

GARDNER HIGH SCHOOL

TECHNOLOGY / ENGINEERING EDUCATION

Technology/Engineering is the study of "how people modify the natural world to suit their own purposes" and generally refers to the diverse collection of processes and knowledge that people use to extend human capabilities and to satisfy human needs and wants. Since everyone uses technology, all students benefit from Technology/Engineering courses. Technology/Engineering is defined as a *core subject* by the Massachusetts Department of Education. The Learning Standards outlined in Strand 4 of the Massachusetts Science and Technology/Engineering Curriculum Framework are the guiding principles of the Technology/Engineering curriculum at Gardner High School.

ARCHITECTURAL DRAWING: This full-year course is designed to increase each student's ability to visualize objects and solve problems in addition to further developing his or her design and drawing techniques. A major emphasis is in the area of computer-aided drafting. After completing this course, students will be able to design, produce, revise and save technical drawings produced on the computer. This course is highly recommended to students who are considering engineering or technical careers.

Prerequisite: Drafting 1

Expectations for student learning: Students will be able to think critically, listen actively and utilize current technology to enhance learning.

Grade: 10 - 12
Credits: 5
Weight: Unweighted
Course# 634

AUTOMOTIVE/TRANSPORTATION TECHNOLOGY: This semester course is for students, who want to learn how to perform routine maintenance, minor repairs, buy, sell, evaluate, modify, and personalize automobiles. Automotive theory, diagnosing common problems, performance, safety, pollution, insurance, hybrid designs, small engines, and societal impacts of all forms of transportation will be studied. The students will be involved in hands-on and theoretical learning.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 10 - 12
Credits: 2.5
Weight: Unweighted
Course # 630

CONSTRUCTION ENGINEERING TECHNOLOGY: The primary intent of the class is to provide the student with information and experience basic to residential construction. This course presents students with the challenges of studying and building various components of an entire structure. The principles and practices to complete this task will be presented in theory and by modeling. This course explores the fundamentals of the construction industry from the architect's drawings and surveying building sites to the finishing procedures on a structure. Masonry, carpentry, plumbing, electrical, and heating/cooling will be studied and students will participate in construction projects, model building and activities. On completion of this class, the student will be able to read a blue print, understand building codes and zoning laws. The student will be able to estimate the cost of construction and prepare a list of materials needed. Energy sources such as gas, solar, hydroelectric, and wind power will also be explored in this class. Curriculum is guided by the Massachusetts State Frameworks for Science, Engineering, and Technology.

Prerequisite: Wood Technology I

Expectations for student learning: Students will be able to think critically, listen actively and utilize technology effectively.

Grade: 10 - 12
Credits: 5
Weight: Unweighted
Course# 642

DRAFTING I: This full-year course is designed to introduce students to blueprint principles and construction techniques. During the school year he or she will be assigned drawings, which require the use of standard drafting tools and equipment. Students will use knowledge of geometric construction to solve sophisticated layout problems. A correlation of geometric terms and mechanical construction techniques will be made. The need for neatness in drawing and accuracy in measuring is highly stressed. Meeting these requirements will enable students to develop their abilities in problem solving and visual perception. All students will be introduced to computer aided drafting equipment and techniques. This course is highly recommended for students considering engineering or technical careers.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 9 - 12
Credits: 5
Weight: Unweighted
Course# 633

WOOD TECHNOLOGY I: (Formerly Manufacturing Engineering Technology) This is an introductory course in woodworking technology. It includes the following: safety in the shop, drawing and planning a project. This course teaches the fundamentals of woodworking. You'll learn how to safely operate all shop machines and the proper use of hand and portable power tools. Emphasis will be placed on the designing, planning and selection phases used to construct a quality wood product. Curriculum is guided by the Massachusetts State Frameworks for Science, Engineering, and Technology.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 9 - 12
Credits: 5
Weight: Unweighted
Course# 651

