

ROBOTICS & AUTOMATED CONTROL II

Course Syllabus

Revised 12/01/2011

C - L - CR
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COURSE NUMBER: AMT 205

PREREQUISITE(S): None

CO-REQUISITE(S): None

COURSE DESCRIPTIONS This course covers installation, testing, troubleshooting, and repairing of automated systems. Concentration is on systems integration and communication.

TEXTBOOK(S): *Bartelt, Terry Industrial Control Electronics Devices, Systems & Applications 3rd Edition Albany New York, Del Mar Publishing/Thomson Learning. 2002*

REFERENCE(S):

1. ABB Programming Books available in the Laboratory.
2. Course information and support materials found on the AMT lecture site: <http://lecture.sccsc.edu/amt>

OTHER REQUIRED MATERIALS, TOOLS, AND EQUIPMENT:

Safety Glasses-for use in lab
5x8 Index Cards
2 Binding Rings-used to create an individual programming guide
1 USB jump drive that can be temporarily dedicated to the course.

INSTRUCTOR ASSISTANCE:

All students are encouraged to contact the instructor as course or advising needs arise. The best way to accomplish this is to see the instructor after class to schedule an appointment and/or look at the office hours schedule posted on the instructor's office door. You may also contact the instructor using email.

METHOD OF INSTRUCTION:

This course will be taught by instructor led discussion, lecture, small group dialogue, whole class participation, individual instruction, appropriate active learning strategies, teaming activities, and hands on lab projects. Learning will be reinforced through written homework assignments that are posted on the AMT lecture site.

GRADING SYSTEM:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
60	-	69	=	D
Below	-	60	=	F

**GRADE
CALCULATION
METHOD:**

Written Homework	=	40%
Lab Projects	=	30%
Class Participation	=	20%
Research Projects	=	10%
		100%

**ATTENDANCE
POLICY:**

Students are responsible for punctual and regular attendance in all classes, laboratories, field trips, and other class activities. The College does not grant excused absences; therefore, students are urged to reserve their absences for emergencies. When illness or other emergencies occur, the student is responsible for notifying instructors and completing work missed.

Students are tardy if not in class at the time the class is scheduled to begin. Tardy students are admitted to class at the discretion of the instructor.

If you have attended at least one session during the first week of the semester you are responsible for dropping yourself from the class. It is the students' responsibility to withdraw from a course.

A student who stops attending class and fails to initiate a withdrawal will remain on the class roster.

If you do not attend a class session during the first week of class you will automatically be dropped by the College.

A student who does not complete an assignment, test, or final exam in the course will receive a zero for each missing grade and the final course grade will be calculated accordingly.

Absences for Religious Holidays: Students who are absent from class in order to observe religious holidays are responsible for the content of any activities missed and for the completion of assignments occurring during the period of absence. Students who anticipate their observance of religious holidays will cause them to be absent from class and do not wish such absences to penalize their status in class should adhere to the following guidelines:

1. Observance of religious holidays resulting in three or fewer consecutive absences: Discuss the situation with the instructor and provide written notice at least one week prior to the absence(s). Develop (in writing) an instructor-approved plan which outlines the make-up of activities and assignments.
2. Observances of religious holidays resulting in four or more consecutive absences: Discuss the situation with the instructor and provide the instructor with written notice within the first 10 days of the academic term. Develop an instructor-approved plan which outlines the make-up of activities and assignments.

ACADEMIC CONDUCT:

ACADEMIC DISHONESTY: Students are expected to uphold the integrity of the College's standard of conduct, specifically in regards to academic honesty. All forms of academic dishonesty including, but not limited to, cheating on assignments/tests, plagiarism, collusion, and falsification of information will call for disciplinary action. Disciplinary action imposed may include one or more of the following: written reprimand, loss of credit for assignment/test, termination from course, and probation, suspension, or expulsion from the College. For further explanation of this and other conduct codes, please refer to the Student Handbook.

CELLULAR PHONES AND PAGERS/BEEPERS: Cellular phones, pagers and beepers are not permitted to be turned on or used within the classroom. Use of these devices during classroom time will be considered a violation of the student code as it relates to "disruptive behavior."

CLASS/LAB PROCEDURES:

Students are required to do original work on graded exercises. They are expected to bring all necessary equipment, texts, etc. to classes and labs. Labs and field trips are scheduled/performed for the experience of the endeavor; therefore attendance is mandatory for a grade. Work or other conflicts that affect the student's attendance may be worked out with the instructor in advance of the scheduled lab/ fieldtrip, however credit for attendance will not be given unless the student either attends class or has completed all scheduled coursework for the semester. Most labs are conducted in a teaming format wherein the students do data gathering and repetitive calculations as a group, but formal lab reports are to be original and done by the individual. Class participation is strongly encouraged in this course, therefore students in regularly scheduled classes will be awarded points per class session for timely and complete attendance. (Come on time; stay till done). In this way, class participation can affect the final grade by at least two whole letter grades.

ACCOMMODATIONS:

Students who need special accommodations in this class because of a documented disability should notify Student Disability Services by calling (864) 592-4818, toll-free 1-800-922-3679; via email through the SCC web site at www.sccsc.edu/resources/disabilities; or by visiting the office located in the East Building Room 30-B on the SCC Central campus. Contacting Student Disability Services early in the semester gives the College an opportunity to provide necessary support services and appropriate accommodations.

**COURSE
COMPETENCIES &
OBJECTIVES:**

Upon satisfactory completion of this course, the student will be able to:

- I. Identify the components and explain the operation of the internal parts of a controller.
 1. Explain the purpose and list the features various types of internal controller components.
 2. Describe the differences between the following types of controllers: low-technology, medium technology, high technology.
 3. List and explain the operation of five (5) different types of controller boards.
 4. List the sequence of events in the signal path control of an automated system.

- II. Develop and demonstrate the execution of a system program.
 1. State the purpose for the two (2) basic programs used in controllers.
 2. Explain the process of developing a program.
 3. Define the importance of flowcharting a program.
 4. Convert a flowchart and program concept into machine codes.
 5. Execute a developed program.

- III. Identify, test, and adjust the major operational components of an automated system for optimum performance.
 1. Explain and demonstrate the use of a tech pendant.
 2. List and demonstrate the use of various types of operator panels.
 3. Explain the features and demonstrate the use of a manual data input panel.
 4. Describe the features of a computer control and demonstrate its operation.

- IV. Describe the characteristics and application of various types of components used in automated system controllers.
 1. Explain the operating characteristics of the following DC motors: Stepper, BSCM
 2. Demonstrate the operation of a solid state DC controller.
 3. Name three (3) characteristics and applications of wire wound AC motors.
 4. Define closed-loop system and describe its principles of operation.
 5. List and describe the various types of feedback

components.

6. Identify the feedback system used in the lab.
7. Explain the theory of operation of AC and DC servo amplifiers.
8. List the different applications of servo signals.

V. Analyze a system operation and select the appropriate sensing equipment for that operation.

1. List various types of sensors used on automated equipment.
2. Describe the purpose of using different types of sensors.
3. Explain how sensors are used to provide intelligent input to a system program.
4. Give examples of different applications of sensors.
5. Analyze the operation of a CIM system, and install sensing equipment.