

**IE 1054 – Productivity Analysis
Syllabus
Fall Term 2022 - 2023**

Instructor: Prof. Robert T. P. Lu

Credit Hours: 3

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Office Hours: Tuesdays, Wednesdays, and Thursdays
11:30 - 13:50
17:20 - 18:00
During online teaching period, office hour needs to be booked to ensure the discussion is confidential. Make request in QQ group before 6 pm the previous day

Office: Zone 4, room 220

Teaching Assistant:

Section 1 Finn Yang 杨帆
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Lectures

Section 1 Tuesday, 13:50 - 17:20, week 2 to week 13

Section 2 Wednesday, 13:50 - 17:20, week 2 to week 13

Classroom Zone 3, room 104

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

Course Description

This course is an introductory course that provides an overview of industrial engineering with a focus on Production 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 practices 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	25%
Homework	15%
Class Participation – (Think and Discuss)	10%

Final grades:

等级成绩 (Level score)	A	A-	B+	B	B-	C+	C	C-	D+	D	F
等级成绩 (Level score)	优秀 (Excellent)		良好 (Good)		中等 (Average)		合格 (Qualified)			不合格 (Failed)	
百分制成绩 (Percentage score)	100~90	89~85	84~80	79~76	75~73	72~70	69~66	65~63	62~61	60	<60
成绩绩点 (Grade point)	4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0

Course Policies:

- Students are expected to come prepared for each lecture by reading the appropriate material prior to class
- Unless announced otherwise, 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 to the student
- Late assignments will **NOT** be accepted and all assignments, projects, examinations, etc. 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, 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.

Teamwork

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. The 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 the 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/or 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 own 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 2: Introduction to IE
Week 3: Manual Work and Worker Machine Systems
Week 4: Work Flow, Batch Processing, and Manual Assembly Lines
Week 5: Logistic Operation and Project Management
Week 6: Methods Engineering and Operations Analysis
Week 7: Charting and Diagramming Techniques for Operations Analysis
Week 8: Motion Study, Work Design, and Work Measurement
Week 9: Direct Time Study and Predetermined Motion Time Systems

Week 10: Facility Layout Planning and Design
Week 11: Lean Production and Inventory Management
Week 12: Final Project Presentation
Week 13: Final Exam

Tentative Exam Schedule

Midterm Exam: Week 8
Final Exam: Week 13

Special Notice: All contents in this syllabus are subject to changes based on the needs of the pandemic control.