Welcome to Engineering Marvel Mania, Semesters 1 & 2

This course is meticulously designed to align with state standards and targeted learning objectives, ensuring comprehensive coverage of essential knowledge and skills required for student success.

Course Description:
Step into the exciting world of innovation and design with **Engineering Marvel Mania**, a self-paced high school course that introduces students to the diverse and dynamic field of engineering. Through hands-on projects and real-world challenges, you'll explore key disciplines like mechanical, civil, and electrical engineering while learning to apply scientific principles and creative thinking.

This course emphasizes teamwork, problem-solving, and ingenuity as you design, build, and refine your own engineering marvels. Get ready to ignite your passion for engineering and develop critical skills that pave the way for future success.

Semester 1: Foundations of Engineering
In Semester 1, students focus on the foundational principles of engineering. They will explore the engineering design process, mechanical systems, and civil engineering through engaging projects and challenges.

Syllabus
Unit 1: Introduction to Engineering
- The engineering process: from concept to creation.
- Overview of engineering disciplines.
- Real-world applications and engineering ethics.

Unit 2: Mechanical Engineering
- Understanding forces, motion, and energy transfer.
- Building simple machines and mechanical systems.
- Designing and testing a mechanical project (e.g., catapult or wind turbine).

Unit 3: Civil Engineering
- Fundamentals of structures and materials.
- Exploring bridge and skyscraper design.
- Collaborative project: constructing a model structure to withstand stress tests.

Learning Outcomes for Semester 1
By the end of Semester 1, students will:
1. Understand the engineering process and its applications.
2. Demonstrate foundational knowledge of mechanical and civil engineering.
3. Design, build, and test mechanical and structural projects.
4. Develop critical thinking and teamwork skills through collaborative challenges.

Semester 2: Advanced Engineering Concepts
In Semester 2, students delve deeper into the world of engineering, exploring electrical engineering and interdisciplinary projects. The semester culminates in a team-based challenge that integrates all learned disciplines.

Syllabus
Unit 4: Electrical Engineering
- Basics of circuits, electricity, and electronics.
- Working with sensors and motors.
- Creating a functioning electronic system (e.g., alarm or robotic arm).

Unit 5: Team Engineering Challenge
- Integrating mechanical, civil, and electrical engineering concepts.
- Developing prototypes and presenting solutions to real-world problems.
- Refining designs based on testing and feedback.

Learning Outcomes for Semester 2

By the end of Semester 2, students will:

1. Understand basic principles of electrical engineering and circuitry.
2. Apply interdisciplinary engineering skills to create innovative solutions.
3. Work effectively in teams to design, prototype, and refine complex systems.
4. Gain confidence in presenting technical projects and solving real-world challenges.

Conclusion

Engineering Marvel Mania combines creativity, teamwork, and innovation to offer a thrilling introduction to engineering. Whether designing mechanical systems, constructing stable structures, or creating electronic devices, students will develop skills to solve complex challenges and turn their ideas into reality. Join the course and build your engineering legacy today!