

# ISE 511L : COMPUTER-AIDED MANUFACTURING

## (ADVANCED MANUFACTURING TECHNOLOGY)

Schedule: 5-6:20PM MW @ KAP 134

### CONTACT

Satish Bukkapatnam

Ext: 09549

Daniel J. Epstein Industrial and Systems Engineering Department

e-mail: [satish@usc.edu](mailto:satish@usc.edu)

GER 203

<http://www.usc.edu/dept/ise/nmcl>

Office Hours: 2-4PM W

### OBJECTIVE

This course provides a graduate level treatment of advanced computer aided methods for manufacturing. The focus will be on the modeling and sensing technologies for real-time control of manufacturing operations.

### SYLLABUS

Week	Topic	Lab/Assignment	Reading
1	Introduction to Modern Manufacturing Processes and Machines	Matlab Demo	Matlab tutorial Matlab links
2	Introduction to Computer-Aided On-Line Quality Control	Machine Tool Processes Demo	Article 1 (week 2)
3	Machine Tool Dynamics	Matlab Modeling	Article 2 (week 3)
4	Computer Modeling of Process Dynamics	Process Simulations	Article 3 (week 4)
5	Computer Modeling and Analysis (Chatter Example)	Midterm 1	
6	Sensing and DAQ fundamentals (in class session)	LabView Interface	LabView tutorial
7	Process Characterization and Modeling - Introduction	DAQ Lab	Article 4 (week 7)
8	Fourier Analysis and signal sampling	Fourier Lab	Handout1(week 8)
9	Periodogram analysis	Periodogram Lab	
10	Classical time-series methods, ARMA modeling	ARMA Lab	Handout2(week10)
11	Midterm 2	ARMA Lab 2	
12	Nonlinear signal analysis	Midterm 2	Article 5(week 12)
13	ThanksGiving week	Nonlinear Analysis Lab	
14	Project Presentations	Review	

### COURSE EXECUTION GRADING POLICY

The class will meet twice a week: one meeting will focus on lectures – where concepts will be presented, and the other will focus on practice – where computer-based assignments to implement and exercise the concepts will be provided. All computer assignments will be based in Matlab environment as it is best suited for various CAM applications including process modeling, data analysis and control. Weekly assignments will extend the in-class exercises and will in addition provide new conceptual perspectives.

The course will also feature a project that will consolidate the learning achieved during the course. The nature of the project may involve either an implementation of computer-aided

modeling and sensing of a relevant process, or an extensive survey of a particular class or CAM technologies. All project plans must be submitted for approval by October 1, and plans must be finalized and approved by October 31. Overall project grade will be derived from the performances in participation (10%), presentation (10%) and the report (80%). The report will be graded based on how well the objectives and the plan will be executed.

The overall grade will assigned by consolidating the grades of the individual components as follows:

Assignments	30%
Midterm	30%
Final Project	30%
Participation	10%

In order to ensure consistency in grading computer assignments and projects, performance in computer assignments and projects will be consistently evaluated on a grading scale of 1-5 with the following equivalent translations:

5-Very Good: complete work devoid of any mistakes (Grade A)

4-Good: mistakes if any are minor and the work demonstrates the efforts of the student to learn (Grade A-/B+)

3-Average, mistakes are significant but the work demonstrates some effort to learn (Grade B/B-),

2-Fair, serious problems with efforts (Grade C)

1-Poor, highly incomplete and sloppy work (Grade F).

## **I. ACADEMIC INTEGRITY**

The Department of Industrial and Systems Engineering adheres to the University's policies and procedures governing academic integrity as described in SCampus. Students are expected to be aware of and to observe the academic integrity standards described in SCampus, and to expect those standards to be enforced in this course.

## **II. STUDENTS WITH DISABILITIES**

Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.