IE 1054 – Productivity Analysis
Syllabus
Fall Term 2019 - 2020

Instructor: Prof. Robert T. P. Lu
Credit Hours: 3
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Teaching Assistant:

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Lectures
Section 1 Tuesday, 13:50 PM - 16:25 PM, Zone 3, room 104
Section 2 Thursday, 09:10 PM - 11:50 PM, Zone 3, room 104

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

Course Description

This course is an introductory course which provides an overview of industrial engineering. This course is designed for students who are majoring in or are interested in industrial engineering practice. Specific topics include productivity, process analysis, manual assembly lines, logistics operation, project management, work and task design, motion and time studies, lean production, inventory management, work organization, facility design, and job evaluation and performance appraisal. Many examples of real-world industrial practice will be delivered.

Course Goal

This course is for the students to understand fundamental concepts in 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
Continuous Improvement

Incentive Systems
Facility designs
Inventory management

Course Objective

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:

(a) An ability to apply knowledge of mathematics, science, and engineering
(b) An ability to analyze and interpret data
(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) An ability to identify, formulate, and solve engineering problems
(e) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Pre-requisites No specific courses, but students must show sufficient academic maturity.

Co-requisites None

Grading

Mid-term Exam	25%
Final Exam	25%
Project/Casework	25%
Homework	15%
Class Participation – (Think and Discuss)	10%

Final grades:

Level	Letter Grade	Reported Numerical Score	Grade Points
Superior Performance	A	90 - 100	4.0
	A-	85 - 89	3.7
Meritorious Performance	B+	80 - 84	3.3
	B	76 - 79	3.0
	B-	73 - 75	2.7
Adequate Performance	C+	70 - 72	2.3
	C	66 - 69	2.0
	C-	63 - 65	1.7
Minimal Performance	D+	61 - 62	1.3
	D	60	1.0
Insufficient Performance (Failure)	F	< 60	0.0

Course Policies:

- Students are expected to come prepared for each lecture by reading the appropriate material prior to class
- 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
- Late assignments will **NOT** be accepted, and all assignments, projects, and examinations must be **completed/taken at the scheduled time**. No exceptions will be made unless there are truly extenuating circumstances
- Cheating or academic dishonesty in any form will result in a grade of F for the course; there will be no exceptions to this policy.
- Professional classroom demeanor is required; in particular, all cell phones and personal electronic devices must remain off or silent during the lecture.
- Do not conduct side conversations during the lecture as it is distracting to the lecturer and other students.

Email Policy I will respond to emails as promptly as I can, usually within two days. For detailed technical questions, please come to the TA or the instructor during office hour. The instructor will not be addressing detailed technical questions via email as it is not efficient.

Project/casework

The project/casework is designed to apply fundamental industrial engineering knowledge to solve real-world problems. Detail description of the project/casework will be provided during class. Project/casework will be team-based. Evaluation of the project/casework will be based on both the presentations and the written reports. In the team-based project/casework report, the student will need to identify which part of the report he/she is responsible for. The overall performance of the team reports and presentations will account for 50% of the student's grade, and the student's personal performance of the report and presentation will account for the other 50%. That means, while project/casework is team-based, the evaluation will be individual-based.

Audio-Video Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion, and activities without the advance written permission of the instructor, and any such recording properly approved in advance should be used solely for the student's private use.

Special Accommodations

If the student has a disability for which the student is or may be requesting an accommodation, the student is encouraged to contact the instructor.

Tentative Schedule

Week 1: Introduction to IE
Week 2: Manual Work and Worker Machine Systems
Week 3: Work Flow and Batch Processing
Week 4: Manual Assembly Lines
Week 5: Logistic Operation
Week 6: Projects and Project Management
Week 7: Introduction to Methods Engineering and Operations Analysis
Week 8: Charting and Diagramming Techniques for Operations Analysis
Week 9: Mid-term Exam
Week 10: Motion Study and Work Design
Week 11: Work Measurement
Week 12: Direct Time Study and Predetermined Motion Time Systems
Week 13: Facility Layout Planning and Design
Week 14: Job Evaluation and Performance Appraisal

Week 15: Lean Production
Week 16: Inventory Management
Week 17: Final Exam
Week 18: Final Project Presentation