Flexible Manufacturing System (MEng7111)

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| **School of Mechanical & Industrial Engineering****Addis Ababa Institute of Technology****Addis Ababa University** |
| **Course Number** | MEng 7111 |
| **Course Title** | Flexible Manufacturing System |
| **Degree Program** | M.Sc in Mechanical Engineering (Industrial Engineering) |
| **Instructor** | Desalegn W. (PhD) |
| **Credit Hours:**  | 3 |
| **ESTC** | 7 |
| **Contact Hours** | 3 Lecture |
| **Course Objective** | * During 1960 to 1970, cost was the primary concern. Later quality became a priority. As the market became more and more complex, speed of delivery became something which is customer critical requirement. A new strategy was formulated: Customizability.
* The companies have to adapt to the environment in which they operate, to be more flexible in their operations and to satisfy different market segments (customizability). Thus the course will provide the basics of FMS to gain competitive advantage.
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| **Course Description** | * Flexible Manufacturing Systems (FMS) involve substituting machines capable of performing a wide and redefinable variety of tasks for machines dedicated to the performance of specific tasks.
* FMS can also be programmed to handle new products, thus extending the machines' life cycles.
* Thus they represent a change from "standardized goods produced by customized machines" to "customized goods produced by standardized machines".
* This course contains fundamental, new and updated materials in this field.
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| **Course Outline** | **Chapter 1: Introduction to Flexible Manufacturing Systems*** History of FMS - FMC & FMS - Defns. - The principle objectives of FMS - Basic components of FMS - Flexibility in manufacturing - Types of FMS - Types of FMS layouts - Adv. and Disadv. of FMS implementation, - Application areas of FMS

**Chapter 2: Role of Computers in Manufacturing*** Computers in Manufacturing – Computer in Design – Computers in Manufacturing Process Plan – Computers in Manufacturing Process Control

**Chapter 3: CNC Machine Tools*** Introduction - CNC definition - Major functions of CNC M/c tools - Classifications of CNC M/c tools - Major components of CNC system

**Chapter 4: Artificial Intelligence (AI)*** AI Introduction - AI techniques - Components of intelligent manufacturing system: Intelligent design, process planning, manufacturing, control - Applications of AI - Future trends

**Chapter 5: Industrial Robotics****Chapter 6: Group Technology** **Chapter 7: Industrial Networking****Chapter 8: Manufacturing Philosophies (MRP, JIT and TOC)** |
| **Pre-requisites** | None |
| **Semester** | II |
| **Status of Course** |  |
| **Method of Delivery** | * Lecture supported by tutorials
* Assignments and Projects.
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| **Evaluation**  | * Assignment = 20%
* Project work = 30%
* Final Exam = 50%
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| **Attendance Requirements** | * Minimum 75% attendance
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| **Semester Hours:** |  **48 Hours** |
| **References** | 1. A. Raouf, M. Ben-Daya, **Flexible Manufacturing Systems: Recent Developments (Manufacturing Research and Technology)**, Elsevier Science, 1995
2. Boucher, **Computer Automation in Manufacturing** , Chapman & Hall, London, 1996
3. Greenwood, Nigel R. **Implementing Flexible Manufacturing Systems**, London, 1988
4. M.P. Groover, "**Automation, Production Systems, and Computer-Integrated Manufacturing"**, Second Edition, Prentice Hall International, 2001
5. M.P. Groover, "**Automation, Production Systems, and Computer-Integrated Manufacturing**", Second Edition, Prentice Hall International, 1987
6. Mikell P. Groover etal, **Industrial Robotics, Technology, programming and Applications,** Mc-GrawHill, 1986
7. Powers Jr. **Computer-Automated Manufacturing**, Mc-GrawHill, 1987, Singapore
8. Rembold, U. etal, **Computer-Integrated Manufacturing and Engineering**, Addison Wesley, 1993
9. T.C. Chang, R.A. Wysk, "**An Introduction to Automated Process Planning Systems**", Prentice-Hall International,1985
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