

EL CAMINO COLLEGE
MANUFACTURING TECHNOLOGY 70

"Basic Robotics"

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COURSE OUTLINE

A. CATALOG AND CLASS SCHEDULE DESCRIPTION:

1. Class Schedule:

9:00 – 10:10 Saturday	Lecture	ITEC 22
10:50 – 2:50 Saturday	Lab	ITEC 22

This class does not meet on Saturday after Thanksgiving

2. Catalog Description

Lecture: 1 hours Laboratory: 3 hours Units: 2
(this is based on an 18 week semester.)

In this course, the students will explore the technologies used to fabricate model robotic systems. Additional topics covered include basic electronics theory, electro-mechanical fabrication, micro-controller operation, machining processes, metal fabrication, and careers in technology. Project building and problem solving will be stressed.

NOTE: LETTER GRADE OR CREDIT/NON CREDIT OPTION

Prerequisite: None

B. MANUFACTURING TECHNOLOGY CURRICULUM:

1. Objectives

The manufacturing technology program prepares students for employment in fields related to manufacturing. By completing the degree or certificate requirements, students acquire a foundation in computer aided design, machining, electronics, technical mathematics, and welding. Students also select a career field in which to specialize or broaden their knowledge. These fields include computer aided design/drafting, electronics, environmental technology,

machine tool technology, quality assurance, or welding.
Competencies will be assessed regularly by student performance in the classroom and laboratory.

El Camino College Major Requirements

Machine Tool Technology 101abcd*; Machine Tool Technology 10A or Computer Aided Design/Drafting 10abcd*; Machine Tool Technology 2 or Computer Aided Design/Drafting 5; Technical Mathematics 1 or Machine Tool Technology 40; Electronics and Computer Hardware Technology 11; Welding 15ab*;
a minimum of 18 units from: Computer Aided Design/Drafting 28abcd*, 31abcd*, 32abcd*, 33abcd*, 37abcd*, 45, 47, 49, Electronics and Computer Hardware Technology 22, 110, 120, 122, 124, 130, 140ab*, 142ab*, 144ab*, 191ab*, 192, Engineering Technology 10 or 10A and 10B, 12 or 12A and 12B, 14 or 14A and 14B, 16 or 16A and 16B, 18 or 18A and 18B, Machine Tool Technology 10B, 10J, 10K, 11abcd*, 103abcd*, 105abcd*, 107abcd*, Manufacturing Technology 2, 70, 75 or 75A and 75B, Welding 1, 2abc, 21, 23abc*, 40abcd*, 45ab* (*one semester); Cooperative Work Experience Education courses: a maximum of 4 units from either Computer Aided Design/Drafting 95abcd, Electronics and Computer Hardware Technology 95abcd, Machine Tool Technology 95abcd, Welding 95abcd Total Units: 37

Students can earn A.S. Degree and/or Certificate of Achievement

C. MANUFACTURING TECHNOLOGY 70 STUDENT LEARNING OBJECTIVES:

Each student, after receiving lectures, demonstrations and laboratory assignments, will be able to:

1. Complete a safety test with 100% accuracy.
2. Interpret schematic diagrams to assemble self-propelled robots.
3. Use a soldering iron and electronic assembly tools to make electrical and mechanical connections.
4. Program operational tasks into robotic systems using industry standard compilers.
5. Perform machining operations to fabricate components for robotic systems.

6. Demonstrate a basic understanding of electronics with an emphasis on appropriate test measurement techniques.
7. Build simple circuits for testing and evaluation on a “Proto-Board”.
8. Compare and contrast types of micro-controllers.

STUDENT LEARNING OUTCOME:

DISABILITY:

El Camino College adheres to all applicable federal, state, and local laws, regulations and guidelines with respect to providing reasonable accommodations for students with temporary and permanent disabilities. If you have a disability that may adversely affect your work in this class, I encourage you to register with the Special Resource Center (SRC) and talk to me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. **Note:** For more information about the Special Resource Center, please call 660-3295 or visit (SRC) Room F-10.

