accordance with district policy, cell phones and other mobile devices are not allowed in class. Students must keep their devices turned off and stored away during class time. Violations of this policy will result in disciplinary action.

## **Class Expectations**

- **Attendance:** Regular attendance is crucial for success in this course.
- **Participation:** Active participation in class discussions and group projects is expected.
- **Assignments:** Complete and submit all assignments on time.
- **Respect:** Show respect for your peers, instructor, and classroom environment.

## **Communication**

For questions or additional help, please contact me via email at [Butleis@richmond.k12.ga.us](mailto:Butleis@richmond.k12.ga.us). I am available during office hours, Monday through Friday from 8:00AM to 9:00AM and 3:15PM to 4:00PM.

Looking forward to an exciting and productive year in Engineering Applications!

**Mr. Israel Butler, M.Ed.**