

Liverpool John Moores University

Title: MANUFACTURING SYSTEMS
Status: Definitive
Code: **6097ENG** (115963)
Version Start Date: 01-08-2011

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Stephen Ebbrell	Y

Academic Level: FHEQ6
Credit Value: 10.00
Total Delivered Hours: 51.00
Total Learning Hours: 100
Private Study: 49

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	21.000
Practical	6.000
Tutorial	21.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70.0	3.00
Report	AS2	Lab Assignment	15.0	
Report	AS3	Lab Study	15.0	

Aims

The module aims to give students a good understanding of material removal processes and the theory relating the manufacturing system to process performance. This will extend to the use of automation in manufacturing and how its effective implementation can increase productivity and reduce costs especially when combined with process optimisation methods.

Learning Outcomes

After completing the module the student should be able to:

- 1 Evaluate and select appropriate material removal processes for the cost effective production of parts in a modern manufacturing environment.
- 2 Demonstrate an in-depth knowledge of the automation used with manufacturing systems and its impact on productivity and cost.
- 3 Apply process optimisation techniques to manufacturing processes to determine the strength to which process parameters affect part quality and how they can be optimised.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3
Lab Assignment	1		
Lab Study	3		

Outline Syllabus

Material Removal Processes and Machines

Theory of metal machining, cutting tool materials, cutting fluids, machining operations, machine tool operations, machine tool design, abrasive processes, process economics, non-traditional and advanced machining processes.

Automation in Manufacturing

The Computer Integrated Manufacturing (CIM) environment, Machine control for different applications, programming techniques, part programming languages, main preparatory functions, programming with CAD/CAM systems, machining from 3D models, tool path generation from solid models, analytical geometry, CAM and rapid prototyping, robotics technology: types, motions, accuracy, repeatability, programming and applications.

Optimisation of Manufacturing Processes

Design and analysis of experiments for manufacturing systems, orthogonal array selection and utilization, analysis and interpretation methods for experiments, confirmation experiments.

Learning Activities

Combination of lectures, tutorials, and laboratory work

References

Course Material	Book
Author	Amiriouche F.M
Publishing Year	2004
Title	Principles of Computer Aided Design and Manufacture
Subtitle	
Edition	
Publisher	Prentice Hall
ISBN	0130646318

Course Material	Book
Author	Altinas Y
Publishing Year	0
Title	Manufacturing Automation
Subtitle	
Edition	
Publisher	Cambridge University Press 2000
ISBN	0-521-65973-6

Course Material	Book
Author	McMahon C & Browne J
Publishing Year	1998
Title	CADCAM: Principles, Practice and Manufacturing Management
Subtitle	
Edition	2nd Edition
Publisher	Prentice Hall
ISBN	0-201-17819-2

Course Material	Book
Author	Kalpakjian S
Publishing Year	2006
Title	Manufacturing Engineering and Technology
Subtitle	
Edition	
Publisher	Addison-Wesley
ISBN	0131489658

Course Material	Book
Author	Mikell P. Groover
Publishing Year	2007
Title	Fundamentals of Modern Manufacturing
Subtitle	
Edition	
Publisher	Wiley
ISBN	978047174485-6

Course Material	Book
Author	Phillip J. Ross
Publishing Year	1996
Title	Taguchi Techniques for Quality Engineering
Subtitle	
Edition	2nd Edition
Publisher	McGraw Hill
ISBN	0-07-053958-8

Course Material	Book
Author	Craig J.J
Publishing Year	2005
Title	Introduction to Robotics: Mechanics and Control
Subtitle	
Edition	3rd Edition
Publisher	Pearson Prentice Hall
ISBN	0131236296

Notes

The module is designed to prepare students for the modern manufacturing environment and give them the skills to understand a process at the fundamental level and relate this to performance. Students will be introduced to optimisation techniques which will allow them to study a process and determine the dominant factors which affect quality, productivity and cost.