IE 1054 Productivity Analysis
Course Syllabus

Catalog Description

This course is designed for students majoring in or pursing a minor in industrial engineering. This course provides an overview of industrial engineering and specific discussion of productivity, process analysis, work and task design, lean operations, and continuous improvement. Co-requisites: IE 1070 Probability. 3 credit hours.

Instructor

Dr. Zhaoxia Guo zxguo@scu.edu.cn

Textbook

Groover, Mikell P.; Work Systems and the Methods, Measurement & Management of Work, Pearson Prentice Hall, 2007.

Required reading: Goldratt, Eliyahu and Jeff Cox; The Goal, North River Press, 1992 (2004 edition also).

Course Goals

For the students to understand fundamental concepts related to process and system analysis and improvement. Additionally, to provide an overview and introduction to Industrial Engineering including:

History of Industrial Engineering and Scientific Management
Problem Solving
Assembly Line Balancing and Lean Operations
Charting and Diagramming for Operations Analysis
Task Analysis and Design
Productivity and Work Measurement
Lean Production and Continuous Improvement
Incentive Systems

Educational Objectives

1. Students will have knowledge of modern Industrial Engineering principles, methods, and tools, including those associated with manufacturing systems, operations research, statistics, information systems, human factors, and methods analysis.

2. Students will have the ability to visualize engineering problems within a total system context and apply engineering design methods to formulate and solve problems

including the ability to recognize problem context and synthesize knowledge and skills from appropriate sources.

3. Students will be effective in oral and written communication.

4. Students will possess the following professional characteristics: leadership, ethics, the ability to work with others, an appreciation for other disciplines, adaptability, and an appreciation for life-long learning.

Applicable ABET Outcomes for this course

(a) An ability to apply knowledge of mathematics, science and engineering
(b) An ability to design and conduct experiments, as well as to analyze and interpret data
(e) An ability to identify, formulate and solve engineering problems
(g) An ability to communicate effectively
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Topical Outline and Schedule

Week #	IE-1054 Topic List and Schedule	Chapter Covered	Others
1	Course Introduction and Introduction to IE	Syllabus, Assignments, etc.	
2	General Discussion and Introduction to Productivity	Chapter 1	
3	Manual Work and Worker Machine Systems	Chapter 2	
4	Work Flow and Batch Processing	Chapter 3	
5	Manual Assembly Lines	Chapter 4	
6	Manual Assembly Lines	Chapter 4	
7	Motion Study and Work Design	Chapter 10	
8	Facility Layout Planning and Design	Chapter 11	
9	Introduction to Work Measurement, Direct Time Study and Predetermined Motion Time Systems e.g. MOST	Chapter 12, 13, 14	Midterm Exam
10	Introduction to Work Measurement, Direct Time Study and Predetermined	Chapter 12, 13, 14	

	Motion Time Systems e.g. MOST		
11	Standard Data Systems, Work Sampling, computerized Work Measurement and Economics of Time Standards	Chapter 15, 16 and 18	
12	Lean Production Part I	Chapter 19 Handouts	
13	Lean Production Part II	Chapter 19 Handouts	
14	Compensation Systems	Chapters 27-29	
15	The Goal and review for final exam	Discussion	
16	Project presentations		Presentations

Class Format

This course will be taught using a combined lecture/lab format.

It is imperative that you come to class prepared. This will generally involve reading one or more chapters of the textbook, viewing tutorial videos, thinking, and engaging with fellow students. This is a three credit hour class, which means you should expect to devote at least 9 to 12 hours of effort outside the scheduled class time every week.

Presentations

When you are selected to present, follow these guidelines:

- Introduce yourself and your team members.
- Succinctly state the problem, the assumptions made, and the appropriate theory or principle you used to solve the problem.
- Describe your solution as if your audience is unfamiliar with the problem.
- Comment on your solution; (e.g., does it make sense? What are the limits of validity? What will change if the assumptions are incorrect?)
- Describe how you verified your solution.
- Speak LOUDLY and clearly. The people at the back of the room have to hear and understand every word.

