INDUSTRIAL TECHNOLOGY **WOODWORKING TECHNOLOGY I, II: COURSE #771, #777**

The Department's Educational Philosophy

All students should gain a better understanding and appreciation for the impact of today's technology in an international marketplace. Students will also learn the importance of leisure time productivity in the development of functional products through the safe use of tools, machines and materials. As a result of these activities, students will develop a healthy, positive, and responsible work ethic that is fundamental in today's society. In addition, the program challenges a wide diversity of skill levels, placing the students at various entry levels within a continuum from basic, and no prerequisite, to advanced, at any level.

Guiding Principles

An essential component of a well-rounded education includes participation in a diverse offering of exploratories, such as offered in the Industrial Technology Department. All students should have the ability to understand human needs, recognize the best solution and construct a functional tangible product.

- Student enrollment will increase with an effective course offering.
- Students will learn and understand the Universal Systems Model.
- Students will be able to identify and explain the 8-Step Engineering Process in creating the best possible problem-solving solution.
- Students will be able to interpret and demonstrate problem-solving solutions to scale using graphic representations such as sketches, isometrics, orthographic projections and multi-view drawings.
- Students will learn and understand the importance of safe operating procedures in a lab or home environment.
- Students will demonstrate the safe use of common hand and machine tools prior to application.
- Students will share factual information and independent thought through tangible and verbal expression.
- Students will have the opportunity to work within a cooperative learning environment while emphasizing the importance of independent learning skills.
- This course presents the possibilities for student career development opportunities as well as leisure time activities.
- This course is integrally related to mathematics.

WOODWORKING TECHNOLOGY I, II: COURSES #771, #777

Course Frequency: **#771** Full-year course, alternate days
#777 Full-year course, 5 times a week

Credits: **#771** 2.5 credits
#777 5 credits

Prerequisites: None

Background to the Curriculum

The one staff member within the department developed this course through the summer R and D Program. The course will continue to undergo periodic review and revision as necessary. The development process is a culmination of several existing factors: ABRHS Program of Studies, the newly-constructed facility, existing equipment, the Massachusetts State Frameworks, and personal values based on 21 years experience in technology education and 14 years in industry.

This curriculum is aligned with the state learning standards in three areas: Engineering Design, Construction Technology, and Manufacturing Technologies. The extent to which we are not aligned is driven by the fact that we need more staff, specific equipment and additional space.

Core Topics/Concepts/Skills

Universal Systems Model: Manufacturing Process – inquiry skills, comprehension skills, procedural skills, communication skills
Engineering Design Process: product development, comprehension skills, procedural skills
Drafting: pencil/paper, graphic representation, pattern making
Lab/Home on Location: Safety Rules – comprehension skills, application skills, work ethic
Lay out Tools: Measuring Devices – comprehension skills, application skills, maintenance skills
Hand Tool: safety and application
Machine Tool: safety and application
Cutting, Drilling, Filing, Sanding and Finishing: comprehension skills, procedural skills, application skills
Shaping: comprehension skills, procedural skills, application skills
Joinery: comprehension skills, procedural skills, application skills
Fastening: comprehension skills, procedural skills, application skills
Laminating, Veneering: comprehension skills, procedural skills, application skills
Material Characteristics: application of material
Construct individual as well as manufactured products
Model House Construction: comprehension skills, application skills, procedural skills, communication skills
Manufacturing: comprehension skills, application skills, procedural skills, communication skills

Learning Objectives

Universal Systems Model – through the application of this model

1] Goal: Students will understand the objective.
2] Input: Students will know the seven resources required to create technology.
3] Process: Students will develop and design Production Control Process.
4] Output: Students will develop a final functional product.
5] Feedback: Students will be able to analyze, synthesize, and apply the results.
6] Impact: Students will understand the impact on the environment and society.

Engineering Design Process

1] Identify the problem: Students will be able to identify, understand, and articulate the problem.
2] Research the problem: Students will explore and investigate existing solutions.
3] Brainstorm: Students will develop critical thinking skills through cooperative learning.
4] Select best possible solution: Students will analyze information, make informed choices, and collaborate on the final solution.
5] Construct a prototype: Students will work cooperatively. Students will understand the aesthetic and functional aspects of the product.
6] Students will interpret graphic representations. Students will organize information. Students will construct using hand/machine tools.
7] Test and evaluate: Students will analyze and assess the prototype.
8] Communicate the solution: Students will describe through oral or written format the best possible problem solution or need.
9] Redesign: Students will incorporate test and evaluation results through a cooperative learning environment.

Construction Technologies

1] In construction technology the students will be aware of various materials, processes and systems to build structures.
2] Model House Construction: Students will interpret house plans. Students will organize material. Students will construct a model house.
3] Zoning Laws: Students will understand source, process, and exceptions.
4] Building Codes: Students will understand source, process, and exceptions
5] Professional Standards: Students will be aware of licensing requirements, education, and unions.
6] Understand and interpret floor plans: Students will read, articulate, and create.
7] Understand scale drawings: Students will read, create, and articulate.

8] Identify elevations: Students will recognize and create.
9] Identify construction materials: Students will distinguish and evaluate.
10] Site development: Students will understand watershed protection, clearing, utilities, sewerage, and maintenance.

Manufacturing

1] Students will design a system for mass production.
2] Universal Systems Model: Technology system fulfillment.
3] Engineering Design Process: Consumer need, pictorial and multi-view drawings.
4] Production Control: Resource deployment, individual accountability.
5] Quality Control: Develop quality assurance program.
6] Finance: Spreadsheets, product cost.
7] Work Ethic: Students will understand the importance of a responsible approach to any task.

Assessment

- Pre- and post-testing
- Portfolios
- Finished product
- Safety practices
- Quizzes
- Presentation
- Meaningful class participation
- Hand and machine tool skills
- Process comprehension (Universal Systems Model, Engineering Design Process, Manufacturing, and Construction)

Materials and Resources

Texts

- Betts, M. Roger, Fannin, John W., Hauenstein, A. Dean, Exploring the Construction Industry, 1st edition, (1976), McKnight.
- Donnelly, Edward T., Hammond, James J., Harrod, Walter F., Rayner Norman A., Woodworking Technology, 2nd edition, (1966), McKnight and McKnight.
- Feirer, John L., Hutchings, Gilbert R., Carpentry and Building Construction, 3rd edition, (1986), Bennett and McKnight.
- Feirer, John L., Furniture and Cabinet Making, (1983), Bennett Publishing Co.
- Harms, Henry R., Kroon, Dennis K., Weigiel, Marlene, Experience Technology, (1997), McGraw Hill.

- Lux, Donald G., Ray, Jullis E., The World of Construction, 4th edition, (1971), McKnight and McKnight.
- Lux, Donald G., Ray, Jullis E., The World of Manufacturing, 4th edition, (1971), McKnight and McKnight.
- Watson, Dan A., Construction Materials and Processes, 2nd edition, (1978), McGraw Hill.

Periodicals

- *Workbench*, Donald B. Peschke, DesMoines, IA
- *Techdirections***,** linking education to careers (www.techdirections.com)