

## MENG561 – MANUFACTURING SYSTEMS ENGINEERING

**Department:**

Mechanical Engineering

**Program Name:**

Mechanical Engineering

**Program Code:** 23**Course Number:**

MENG561

**Credits:**

3 (3,0)

**Year/Semester:**

2017-2018 Spring

 Required Course     Elective Course     Service Course**Prerequisite(s):** None**Catalog Description:**

CAD/CAM Hardware; CAD/CAM software, Integrative manufacturing Planning and control, Group Technology, Computer Integrated manufacturing (CIM), Modeling methodologies and analysis tools for CIM, Systems analysis and design methods, Computer Assisted Systems Engineering (CASE).

**Course Web Page:** <http://staff.emu.edu.tr/qasimzeeshan/en>**Textbook(s):**

Groover, M.P. (2013). Fundamentals of Modern Manufacturing: Materials, Processes And Systems, 5th edition, John Wiley & Sons Inc.

**Indicative Basic Reading List :**

Katsundo, Hitomi (1996). Manufacturing Systems Engineering: A Unified Approach to Manufacturing Technology, Production Management and Industrial Economics, CRC Press

Groover, M.P. (2008). Automation, Production Systems, and Computer Integrated Manufacturing, Third Edition, Pearson Prentice Hall.

Kalpakjian & Schmid (2014). Manufacturing Engineering and Technology, SI 7 Edition - Pearson

Gershwin, Stanley B. (1993). Manufacturing Systems Engineering. Englewood Cliffs, NJ: Prentice Hall.

**Topics Covered and Class Schedule:****(3 hours of lectures per week)****Week 1-2: Introduction to Manufacturing Systems Engineering**

Systems Design, Systems Engineering, Basic Concepts and Principles of Manufacturing Systems and Manufacturing Systems Engineering, Types of Manufacturing Systems, Design for Manufacturing

**Week 3-4: Automation Technologies for Manufacturing Systems**

Automation Fundamentals, Hardware for Automation, Computer Numerical Control, Industrial Robotics

**Week 5-6: Computer Integrated Manufacturing Systems**

Material Handling, Fundamentals of Production Lines, Manual Assembly Lines, Automated Production Lines, Cellular Manufacturing, Flexible Manufacturing Systems (FMS), Computer Integrated Manufacturing (CIM), Computer-aided Design (CAD). Computer-Aided Manufacturing (CAM), and Computer-aided Engineering (CAE), Computer-aided Process Planning (CAPP), Group Technology

**Week 7-8: Manufacturing Support Systems**

Process Planning, Manufacturing Engineering Functions, Production Planning and Control, Just-In-Time Delivery Systems, Lean Production, Toyota Production System

**Weeks 9-10      Mid-Term Examination**

**Week 11-12: Manufacturing Support Systems**

Product Quality, Process Capability and Tolerances, Statistical Process Control, Quality Programs in Manufacturing Inspection Principles, Modern Inspection Technologies

**Week 13-14: Intelligent Manufacturing**

Intelligent Manufacturing Systems, Cloud Manufacturing, Big Data Analytics, RFID Applications, Industry 4.0

**Week 15: Final Examination & Project Presentation****Term Assignment:**

Each student is expected to choose a term project and produce a paper at the end of the semester. Students are also required to make presentations for their project. Completion of the term assignment and presentation is a requirement to pass the course.

**Course Learning Outcomes:**

The focus of Manufacturing Systems Engineering is to enable the students to gain knowledge about the modern methodologies for design, analysis and operation of manufacturing systems. The course is intended to provide with the following benefits to the students:

1. An understanding of the overall aspects of Manufacturing Systems and the Manufacturing Supporting Systems.
2. An understanding of the practical tools and methods for Design and Analysis of Manufacturing Systems.
3. An awareness of the recent related research on Manufacturing Systems.
4. Practice oral and written communication skills through the design project and presentation.
5. Prepare them to work in modern manufacturing industry.

	<b>Method</b>	<b>No</b>	<b>Percentage</b>
<b>Assessment</b>	Midterm Exam(s)	1	20 %
	Design Project Report *	1	30 %
	Design Project Presentation **	1	10 %
	Final Examination	1	40 %

**Relationship of Course to Program Outcomes**

This course introduces students to the fundamentals of design, planning and control of manufacturing systems. Concepts of design for manufacturing and assembly, process planning and operations design, production planning and control, facilities layout design, production scheduling as well as group technology, etc., will be addressed.

**Prepared by:** Assoc. Prof. Dr. Qasim Zeeshan

**Date Prepared:** Dec 2017

\* Submission of the report on the selected topic in the format of a paper.

\*\* Short presentation on the selected topic (30 mins)

**NG Policy:** Students who do not attend any of the above assessment activities (such as mid-term exam, project report, presentation etc.) will be given NG (Nil Grade).