Definitive Module Document (DMD)

Module Code:2AAD0028

Title of Module
Full Title: Manufacturing Technology
Short Title: Man Tech

Version: 1

Credit Points: 30

Level / ECTS Level: 2

First Offered: 26/9/2005 00-00-00

6. Home Department:
AAD

7. Departments(s) contributing to teaching:

9. Module Aims:
- further their knowledge and understanding of manufacturing processes, manufacturing technologies and manufacturing automation

- select appropriate materials and manufacturing processes with respect to various constraints

10a. Learning Outcomes: Knowledge and Understanding:
- evaluate alternative manufacturing processes with respect to a given product

- identify the range of manufacturing processes available to an engineer

- identify the range of control of manufacturing processes available in industry

- identify appropriate H&S environmental issues regarding manufacturing processes and materials

10b. Learning Outcomes: Skills and Attributes:
- plan the manufacturing processes for simple products

- use appropriate analytical techniques to compare alternative methods of processing a manufactured component

- use appropriate measures to design and analyse control system of simple manufacturing processes

11. Module Content
11a Module Content:
The module covers support functions in manufacturing, such as processes planning, design for manufacture and value analysis. The role of automation and control in the manufacturing process are also developed in parallel with

considerations of competitive aspects and economics of manufacturing and the place of computer-integrated manufacturing systems. An introduction to computer numerical control is also offered.

The specific manufacturing techniques developed during the module are in welding processes, concentrating on aspects such as electron beam welding, plasma, cold welding and ultrasonics. Non traditional machining processes are also emphasised, such as chemical, electrochemical and electro-discharge, as well as a broad coverage of surface finishing technologies and sheet metal fabrication. Health and safety, recyclability and waste handling are discussed wherever relevant.

11b. Further details on how the learning outcomes of the module will be achieved:
The trust of this module is to develop the students' knowledge and understanding of manufacturing technologies, their application and associated supporting processes for the benefit of the enterprise. Hence, the intended learning outcomes are facilitated through a combination of approaches to learning and teaching, typically this will include lectures and tutorials, practical activities. These activities will be supported by the module team and by encouraging the students to access a variety of resources, eg Studynet, academic texts and case studies.

The topics covered are;-

Support Functions in Manufacturing; Process Planning, CAPP, Design for Manufacture & Assembly (DFMA), Value Engineering/Value Analysis (VE/VA), Rapid Prototyping.

Automation of and Control of Manufacturing Processes; Simple black box concept, including the basics of open and closed loop principals, Boolean Algebra, relating to design of systems, Adaptive Control, Materials Handling, Industrial Robots, Sensor Technology.

Competitive Aspects & Economics of Manufacturing; Selection of Materials, Product Design and Quantity of Materials, Substitution of Materials - recycleability, Selection of Manufacturing Processes, Process Capabilities, Basic calculations in terms of feeds and speeds and depth of cuts, Jig and tool design - their relative costs.

Sheet Metal Fabrication; Rolling mill construction, metal thickness control, Mill Modulus, springback, Spinning, rubber forming, stretch forming, sheet metal formability tests, such as Erichsen, Olsen and Fukui, Failure Limit Diagrams (FLDs).

Welding Processes; re-cap on level 1 processes, Plasma Welding, Electron Beam Welding, Laser Beam Welding, Cold Welding, Ultrasonic Welding, Friction Welding, Relative merits and economics.

Non-Traditional Machining Processes; Chemical Machining, Electrochemical Machining, Electro-Discharge Machining, Surface Technology, Surface Treatment/Coating/Cleaning, Protective and aesthetic finishing, Case Hardening, Vapour Deposition, Electroplating, Anodising.

Introduction to CNC Machining; NC, CNC, DNC, Machine Configurations, Drives and Feedback Control,

Programming Optimisation, Tooling Systems, Work Holding- Flexible Fixturing, Associated Automatic Work Handling.

Computer-Integrated Manufacturing Systems; Computer-Integrated Manufacturing, Computer-Aided Design & Engineering, Computer-Aided Manufacturing, Computer, Simulation of Manufacturing Systems, Group

Technology, Cellular Manufacturing, Flexible Manufacturing Systems, Just-in-Time Production, Manufacturing Communications Networks.

12. Language of Delivery:
English

13. Language of Assessment:
English

14. Assessment Details (Academic):
Coursework: 50

Exam: 50

Other:

Assessment Notes:
Separate passes are required in both the coursework and examination elements of assessment.

Typical assessment will consist of-

- Individual assignments/phase tests - 50%

- One unseen examination - 50%

Each assessment satisfies a selection of the learning outcomes.

15. Locations(s):
UH HATFIELD

16. Pre and Co-Requisite:

Pre-Requisite
1AAD0008-

Co-Req

Prohibited

17. Subject Board of Examiner/s:

18. Comments
'Manufacturing Engineering & Technology' by S. Kalpakjian