

Liverpool John Moores University

Title: MANUFACTURING TECHNOLOGY
Status: Definitive
Code: **5507ENGSBC** (113907)
Version Start Date: 01-08-2012

Owning School/Faculty: Engineering
Teaching School/Faculty: Shanghai British College

Team	Leader
Stephen Ebbrell	Y

Academic Level: FHEQ5
Credit Value: 12.00
Total Delivered Hours: 37.00
Total Learning Hours: 120
Private Study: 83

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	20.000
Practical	5.000
Tutorial	10.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	60.0	2.00
Essay	AS2	Coursework	40.0	

Aims

To give students and introduction to traditional and non-traditional material-removal processes and how they can be used effectively in an automated and CIM environment.

Learning Outcomes

After completing the module the student should be able to:

- 1 Select suitable conventional machining processes and techniques for generating geometrical forms for a given component specification.
- 2 Explain the benefits of using CNC machining and automation in a modern CIM environment.
- 3 Select suitable non-conventional machining techniques for a given component specification.

Learning Outcomes of Assessments

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

EXAM	1	2	3
CW	1	2	

Outline Syllabus

Machining processes and machine tools

Component manufacture: specify components for manufacture, e.g. surface texture, material removal rates, speeds and feeds, cycle times.

Machining techniques: production of flat and cylindrical geometry e.g. turning, milling, surface grinding, lapping, planing, cylindrical grinding, centreless grinding, honing, horizontal boring, vertical boring.

Tooling requirements: multi-tooth cutting, e.g. milling, grinding, hobbing, drilling, reaming, and broaching; single-point cutting e.g. turning, planing and slotting; appropriate cutting angles for given materials; types, advantages and disadvantages of coolants and cutting fluids used for various materials and processes.

Work-holding techniques: selection of appropriate work-holding devices e.g. three and four jaw chucks, vices, jigs, fixtures, clamping arrangements, vee blocks, angle plates and magnetic chucks; health and safety issues and limitations of devices.

CNC machining and Automation

Machining techniques: Generation of CNC data for 3, 4 and 5-axis milling, 2 and multi-axis turning, with the aid of CAD/CAM systems.

CNC programming: Programming techniques for computer controlled machine tools.

Manual and off-line programming, use of CAD/CAM systems. Use of post processors. Machining simulation. High speed machining. Hard turning.

Automation in manufacturing, Computer Integrated Manufacturing (CIM), adaptive control, material handling and movement, industrial robots, sensor technology, economic considerations.

Non-traditional machining

Component manufacture: principle of operation of the non-conventional machining techniques, e.g. electro-discharge machining (EDM), wire erosion, ultrasonic machining, etching of electronic printed circuit boards (PCBs), laser-beam machining, plasma-jet machining; specification of components for non-conventional machining techniques, e.g. criteria-tolerances, types of material, suitable technique, surface texture, material removal rate, cost factors.

Tooling requirements: tooling and ancillary equipment needed to perform non-conventional machining techniques; work-holding techniques; health and safety

issues.

Learning Activities

Combination of lectures, tutorials, and laboratory work

References

Course Material	Book
Author	Kalpakjian S
Publishing Year	2005
Title	Manufacturing Processes for Engineering Materials
Subtitle	
Edition	
Publisher	Addison Wesley
ISBN	

Course Material	Book
Author	Mikell P. Groover
Publishing Year	2007
Title	Fundamentals of Modern Manufacturing
Subtitle	
Edition	
Publisher	McGraw Hill
ISBN	

Notes

The module will equip students with industrial relevant knowledge that will allow them to understand the modern manufacturing environment with regard to material removal processes.