

**INDUSTRIAL TECHNOLOGY 442**  
**CAD/CAM/Robotics**  
**Spring 2007**

Office: Room 210-E, Anzalone Hall  
Phone: Office: (985) 549-3794  
Office Hours: 7:30-8:00 MTWTh  
                  10:00 – 11:00 TTh  
                  1:00 – 2:00 MW  
                  5:30 – 6:00 MW  
                  At other times by appointment  
E-mail:           jsstutts@selu.edu

Course Credit:           3 Semester Hours,

Prerequisite:           IT 331, IT 351 and a 200-level Computer Science

Class Meeting Time: 8:00 - 11:50, Wednesday and Friday Mornings, **first term, 1/19 to 10/12/2005**

Class Location:       Room 120, Anzalone Hall

Course Description:

A course designed to teach the use of the computer and peripheral equipment to create the database and control network for programming the operation of manufacturing equipment such as lathes, drilling, and milling machines. It is also a review of the economic feasibility and human considerations including safety in automated system applications. This course is designed for both lecture and laboratory experience per session.

Text: *Computer Numerical Control*, by Chin-Sheng Chen and Hui-Chung Lin, 2003, Glory Educational Resource, Inc.

Attendance Policy:

This is a lecture/lab class and your presence for the entire class is essential. Attending the lecture and leaving *is not an acceptable* alternative. The classes are 3 hour and 20 minutes long and you are expected to be present the entire time. You will be marked absent if not in full attendance, unless the professor assigns outside class activities, or specific arrangements are made with the professor.

### Course Objectives:

1. The student will demonstrate a working knowledge of the evolution of automated machinery.
2. The student will describe the advantages and disadvantages of automated systems.
3. The student will understand the electrical power, computers, and the auxiliary equipment needed to run CNC equipment.
4. The student will set up and program CNC equipment.
5. The student will demonstrate knowledge of Computer-Numerical Control Systems.

### Lab Work:

You may not be able to complete all assigned work during the class time. We will plan other times during the semester on an as needed basis. It may be necessary that you use other labs in the department (Drafting rooms, CAD lab, wood shop, metal lab, etc.) to prepare for experiments and presentations. If that is the case the following guidelines must be followed to properly abide with department and university policies.

Obtain proper permission to go in the lab from the professor(s) in charge of the lab

Never disturb a class in progress

Have complete approved working drawings for specimen preparation

All activities performed in other labs must be completed by early to mid March.

**ANSI Approved safety glasses must be worn at all times in the lab!**

### Course Outline:

1. History and evolution of CNC systems and equipment
2. Control circuits
3. Tool Movements
4. Function and Machine Codes
5. Computer simulation of machine operation
6. Computer simulation
7. Specifications of actual lathes and milling machines
8. Programming
9. Computer Integrated Manufacturing
10. Social and ethical issues related to automation

### Course Requirements:

Students **must** have successfully **completed** IT 331, IT 351 and a 200-level Computer class prior to enrollment in this course.

Students are expected to attend class regularly and punctually. Excessive absences will be handled in accordance with departmental policies.

Each student will prepare written reports and make oral presentations and demonstrations on professor-approved topics. You will be given specific information at a later date.

Students are to read five “Technical” articles dealing with automated systems to be used and referenced in the term paper. Specific information will be provided at a later date.

### Assignments

3. Group Project 1. Definition and Scope of automation. A history of automation, various programming languages and application software, computers, electronic components, mechanical components, and techniques. (0-59, 60-80 & 81-now)
4. Group Project 2. Demonstrate a project using one of the three automated systems available in class. The objective is to become familiar with automated equipment and learning to use and produce manuals.
5. Individual Project 1. Begin a class report on a topic of choice related to automated systems. Five Tech Briefs will be written
6. Group Project 3. Demonstrate knowledge of computer systems used in automation. This will require research on hardware/software (computers), hardware/software (CAD/CAM), and networking (local and wide area) aspects of CNC. These should include mentions of available equipment in the lab.
7. Group Project 4. Complete and demonstrate projects using all of the CNC systems available in class. The objective is to become familiar with all CNC equipment available in the classroom. This will include three turning operations, two milling operations, and one operation of your choice.
8. Individual Project 2. Compile the Tech Brief into a report similar to a short term paper.
9. Group Project 5. Complete a manual for the machine assigned to the group, and, if applicable, include narratives and programs from projects in G4.
10. Individual Project 3. Produce a part using a turning or milling operation.

Basis for Assigning Grade:

A. Tests and short quizzes	45%
B. Experiments	25%
C. Presentation/Demonstration	15%
D. Annotated bibliography sheets [5]	5%
E. Written report	5%
F. Individual part	5%

Grading Scale: (*Departmental Policy*)

93% - 100% = A
85% - 92% = B
76% - 84% = C
69% - 75% = D
Below 69% = F

**NOTES:**

**INDUSTRIAL TECHNOLOGY MAJORS MUST EARN A GRADE OF "C" OR BETTER IN ALL MAJOR COURSES.**

**PLEASE DISCUSS WITH THE INSTRUCTOR ANY RELEVANT INFORMATION THAT MAY BE USEFUL IN ASSISTING YOU TO SUCCESSFULLY COMPLETE THIS COURSE. IF YOU ARE A QUALIFIED STUDENT WITH A DISABILITY, SEEKING ACCOMMODATIONS UNDER THE ADA, YOU ARE REQUIRED TO SELF-IDENTIFY WITH THE OFFICE OF STUDENT LIFE, ROOM 202 IN THE STUDENT UNION.**

