

**IE 1054 – Productivity Analysis  
Syllabus  
Fall Term 2021 - 2022**

**Instructor:** Prof. Yang Liu  
**Credit Hours:** 3  
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**Office Hours:** Tuesday, Wednesday, Thursday, 10 AM - 12 PM, 4:30 PM - 5:30 PM  
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**Teaching Assistant:**

**Section 1**

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**Section 2**

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**Lectures**

**Section 1**

Tuesday, 1:50 PM - 4:25 PM, Room 104, Zone 3

**Section 2**

Thursday, 1:50 PM - 4:25 PM, Room 104, Zone 3

**Textbook** Mikell P. Groover, *Work Systems: The Methods, Measurement and Management of Work*, 1<sup>st</sup> Edition, 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 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, six sigma, work organization, and job evaluation and performance appraisal.

**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	30%
Final Exam	30%
Project	15%
Homework	25%

**Final grades:**

<b>Level</b>	<b>Letter Grade</b>	<b>Reported Numerical Score</b>	<b>Grade Points</b>
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: National Holiday  
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: Facility Layout Planning and Design  
Week 12: Introduction to Work Measurement  
Week 13: Direct Time Study and Predetermined Motion Time Systems  
Week 14: Lean Production  
Week 15: Six Sigma and Other Quality Programs  
Week 16: Job Evaluation and Performance Appraisal  
Week 17: Project Presentation  
Week 18: Final Exam