

Technology Education Program

Rhode Island College
Feinstein School of Education and Human Development
Department of Educational Studies

Spring 2008

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Communication Devices: Out of courtesy for other students and the instructor, please silence and place out of sight all communication devices (cell phones and pagers, etc.) during class time so that we may learn and work together without distraction.

I. COURSE TITLE: TECH 205 - 01 *Production Systems* (3 credits)
CLASS HOURS: Tuesday - Thursday 7:00 – 8:50
CLASSROOM LOCATION: WH 101 & East Greenwich High School

II. Course Description:

This course examines the production methods related to the tools and materials found in the typical Technology Education Laboratory/Classroom. Included in this examination are the study of fundamental manufacturing and industrial processes, tool and machine safety, and lab management.

III. Rationale:

This course was created to provide the student with opportunities to develop technical proficiencies with tool, machines and materials, commonly found in the Technology Education laboratory.

Skill level from person-to-person will vary, but you all will have exposure and the chance to operate the machines located in our lab. Each person will develop at least one specialty during this class. They will then demonstrate to the class the machine or technique they have mastered.

We will attempt to create safe and worthwhile experiences for the participating students. It will be necessary for students to attend all classes. Safety requirements and special instructions missed will eliminate you from using equipment

IV. Text:

Wright, R. T. (2005) *Processes of Manufacturing*. The Goodheart-Willcox Company, Inc. ISBN: 978-1-59070-362-6

V. *Relationship to Feinstein School and Professional Development*

This course is designed to introduce students to production methods for Technology Education. The study of production will create awareness of the resources and their manipulation to create efficient technological systems. Issues related to production impacts and relationships with the individual, society, and the environment will support appropriate problem solving and decision-making opportunities. The directed laboratory experiences emphasize the application of safe production applications and techniques. Students will develop an appreciation and understanding of the basic principles of production systems and the safety requirements needed to manage a lab.

Students will reflect on, analyze, select, and implement new and contemporary methods, activities, and curricula related to technology education. Students will be introduced to technological principles and cross curricular opportunities to solve problems related to the development and understanding of technology. Students will be prepared to teach production systems in technology education using strategies appropriate for pre-service teachers, guided by the Rhode Island Beginning Teacher Standards.

Participants in this course should benefit from a consistent best practice scenarios and the intentional use of models which explore global attitudes and diverse student populations in the technology education classroom. This technology education course is grounded in FSHED's Conceptual Framework and the PAR Model embrace by Rhode Island College.

STANDARDS ACHIEVED:

Standards for Technological Literacy

1; 2; 3; 4; 5; 8; 9; 10; 11; 12; 13; 18;

RIBTS

1.2; 2.2, 2.3, 2.4, 2.5, 2.7; 3.3; 8.1, 8.2, 8.3, 8.4

VI. *Laboratory Experiences and Hours:*

This class includes laboratory activities which require time outside of the scheduled class period. Normally, one or two additional lab hours of work per week are required in addition to class time. The laboratory is only open during selected hours; laboratory hours will be posted. Only those students who are willing and able to do the required laboratory work during lab hours should be enrolled in this course.

VII. *Laboratory Policy:*

- A. No one is to use lab equipment without the permission and direct supervision of the instructor/attendant.
- B. The instructor's permission is required for use of materials in the lab.
- C. All hazards, including malfunctioning equipment, are to be reported to the attendant immediately.
- D. Safety glasses or other approved eye protection must be worn by all people in the lab during all lab work and demonstrations.
- E. Long hair, ties, jewelry and loose clothing must be secured to prevent injury.
- F. Shoes with non-skid soles and closed toes are required in the lab.
- G. Each piece of equipment is to have only one operator (who may have helpers.)
- H. Do not distract the operator or get too close to their machine.
- I. Do not operate a potentially dangerous piece of equipment if you are not fully alert.
- J. If you are unsure about a certain procedure, do not proceed. Instead, tell the instructor of your doubts.