D. **TEXT**

Text book will be found on-line at the parallax website.

www.parallax.com/go/Boe-Bot

Other websites will be used.

E. **REQUIRED* AND RECOMMENDED MATERIALS:**

1. Scientific calculator (trigonometry functions)
2. Safety glasses or goggles*
3. USB flash drive

F. **EVALUATION INFORMATION:**

1. The semester's evaluation (grade) will be based on grades or points received on:
 - a. Homework assignments
 - b. Fast Five Quizzes
 - c. Lab Write Ups
 - d. Attendance

- e. Laboratory work

Other factors that influence evaluation:

- a. Attendance and attitude

Attendance at First Class

Students who enroll in class but do not attend the first scheduled class meeting may be dropped from the roster and their places given to waiting students who were unable to enroll at the time of registration. If illness or emergency prevents a student from attending the first class session, the student must contact the instructor.

A student who registers for a class and never attends is still responsible for dropping the class. Failure to properly drop a class may result in a "W" and may subject the student for any and all fees associated with the class.

Attendance During Semester

Students are expected to attend their classes regularly. Students who miss the first class meeting or who are not in regular attendance during the add period for the class may be dropped by the instructor. Students whose absences from a class exceed 10% of the scheduled class meeting time may be dropped by the instructor. However, students are responsible for dropping a class within the deadlines published in the class schedule. Students who stop attending but do not drop may still be retained on the course roster and receive a failing grade. Students may view their registration status using the college's Web site.

Withdrawal from Class

Official withdrawal from class must be processed through the online system in the Admissions Office. Failure to complete this process may result in the assignment of a letter grade of A through F.

Dropping a Class

It is the responsibility of the student to officially drop a class by the deadline date.

This class meets about 25 times, so 3 absences or less will be acceptable. Remember that Tardies and Left Earlies are 1/3 of class absent.

- b. Care and use of equipment
- c. Ability to follow instructions
- d. Mechanical judgement

- 2. The following scale will be used to determine the final grade of

the semester.

90% - 100% = A

80% - 89% = B

70% - 79% = C

60% - 69% = D

Below 59% = F

3. Laboratory work criteria:

- a. The primary criteria is the quality of the work produced, which is a function of sizes, fits and finishes as specified by engineering drawing specifications.
- b. The secondary criteria is the quantity or variety of work; this does not mean total weight or size, but rather the variety of machine tool operations performed and general difficulty of the product produced.
- c. It will be assumed that all laboratory work submitted for evaluation will represent the student's best efforts.

4. Fast Five Quizzes will be of the objective nature such as:

- a. True/False
- b. Short fill-in
- c. Matching
- d. Multiple choice

Fast Five Quizzes will be used to evaluate your comprehension of reading assignments, lectures, lab work, and demonstrations. A grade of "zero" will be recorded if you are absent when a quiz or examination is given to the class.

G. CLASS ROUTINE:

1. Lecture
2. Laboratory
3. Tool crib

H. ADMINISTRATIVE CARDS:

I. LABORATORY WORK ASSIGNMENTS:

Projects:

Semester Appropriate Project

Class Project

NOTE: Additional or supplementary areas of laboratory work or projects may be added or substituted only with the approval of the instructor.

APPROXIMATE TIME ALLOTTED IN HOURS	MAJOR TOPICS
4	The World of Robotics Education and career paths Robotic types and applications
24	Basic Electronic Fabrication Lab safety, hand and power tools Schematics and assembly drawings Soldering, proto-boarding, materials Hand tools, surface mount technology Electrical and mechanical fasteners Chassis and sheet metal fabrication Machining processes
20	Basic Electronics Basic circuits Electronic measurement Electrical prefixes Basic components Basic of digital gates Basic motors
16	Microcontroller Program Techniques Imbedded micro-controllers Editors and compilers Compilers command lines Debug PC interface methods
6	Robot Operational Performance Troubleshooting and tuning Competition and performance evaluation
2	Review and Examinations

