ME345: Automation and Manufacturing Methods
Fall 2017

Instructor and Class Information

Instructor: Peter A. Zink, pzink@bu.edu, (617)358-1631
Office Hours: E-mail for appointment, check http://bit.ly/1GTfzfj for availability,
Office Location: 730 Commonwealth Ave, EMA 209
Lecture Times, Location: Mon 2:30-4:05 & Wed 2:30-4:05, EMB 125 (ECL)
Graduate Teaching Assistant: Krishna Sanka, sanka@bu.edu
Lab Supervisor: Ryan Lacy, lacyr@bu.edu, (617)353-4274
Lab location, Hours: 750 Comm Ave, See EPIC Website for hours
Prerequisites: None
Course Website: `http://learn.bu.edu` & Twitter feed: `https://twitter.com/profpzink`

Course Description:

An introduction to the major concepts and practices of modern manufacturing, including computer numerically controlled (CNC) machine programming, factory physics, robotic programming and control, real-time process control, digital imaging and machine vision, programmable logic control (PLC), statistical process control (SPC), production system design (LEAN), and computer-based process simulation. Strong emphasis is given to hands-on laboratory experience, with a lecture component covering fundamental concepts and supporting the laboratory exercises and projects. Includes lab. 4 credits.

Course Objectives

1. Introduce principles, methods, and tools used in modern manufacturing.
2. Acquire practical experience in computer-aided manufacturing (CAM) and manufacturing process development through a series of laboratory exercises.
3. Understand the strategies and methods used to optimize production system design & operations.
4. Support a team effort to design & manufacture a product with the ADML flexible manufacturing cell.

Required Reading

- *The Goal:*, E. M. Goldratt, North River Press, 3rd Edition (2004) or newer.
- *Other readings (articles, excerpted material, etc) posted to Blackboard*

Grading:

1. Labs (pre-lab questions 20%, lab reports 70%, group feedback 10%): [25%] (lowest pre-lab grade will be dropped)
2. Homework [15%] (weighted equally, lowest score dropped)
3. Mid-term Exam* [15%]
4. Course Project (based on level of effort, presentation and reports) [20%]
5. Final Exam* [20%] (comprehensive)
6. Class & Lab Attendance, quizzes and participation [5%]

*Exams will be given roughly at the midway point and near end of the semester, based on lectures, homework, discussions, labs, reading, etc.

Labs:

- All labs will take place in the EPIC ADML facility (EPC 101, 750 Comm Ave).
- In order to access that facility, you must take and pass the EPIC Safety quiz: http://www.bu.edu/eng/current-students/epic/safety/.
- Students must hand in their **individual** pre-lab answers at the beginning the lab exercises to the lab supervisor.
- Students will work in teams of two, a single lab report is written by each group of two, and handed to the lab supervisor one week after their lab session.
- Non-engineering related cell phone use in lab is prohibited, and may result in a grade reduction.

Table 1: ME345 Lab Schedule; labs on the same row are conducted in parallel (groups A and B switch the following week)

Lab#	Title	Lab#	Title
1	Design for Manufacturing		
2	Intro to CAD/CAM Mill	3	Intro to CAD/CAM Lathe
PI	Project Part I: RC Car Breakdown		
4	Intro to Robotics		
5	Statistical Process Control		
PII	Project Part II: RC Car Prototype Build		
6	Advanced Robotics		
7	Vision	8	Programmable Logic Control
9	Computer Integrated Manufacturing, Part I (CIM Intro)		
10	Computer Integrated Manufacturing, Part II (Dry Run)		
11	Computer Integrated Manufacturing, Part III (Final Run)		

Course Project:

The course project entails the manufacture of a product using the flexible manufacturing cell in the ADML. This project includes: design of the product and its parts, development of manufacturing strategy and processes, CIM control, scheduling and cost estimation. Your lab group of 4 (both groups that meet during your lab time) is your final project group.

Each team will design, manufacture, and race small RC cars. Each team must provide at least one complete, working, assembled car for racing purposes, and a TBD number of cars during the final manufacturing session. The (4) students in each weekly lab period comprise a team. Each team will compete using their own car on a race course to test the success of their team's design. A written project proposal and final report are written as a team.

General Class Policies

- Make up of missed work permitted only with approval **before** the scheduled due date/time.
- It is the student's responsibility to ensure sure that all quizzes and assignments have been recorded correctly. After two weeks after an assignment is returned there is no change in grade.
- Students must follow the BU Academic Conduct Code:
  `http://www.bu.edu/academics/files/2011/08/AcademicConductCode.pdf`. Any violation of this conduct code will be reported to the College of Engineering Academic Conduct Committee.