

COURSE SYNOPSIS

CORE COURSES

MKMP 1703 - CAD/CAM

This course provides basic techniques involved in computer graphics and modelling. Issues in the selection, implementation and management of a Computer Aided Design (CAD) system or a Computer Aided Manufacturing (CAM) system. It also covers the importance of CAM, CNC machine technology, manufacturing systems and programming. Students are required to complete CAD/CAM projects using up-to-date facilities available in the Production Laboratory.

MKMP 1713 - Product Development and Manufacture

This course introduces the product development and manufacture activities and fundamentals. Main content explains the issues affecting needs for reduction of product development cycle times, phases of product design and development, and capturing customer requirements. The course also defines product needs and development of product specifications, product selection, product architecture and prototyping. It involves the manufacturing aspects in terms of components classification, process selection, materials and component manufacture, finishing and assembly operation.

MKMP 1903 – Research Methodology

This course aims to provide students with fundamental knowledge of research and the methodologies commonly used in engineering. It encompasses literature review, problem formulation, designing research methods, analysis methods and report writing.

MKMP 2763 - Advanced Manufacturing

This course focuses on automation and advanced techniques used in modern manufacturing, various automation systems, their applications and advantages. The topics include principles and basic concepts of CAD/CAM, CAPP and their applications in various manufacturing automation systems such as GT, FMC, FMS and CIM. It also covers the CNC technology and part programming of simple components. Current issues related to advanced manufacturing practices such as lean, agile, networking and cyber manufacturing are also highlighted. Students will be assigned a case study related to advanced manufacturing.

ELECTIVE COURSES

MKMP 1723 - Engineering and Technology Management

This course introduces the fundamental of engineering management, function of management, planning, coordinating, organising, leading and monitoring in an engineering context to train engineers as managers. The topics include the introduction to technology management, definition, components of technology, technology acquisition strategies, case studies of technology transfer, competitive advantage of organisations, characteristics of fast response organisations, innovation management and intellectual property.

MKMP 1733 - Automation & Robotics

This course delivers the principles of design and selection of automated systems in a manufacturing perspective where software and hardware involved in an automation system. Example of robotic technology and its use in various industrial applications is also given.

MKMP 1743 - Tooling for Production

This course aims to equip students with fundamental knowledge of tooling used in production. The topics include introduction to various toolings, their importance, design procedures and responsibilities of a tooling engineer. Procedures in designing jigs and fixtures and selection of tooling for various applications are also delivered. The course also covers the selection and design of the various types of dies for press working. It utilises computer aided analysis of jigs and fixture design and stamping dies.

MKMP 1753 - Manufacturing Sciences

This course aims to provide basic principles and theories of various manufacturing processes. Characteristics of the processes including the setting of parameters for processes and tooling are also given. The course also uses basic case study as a basis for further analysis and development of manufacturing techniques.

MKMP 1763 - Design for Manufacture and Assembly

This course focuses on the cost reduction by drawing attention to the design procedures to assist manufacture and assembly. The intention is to provide design philosophy on how to improve product design for easy and low-cost manufacturing and assembly. The course also highlights issues in designing for casting, welding, machining and other manufacturing processes and products that require assembly.

MKMP 1773 - Advanced Quality Engineering

This course is designed to expose the students to engineering design of experiments technique for process and quality improvement. It involves the application of Factorial Design, 2-level Fractional Factorial design, Fold Over and Plackett-Burman and design optimisation techniques such as response surface methodology. Taguchi Method for quality and process improvement will also be discussed.

MKMP 2703 – Information Technology for Manufacturing

This course introduces the concepts of Information Technology (IT) and the importance of IT in manufacturing. Basic software, operating systems and existing IT tools are amongst the topics covered. Relationship between the role of IT and design methods, implementation and managing IT systems are also included.

MKMP 2713 - Computer Aided Process Planning

This course provides introductory knowledge on the role of process planning in CAD/CAM integration. Basic approaches in Computer Aided Process Planning (CAPP) systems and their implementation techniques will be discussed. The course also provides a case study to demonstrate the selection criteria for CAPP systems.

MKMP 2723 - Modern Machining Processes

This course covers the principles and basic theories of various modern machining processes. Characteristics of processes including process parameters, rate of material removal, surface finish, accuracy and characteristics of shapes produced will be covered. Materials that may be processed, effects of processes on material properties and tooling considerations will also be discussed. It also highlights the process equipment and applications of modern machining processes.

MKMP 2733 - Computer Integrated Manufacturing

This course covers the philosophy of Computer Integrated Manufacturing (CIM) architecture in the context of modern manufacturing system. It includes topics such as the relationship between CAD/CAM, CAE and CIM. Various tools and software used in CIM system will be introduced. The overall aim is to provide awareness on how an organisation can be equipped in basics of design, implementation and management of CIM systems.

MKMP 2743 - Production Operations and Management

This course aims to present the principles and basic production operations management. Topics include techniques and strategies practiced in operations management, quantitative and qualitative techniques in decision making and state-of-the-art techniques in operation management.

MKMP 2753 - Precision Engineering

This course focuses on the basic theories of ultra-precision turning and grinding and their departure from Merchant's theory. It covers the fundamentals of special elements in ultra-precision turning and grinding machines such as hydrostatic and aerostatic bearings, linear motor and, C drives. Other topics such as single-crystal diamond cutting tools and diamond wheels for ultra-precision machining, Taniguchi's classification of precision engineering products, their tolerances, and their fabrication will also be included. Examples on how to manufacture MEMS (Micro Electro Mechanical Sensors) using LIGA and FIB techniques will be presented.

MKMP 2773 - Machining & Machine Tools Technology

This course covers the basic metal cutting operations for product manufacture and machine tool technology. Various aspects of machine tool technology are addressed such as the constructional and design features, major components, drives, vibration and chatter, machine tool metrology, machine tool maintenance and troubleshooting. Students are given various individual assignments and exercises, and group-based case study.