VIII. CLASS ATTENDANCE POLICY:

Students should attend all class meetings and are responsible for all class work and assignments. At the beginning of each semester, instructors will distribute a syllabus, which may include attendance and/or class participation as a component of the course grade. Students who are absent must take the initiative to determine from the instructor what course work can be made up. Students who are absent on the day of an examination should make every effort to call the instructor (or department office) before the scheduled test.

....All students who incur or anticipate an extended absence (five or more consecutive days or more) should call the Office of Student Life at 456 - 8061, so that notice (not an excuse) may be sent to instructors. (p. 38 RIC Student Handbook)

- The policy of this class is that after the third absence the final grade will be dropped one letter grade.
- Six absences from this class will result in a final grade of (F).
- Absences are considered excused **only** when official documentation of the nature of the absence is supplied by the student. (i.e. attending physician's notice, court documents, obituaries, field trip memo)
- All exams and quizzes will be taken at the scheduled time. Make-up exams and quizzes may not be provided unless proper documentation is presented..

VIII Course Objectives:

Upon satisfactorily completing this course, the student will be able to:

1. Define the terms "Construction", "Manufacturing", and "Production"
2. Describe conversion methods that transform raw materials into industrial materials.
3. Describe the steps necessary to transform industrial materials into useful products
4. Generate and communicate a product idea.
5. Develop safety procedures for the use of tools and power machinery.
6. Describe the qualities of materials used in the lab.
7. Design, build, and test a materials testing device.
8. Perform safety processes in the lab
9. Design a prototype lab.

IX METHODS OF INSTRUCTION:

Instructional strategies will include:

- Lecture
- Multimedia
- Individual reports
- Group interaction
- Electronic media
- Discussion / Question and answer

X EVALUATION:

MID-TERM /FINAL	20%
LABORATORY MANUAL	10%
MATERIALS TESTING DEVICE	10%
PLASTICS MODULE	10%
METALS LAB	10%
PRODUCTION PROJECT	10%
INDIVIDUAL PROJECT	10%
PROCESS DEMONSTRATION	10%
PORTFOLIO	10%
TOT	100%

Final course grades are assigned on the basis of total points earned from exams, quizzes and projects. All points earned during the semester will be totaled and a percentage will be determined from the points earned. The final grade will be determined from the following percentages.

Grade Scale:

A	100% - 96%	C+	79% - 76%
A-	95% - 90%	C	75% - 73%
B +	89% - 86%	C-	72% - 70%
B	85% - 83%	D	69% - 60%
B-	82% - 80%	F	59% or less

Participation/Professional Courtesy : It is expected that all members of the class will conduct themselves in an appropriate manner. Students will respect the ideas and comments of others. Failure to behave in a mature manner and disregard for classroom rules will be dealt with by reducing the grade in the Participation/Professional Behavior Category 10 points for each infraction.

XI. CONTENT OUTLINE

MEASURING EQUIPMENT

Measuring equipment

Rulers

Marking Gauges

Combination Square

Using and Identifying Layout tools

Scribes

Rules

Carpenter's Square

Chalk line

Compass

Etc.

INVENTORY OF HAND PROCESSING EQUIPMENT

Tools in this section will be described and used throughout the course.

Appropriate use and safety issues will be addressed.

Proficiency and safety issues in the lab will be demonstrated.

Special emphasis on class conduct and rules

Portable Power Tools

Drill

Sander (random orbital/vibrating/belt) Router

Scroll Saw

Hand tools

- Screwdrivers
- Hammers
- Rip saw
- Cross-cut saw
- Back saw
- Miter Box

Laboratory Processing Equipment

During the Semester we will be looking at various processing techniques of the equipment we have in the lab. Our foremost objective is to work SAFELY. Please record and obey all safety rules and safe practices.