WOOD TECHNOLOGY II: Wood Technology II is an advanced level course in woodworking. It includes the following: safety in the shop, drawing and planning a project. Its purpose is to provide more extensive experience to students who desire to explore the woodworking field in greater depth. Emphasis will be placed on technology used in carpentry, cabinet and furniture making, as well as more abstract type woodworking. Students will be given the opportunity to advance skills learned in Wood Technology I in areas of materials, machines, and procedures. Students will be expected to design and develop plans for an advanced project of their choice. Curriculum is guided by the Massachusetts State Frameworks for Science, Engineering, and Technology

Prerequisite: Wood Technology I

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 10 - 12
Credits: 5
Weight: Unweighted
Course# 652

TECHNOLOGY/ENGINEERING: During this full-year course, students will work on projects that include: mechanical drawing, computer aided drawing, woodworking tools and machines, metal working tools and machines, welding, electrical systems & circuits, digital photography, and power point presentations. Students will examine existing and emerging technologies in the fields of Engineering Design, Construction, Manufacturing, Communications, Energy, and Power Technologies. Engineering design involves practical problem solving, research, and development of solutions, designing, drawing, building models and prototypes, testing, evaluation, and redesign. This laboratory science class prepares students for the topics on the Technology/Engineering MCAS exam.

This class may be used toward science graduation requirements.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 9 - 12
Credits: 5
Levels: College Preparatory **Weight:** 4 **Course #** 242

TECHNOLOGY/ENGINEERING: During this full-year course, students will work on projects that include: mechanical drawing, computer aided drawing, woodworking tools and machines, metal working tools and machines, welding, electrical systems & circuits, digital photography, and power point presentations.

Students will examine existing and emerging technologies in the fields of Engineering Design, Construction, Manufacturing, Communications, Energy, and Power Technologies. Engineering design involves practical problem solving, research, and development of solutions, designing, drawing, building models and prototypes, testing, evaluation, and redesign. This laboratory science class prepares students for the topics on the Technology/Engineering MCAS exam.

This class may be used toward science graduation requirements.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 9 - 12
Credits: 5
Levels: College Preparatory **Weight:** 4 **Course #** 242

ROBOTICS: During this full-year course, students will engage in real-world applications of Science, Technology/Engineering and Math (STEM) concepts through the use of the engineering design process. Through hands-on activities students will study engineering concepts including, Physics, programming, mechanical systems, and electrical & electronics systems. These concepts are delivered with a robotics emphasis through activities and projects using Vex Robotics hardware and easy C® robotic programming software.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 9 - 12
Credits: 5
Weight: Unweighted
Course# 239

DESIGNER'S WORKSHOP: In this course you will utilize the skills acquired in the Manufacturing and Construction pre-requisites to design and build products that are technical in nature. Students will work with wood, metal, plastic and glass to solve design problems that will be assigned. Students will be expected to work independently, but lessons will be provided when challenged to work in a medium not yet experienced. Drafting is not a pre-requisite course, but it would definitely be a plus for students to have taken it. If you love a challenge, and you like working in technology related area, this course is designed to take you out of your comfort zone.

Prerequisite: Wood Technology I and II

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 11 - 12
Credits: 2.5
Weight: Unweighted
Course # 640

POWER AND ENERGY TECHNOLOGY: Power and Energy Technology is an elective course that studies the subject of energy, how it is generated, controlled, and used and its impact in our society. The class is beneficial to any student interested in careers related to engineering, physical sciences, mechanics, transportation, technological fields, or any aspect of manufacturing. Topics covered in this course include power that is generated / converted and transmitted using; wind power, water power, steam power, electrical power, internal combustion engines, nuclear power, solar, and geothermal power. This class utilizes hands on activities in the technology lab. Students will build such things as a wind turbine, solar panels / ovens, robotic arms, and small gasoline engines, and other activities that will reinforce the principles. A minimum of 60 percent of class time will be spent on hands-on activities in the lab. Curriculum is guided by the Massachusetts State Frameworks for Science, Engineering, and Technology.

Expectations for student learning: Students will think critically, listen actively and utilize technology effectively.

Grade: 10 - 12
Credits: 5
Levels: College Preparatory **Weight: 4** **Course # 205**