

IME 452 Industrial Engineering Design - II

Designation: Required

Catalog Data: IME 452, Industrial Engineering Design II (II, 3) A team project approach to industrial engineering design including assembly lines, transfer lines, cellular manufacturing, facilities, operation, and material flow design; facilities design and operation; production systems design. (Lec.3) Pre: 451 or permission of instructor.

Textbook: _ Modeling and Analysis of Manufacturing Systems, R. G. Askin.
Software used: Excel, Promodel, LINDO/LINGO and Visual Basic

Prerequisites by Topic:

1. Intermediate Calculus and Analytical Geometry.
2. Computers
3. Probability
4. Statistics
5. Operations Research – deterministic systems
6. Operations Research – stochastic systems.

Course Objectives: After successful completion of this course, students will have the following:

Objective	Link to Curriculum Objective
1. The ability to design and analyze manufacturing systems.	6
2. Quantitatively analyze specific types of manufacturing engineering problems such as line balancing, scheduling, and system reliability and productivity.	6
3. Understand the complex issues involved with planning a manufacturing system and the diverse human perspectives that must be considered.	6,12
4. Evaluate the performance of different manufacturing systems using computer applications such as modeling, simulation, spreadsheets, and optimization techniques.	2
5. Demonstrate proficiency in manufacturing systems layout for different environments including flexible manufacturing systems.	6
6. Work together in a team on a system design and analysis case from industry.	6,9
7. Demonstrate written and oral communication skills in class exercises.	14
8. Begin a career as an industrial or manufacturing engineer in industry.	12,13

Topics Covered:

The following topics will be covered in this course:

- Assembly Systems – Deterministic and stochastic line models.
- Cellular Manufacturing –configuration and operation models.
- Flexible Manufacturing Systems – Design, Loading and operation.
- Facilities Design – SLP, Quadratic Programming and heuristics.
- Service Facilities Design and Operation.
- Manufacturing Systems Design – integrated consideration with facilities design.

Contribution to Professional Component:

Engineering Science: 1 credit or 33%.

Engineering Design: 2 credits or 67%.

Course Outcomes:

Department Outcome	Indicator
B. An ability to use modern computing tools and techniques to effectively solve industrial engineering problems	Homework Assignments, Project Report, Overall Grade
I. An ability to design, develop, implement and improve integrated systems that involve people, materials and energy.	Homework Assignments, Tests, Project Report, Overall Grade
M. An ability to take an assigned engineering problem, analyze it and formulate and implement a solution.	Project Report
N. An ability to effectively contribute to a team solution of a complex engineering problem.	Project Presentation, Project Report, Overall Grade
Q. An understanding of the effects of industrial engineering activities on society and the environment.	Project Report, Homework Assignments
R. An understanding of the necessity for continued professional development and education for the effective professional practice of industrial engineering.	Homework Assignments
S. An ability to effectively communicate the reasoning behind specific engineering decisions.	Homework Assignments, Tests, Project Presentation, Project Report
T. An ability to present engineering information clearly and succinctly in written form.	Homework Assignments, Project Report
U. An ability to make clear oral presentations.	Project Presentation
V. An ability to present and discuss diverse problems and ideas in group situations.	Project Report

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