

Course Title:	Intro to Engineering
Grade(s):	9-12

Course Description
In this introductory course, students develop problem-solving skills, with emphasis placed on the concept of developing a 3-D model or solid rendering of an object through the use of a Computer-Aided Design system. Students focus on the application of visualization processes and tools to solve an engineering problem. This course will emphasize the design development process of a product and how a model of that product is produced, analyzed, and evaluated using a Computer-Aided Design System.
Approved Curricular Materials/Textbook(s)

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Shop Safety	Students will learn and apply safe practices for working in a technology and robotics laboratory. Emphasis is placed on personal safety, proper tool usage, equipment operation, and maintaining a safe work environment. Students will develop habits that promote responsibility and reduce risk while completing engineering and robotics projects. Objectives: • Identify potential hazards in a technology and robotics lab. • Demonstrate proper use of personal protective equipment (PPE). • Follow established shop safety rules and procedures. • Safely operate hand tools and basic power tools. • Explain emergency procedures and accident reporting protocols. • Maintain an organized and safe workspace.	Ongoing
Unit 2: Construction: Truss Bridges	Students will investigate structural engineering concepts through the design, construction, and testing of truss bridges. They will explore how forces act on	3 weeks

	structures and apply engineering principles to build efficient and strong bridge designs. Objectives: • Identify common bridge types and their applications. • Explain tension, compression, and load distribution in structures. • Analyze the components of a truss bridge. • Design a bridge using engineering design principles. • Construct a model truss bridge using specified materials. • Test bridge performance and evaluate structural strength. • Use data from testing to improve future designs.	
Unit 3: Transportation	Students will examine transportation technologies and their impact on society. Through hands-on activities, students will explore vehicle design, propulsion systems, energy transfer, and efficiency while applying engineering concepts to transportation challenges. Objectives: • Describe the evolution of transportation systems. • Compare various modes of transportation. • Explain the relationship between force, motion, and vehicle performance. • Investigate energy sources used in transportation technologies. • Design and build a model transportation device or vehicle. • Test and evaluate vehicle efficiency and performance. • Analyze transportation technologies' environmental and societal impacts.	2 weeks
Unit 4: Residential Construction	Students will explore the fundamentals of residential construction, including planning, design, building materials, and structural systems. Students will develop an understanding of how homes are designed and constructed while applying measurement, drafting, and model-building skills. Objectives: • Identify major components of residential structures. • Interpret basic floor plans and construction drawings.	2 weeks

	• Demonstrate accurate measurement and layout techniques. • Recognize common building materials and their uses. • Explain the role of foundations, framing, and roofing systems. • Construct a scale model of a residential structure. • Evaluate construction designs for functionality and efficiency.	
Unit 5: Robotics: Hydraulic/Pneumatic Robotic Arm	Students will explore robotics systems through the design, construction, and operation of hydraulic and pneumatic robotic arms. Students will learn how fluid power systems create movement and how engineers use robotics to solve real-world problems. Objectives: • Define robotics and identify common robotic applications. • Explain the principles of hydraulic and pneumatic systems. • Identify components of fluid power systems. • Construct a functional hydraulic or pneumatic robotic arm. • Demonstrate control of robotic arm movement and functions. • Analyze the mechanical advantages provided by robotic systems. • Evaluate robotic arm performance and suggest design improvements. • Discuss careers related to robotics and automation.	2 weeks
Unit 6: Technology and Society	Students will investigate how technology influences individuals, communities, and global society. Topics include technological innovation, ethics, sustainability, and the impact of emerging technologies on daily life and future careers. Objectives: • Define technology and its role in society. • Examine historical technological developments. • Analyze the positive and negative impacts of technology. • Discuss ethical issues related to technology use. • Evaluate the effects of automation and artificial intelligence. • Investigate sustainable technology practices. • Communicate informed opinions on current technological issues.	2 weeks

Unit 7: Construction: Towers	Students will apply engineering and construction principles to design, build, and test tower structures. Through hands-on projects, students will investigate stability, load-bearing capacity, and efficient structural design. Objectives: ● Explain the forces that affect tall structures. ● Identify characteristics of stable tower designs. ● Apply the engineering design process to tower construction. ● Build a tower using the specified design constraints. ● Test tower strength, height, and stability. ● Analyze structural failures and recommend improvements. ● Compare tower designs based on performance data.	4 weeks
Unit 8: Communication Technology	Students will explore technologies used to create, transmit, and receive information. They will investigate communication systems ranging from traditional media to modern digital technologies while developing skills in technical communication and multimedia design. Objectives: ● Identify different forms of communication technology. ● Explain how information is transmitted through communication systems. ● Analyze the evolution of communication technologies. ● Create digital media products using appropriate software tools. ● Demonstrate effective visual and technical communication techniques. ● Evaluate the reliability and credibility of digital information sources. ● Assess the impact of communication technologies on society and industry.	4 weeks