Be prepared in case of technology breakdown (e.g., use the whiteboard if the computer or projector fails).

Both the instructors and your fellow students will evaluate presentations.

Homework

Homework problems will usually be assigned each week and will be due in lecture the following week. Late homework assignments are not accepted and homework not turned in will receive a score of "zero". All work (computer and manual) should be shown for each problem so that partial credit may be given. No credit will be given for problems where work is not shown. Some homework may be done in groups of up to two people and if this is the case it must be indicated on the assignment. The group homework assignments will be indicated on the assignment. Selected problems from each homework assignment will be graded. Your lowest homework score for the term will be dropped.

If you're sick, or have a compelling emergency that prevents you from turning in the homework on time, email the instructor.

If you believe an error has been made in the grading of an assignment, bring it to the attention of a TA or the instructor within ONE WEEK of its return.

Exams and Grading

Two exams are scheduled for the course (a midterm and a final). If you must miss an exam, please make alternative arrangements with the instructor before the exam is given.

Cheating of any form on exams will result in a grade of 0 for exam.

Your grade will be based on the mid-term exam (20%), final exam (30%), homework (30%), and class attendance and course project (20%).

Students must have a passing grade on the two exams in order to pass the course.

Questions concerning the grading of homework assignments, project related materials, or exams must be presented to the instructor or the TA within one week (7 calendar days) after the materials have been made available for return to the student (this may be sooner than when the student picks up the materials).

Office Hours

If you don't understand something, and talking to your classmates doesn't help, then you should be seeking help from one of the instructors.

Office hours are times we have specifically set aside to be available to students. During office hours, you can come to our office; you don't need an appointment. We are also available at other times; please email to schedule a time. Current office hours will be posted on the class website.

Plagiarism and Academic Misconduct

Collaboration on homework assignments is permitted and encouraged. Your homework writeups will be individually written and represent your independent efforts.

Plagiarism, copying, and any other form of academic misconduct or dishonesty will not be tolerated. Cite all references, including books, technical reports, and web sites you have used. You may discuss the homework with other people currently taking this class, the instructors, and teaching assistants.

Examples of disallowed sources include websites that offer homework help; course documents from previous semesters; people or agencies that do your work for you.

You are not to share materials distributed in class with people outside the University. Uploading of course materials, including homeworks, handouts, homework and test solutions, etc. to the web is prohibited.

To reiterate: use of homework or test solutions from previous semesters or the web is not allowed. Getting homework help from the instructors and fellow students in the class is ok; looking up things on the Google, Baidu, and the Wikipedia is ok; getting help from websites offering homework help and problem solutions is NOT ok.

If you have any questions about referencing material, or the boundaries of acceptable collaboration, please talk to Prof. Reed.

Class Participation

As members of an academic community, all students are expected to actively participate in and contribute to class discussions. You are expected to engage with the class during the lecture/lab time, and to be prepared to think and answer questions on your feet. There is no penalty for not knowing the answer to a question, but you need to be able to "think out loud" and demonstrate the procedure you will follow to arrive at a solution. So, if you're asked a question in class, be prepared to figure out the answer.

You are also expected to follow and critique the presentations of other teams, and provide useful feedback to them so they can learn from the experience.

Other Useful Information

Although there are no formal prerequisites for this class, you are expected to know how, or learn how, to do the following:

- Use an internet browser to find things on the web.
- Use Word to write up and print your assignments.
- Open, read, and print Acrobat pdf files.

For most of you, this will be your first major course to the field of industrial engineering. You will have to learn how to approach industrial engineering problems. Industrial engineering is about problem solving. In this class, you will develop the skills you need to become a creative problem solver.

When you get your graded homework back, you should go over any problems you did not do well on. Homework solutions will not be distributed, but you may contact a TA if you need help in understanding where you went wrong.

You should be having fun and learning something. If you're not, please tell us.