**BECAUSE THIS IS A SENIOR-LEVEL COURSE, PROFESSIONAL STANDARDS OF CONDUCT WILL BE EXPECTED, INCLUDING CARE OF EQUIPMENT AND FACILITIES, PROMPTNESS IN COMPLETION OF ASSIGNMENTS, SELF DISCIPLINE IN CLASS ATTENDANCE, AND HONESTY. VIOLATION OF THESE STANDARDS CAN AFFECT YOUR FINAL GRADE IN INDUSTRIAL TECHNOLOGY 442.**

**STUDENTS SHOULD NOTE THAT REPERCUSSIONS OF ACADEMIC DISHONESTY ARE DISCUSSED IN THE UNIVERSITY CATALOGUE.**

### **Important Dates and Notes:**

1. Students will **NOT** automatically be dropped from class. Students who choose to drop must do so by the semester deadline! ! **Friday, March 16, 2007** is the last day to **withdraw** from classes.
2. The **final exam** for this class will be on **Monday May 7, 2007 10:15 – 12:15!!!**
3. **Monday, March 19 –Thursday March 22, 2007** is **early registration** for the **Summer 2007** Semester. **Monday, April 2 –Thursday April 5, 2007** is **early registration** for the **Fall 2007** Semester.
4. If you are a qualified student with a disability seeking accommodations under the Americans with Disabilities Act, you are required to **self-identify** with the office of Disability Services, Room 203, Student Union. No accommodations will be granted without documentation from the Office of Disability Services.
5. **Student behavior/Classroom decorum:** "Free discussion, inquiry, and expression is encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples may include routinely **entering class late or departing early**; use of beepers, cellular telephones' or other electronic devices; repeatedly talking in class without being recognized; talking while others are speaking; or arguing in a way that is crossing the civility line." In the event of a situation where a student legitimately needs to carry a beeper/cellular telephone to class, prior notice and **approval by the instructor is required.**" Otherwise,

### **ALL BEEPERS, CELLULAR TELEPHONES' AND OTHER ELECTRONIC DEVICES ARE TO BE TURNED OFF BEFORE YOU ENTER THE CLASSROOM.**

Classroom behavior that is deemed inappropriate and cannot be resolved by the student and the faculty member may be referred to the Office of Judicial Affairs for administrative or disciplinary review as per the Code of Student Conduct which may be found at <http://WWW.SELU.EDU/Student Affairs/Handbook/>.

6. **Academic Integrity:** Students should note that repercussions of academic integrity are discussed in the university catalogue. "Cheating on examinations, plagiarism, improper acknowledgment of sources in essays and the use of a single essay or paper in more than one course without permission are considered very serious offenses and shall be grounds for disciplinary action".
7. The students Southeastern Louisiana University e-mail address **MUST** be used for all e-mail communication between students and faculty/administration/staff. Students are encouraged to check their Southeastern e-mail frequently for important communications from the university.
8. University policy states that the lab is not a place for children. Students are not to bring their children to the lab.

## **Course Requirements:**

Adherence to Departmental policies and procedures, a copy of which you were provided.

Regular and punctual class attendance. Students who have unexcused absences will receive the grade of zero ("0") for all tests, quizzes, and/or lab experiments missed.

Students must provide their own safety glasses or goggles. Glasses or goggles MUST meet standard Z87 to be considered "Safety" glasses or goggles. Only those glasses or goggles with Z87 clearly imprinted on them are acceptable. Also, they MUST be equipped with side shields, MUST be clear and untinted, and MUST be in good condition. All forms of eye protection MUST be inspected and approved by the instructor prior to their initial use in the lab.

Sandals or other forms of "open" footwear are NOT permitted in the lab.

Students who are not properly attired or do not possess approved eye protection will NOT be allowed in the lab and will receive a grade of zero (0) for the days' activity. Students must realize that their safety and that of their classmates is most important!

Students are to complete lab assignments in a timely fashion. Students are to turn in the study questions of each lab experiment completed by the beginning of the next class period. Students are to begin and end labwork according to the class schedule. Students, who fail to utilize their time effectively, perform incomplete experiments, who begin their work late, who leave the lab early or who submit their experiments late will have their lab grade penalized.

## **Useful references for the course:**

The students are encouraged to visit traditional libraries and online sources of information regularly. Many of the course assignments require such visits, but the visits should not be limited to completion of assignments. The following references are but a few, which may prove to be helpful in finding valuable CNC information.

Bone, J. Opportunities in CAD/Cam Careers. NTC Publishing Group. October 1993

Jami J. Shah, Martti Mantyla. Parametric and Feature Based CAD/Cam: Concepts, Techniques, and Applications. Wiley, John & Sons, Incorporated. October 1995

Kunwoo, Lee. Principles of CAD/CAM/CAE Systems. Addison Wesley, Longman, Inc. January 1999

Mikell P. Groover, Emory W. Zimmers. CAD/Cam: Computer-Aided Design and Manufacturing. Prentice Hall PTR. February 1997

Soenen, R. and Olling, G. Advanced CAD/Cam Systems : State-of-the-Art and Future Trends in Feature Technology. Chapman & Hall. April 1995

**Also the following online sources:**

[http://www.discover.com/feb\\_00/feat3dfax.html](http://www.discover.com/feb_00/feat3dfax.html)

<http://www.manufacturing.net/>

<http://www.deskeng.com/articles/01/mar/cover/index.htm>

<http://www.caenet.com/res/archives/CAE-200105/feature1.html>