Band Saw (wood)

- TYPES OF CUTS
 - ripping
 - crosscutting
 - cutting external and internal
 - curves
 - cutting angles
- MACHINE MAINTENANCE
 - blade selection
 - machine setups and adjustments
 - cutting speeds/feeds
 - material selection
- SAFETY

- bit selection
- MACHINE MAINTENANCE
 - cutting speeds/feeds
 - machine setups and adjustments
 - material selection
- SAFETY

Jointer _ safety

- JOINTING TECHNIQUES
 - jointing edge
 - jointing surface
 - squaring
- MACHINE MAINTENANCE
 - machine setups and adjustments
 - material selection

Tables Saw

- TYPES OF CUTS
 - ripping
 - crosscutting
 - grooves and dados angles
- MACHINE MAINTENANCE
 - blade selection
 - machine setups and adjustments
 - material selection
- SAFETY

- Surfacer** -- safety
 - squaring speeds/feeds
 - machine setups and adjustments
 - material selection
 - safety

Drill Press (metal/wood)

- DRILLING PROCESSES
 - counter boring
 - counter sinking
 - drilling

Compound Miter Saw

- TYPES OF CUTS
 - crosscutting
 - cutting angles
 - blade selection
- MACHINE MAINTENANCE
 - machine setups and adjustments

material selection
SAFETY

Disk/Belt Sander
abrading edges
abrading surfaces
abrading bevels
squaring
external curves
abrasive selection
MAINTENANCE
machine setups and
adjustments
material selection
SAFETY

Table Jig Saw
TECHNIQUES
ripping
crosscutting
cutting external and internal
curves
cutting angles
blade selection
MAINTENANCE
machine setups and
adjustments
cutting speeds/feeds
material selection
SAFETY

PLASTIC CASTING/MOLDING

Thermo Former
Time, temperature & pressure
mold selection
machine setups and adjustments

material selection
MAINTENANCE
SAFETY

Strip Heater forming
time/temperature
machine setups and adjustments
material selection
safety

Adhesives
adhesion and cohesion
using thermoplastics and
thermosets
using bar, C-, and parallel jaw
clamps
gluing
edge
surface
solvent
bonding

Fasteners
nailing
screwing
doweling
stapling

FINISHING

Brushing
Rubbing/Wiping
Spraying

Safety of Materials and Material Handling
MSDS

**Tentative Schedule
Spring**

**Production Processes
TECH 205-01**

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Office Hours: by Appointment

Week	Date	Activity/Topic	Readings
1	Jan. 26 - 28	Introductions/Syllabus/Schedule Nature of Manufacturing	pp. 7 - 20
2	Feb. 2 - 4	Industrial Materials <i>Lab manual explained</i>	pp. 20 - 42
3	Feb. 9 - 11	Casting Processes Metals	pp. 43 - 71 pp. 72 - 80
4	Feb. 16 - 18	Plastic Casting Ceramics Casting Plastics Module Due	pp. 81 - 92 pp. 93 - 98
5	Feb 23 - 25	Forming Materials Process demos	pp. 99 - 173
6	Mar. 2 - 4	Forming Plastics (emphasis) Process demos	pp. 150 - 161
7	Mar. 9 - 11	Separating Processes Separating Operations Process demos	pp. 184 - 202 pp. 203 - 238
	Mar. 16 - 18	Spring Recess	Enjoy
8	Mar. 23 - 25	Separating Operations MID-TERM 20th	pp. 239 - 271
9	Mar. 30 - Apr. 1	Open Labs Abrasive, Thermal & Shearing Mass Production Due	pp. 272 - 316
10	Apr 6- 8	Conditioning Processes	pp. 317 - 334

11	Apr. 13 -15	Assembling Processes Adhesive and Mechanical Assembly Individual Project Due	pp. 335 - 357 pp. 358 - 382
12	Apr. 20 - 22	Materials Testing	Handouts
13	Apr. 27 -29	Device design	Handouts
14	May 4 - 6	Finishing Processes Materials Testing Device Due	383 - 410
15	May. 11 - 13	Final Exam Week	