IE 1054 – Productivity Analysis
Syllabus
Fall 2022

Instructor: Prof. Yang Liu
Credit Hours: 3
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Office Hours: Thursday, 9:30 - 11:30 AM, 1:30 -- 5:30 PM, 7:00 - 9:00 PM
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Lectures
Friday, 8:15 AM - 11:00 AM, Room 103, Zone 3

Textbook Mikell P. Groover, *Work Systems: The Methods, Measurement and Management of Work*, 1st Edition, Pearson, 2014.

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 industrial engineering. Specific topics include productivity, work system, manual assembly lines, logistics operation, project management, motion study and work design, facility layout planning and design, work measurement, time study, learning curves, lean production, and six sigma.

Course Goal
This course is for students to understand fundamental concepts in Industrial Engineering including:
History of Industrial Engineering
Problem Solving
Assembly Line Balancing and Lean Operations
Charting and Diagramming for Operations Analysis
Task Analysis and Design
Productivity and Work Measurement
Continuous Improvement
Facility Layout Planning and Design

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 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	35%
Project	15%
Homework	15%
Quiz	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 Email will be responded as promptly as possible. For detailed technical questions, please come to the TA or the instructor during office hour.

Project

The project is designed to apply fundamental industrial engineering knowledge to solve real-world problems. Detail description of the project will be provided during class. Project will be team-based. Evaluation of the project will be based on both the presentations and the written reports. In the team-based project 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 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, discussions, 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.

Make-up exam Policy

Make-up exam grading is only to replace your final exam grading. Students who pass the course after the make-up exam will receive only a passing grade as the final grade.

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 Industrial Engineering
Week 2: Manual Work and Worker-Machine Systems
Week 3: Work Flow and Batch Processing
Week 4: Manual Assembly Lines
Week 5: Logistics Operations
Week 6: Service Operations and Office Work
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: Projects and Project Management
Week 11: Motion Study and Work Design
Week 12: Facility Layout Planning and Design
Week 13: Introduction to Work Measurement
Week 14: Direct Time Study and Predetermined Motion Time Systems
Week 15: Lean Production
Week 16: Six Sigma and Other Quality Programs
Week 17: Project Presentation
Week 18: Final Exam