

## **Master of Engineering Management**

The Master of Engineering Management comprises of a total of 9 subjects that includes 6 core subjects, 2 elective subjects and a final project.

Students from a three year bachelor's degree or a four year program without a research component will be required to take additional two subjects decided in consultation with the faculty.

### **Core Subjects**

## **Innovation and Design**

Topics will be selected from: The creative and innovative process, aesthetics in design, life cycle design and planning. Design for economy, maintenance, disassembly, recycling, repair and rehabilitation. Designing with materials. Durability of materials, components, systems and structures. Intellectual property, patents and technology transfer. The international marketplace. Constraints on design: standards, specifications and codes of practice. Feasibility studies and costing Teamwork in design. Case studies.

## **Engineering Project Management**

Topics will cover: Scope Management, Time Management, Human Resource Management, Risk Management, Financial Management, Project Plans, Project Quality Management and Procurement and Contract Management.

## **Modelling of Engineering Management Systems**

Concentrating on the search of appropriate operations research techniques to assist in the solution of engineering management problems and basic experimental design. Topics include: the basic principles of modelling, decision support models, modelling failure processes, search methods, scheduling models, queuing theory and its application, ANOVA analysis and regression modelling within the context of modelling an existing system. Basic statistic knowledge is assumed with use of a statistics package required. Self-learning package covering the assumed statistical knowledge is provided.

## **Strategic Management for Engineers and Technologists**

The subject introduces engineers to strategic management. This includes basic strategic planning principles. The aim is to create awareness of strategic issues which engineering and technology based organisations face and how an organisation goes about developing a strategic plan to address them. This includes an appreciation of the nature of competition and competitive leverage that can be achieved from effective technology decisions. A need for

consciousness of these issues amongst engineers is crucial to their function and development as professionals in both commercial and not for profit organisations.

## **Financial Management for Engineered Assets**

Financial management principles, time value of money, discrete assets considerations, continuous assets considerations, identification of cost elements, cost prediction methods, regulatory economics, financial case development, engineered asset repair-replace decision making.

## **Engineering Logistics**

Logistics decisions play a critical role in the development of fast, efficient and responsive supply chains, and Engineers are increasingly called upon to make such decisions. This subject examines the key aspects of logistics systems design, operation and optimisation within the broader context of supply network configuration. The subject introduces a range of quantitative tools and techniques that support logistics decisions, and helps students develop the skills required to deal with real world logistics problems through simulation modelling, case study analysis and experiential exercises.

## **Dissertation**

The dissertation is a project allowing you to pursue a particular area in depth and solve a specific practical engineering problem. Students complete a dissertation in their area of interest. The dissertation develops skills in information retrieval, project planning and organisation, analysis, problem solving and effective communication of results. Involves the undertaking of an individual supervised project focused on solving a problem relevant to the discipline area of the degree. The student would normally be required to do a literature survey, analysis, and develop suitable solutions to the selected problem. This will allow the students to apply the knowledge and skills acquired in the structured coursework and thus gain valuable confidence in their ability to practice engineering at a high professional standard. An electronic version of the final report in Microsoft word must be submitted for assessment.

**Choose any two Electives from the approved list below:**

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### **Asset and Maintenance Engineering Stream**

## **Life-Cycle and Risk Management**

Framework, context and history of asset management, strategic management and engineered asset management in context. Application/adaptation of basic tools, costs and benefits of life cycle management, available models and standards. Possible uses of models business drivers, legal requirements, quality systems and configuration and documentation management, interfaces with other functions (departments and organisations).

## **Systems Reliability Engineering**

RAM (Reliability, Availability & Maintainability) studies, requirements flow down, cost estimation, analysis on design, probabilistic design, logistic support, maintainability, availability, interface control, system integration, reliability growth modelling, cost estimation, sparrings. Testing and performance evaluation, system safety modelling, installation procedures, asset management, disposal, asset purchase/replacement policies and decision-making. More specifically, the topics covered under this subject include terminologies for reliability engineering, failure data analysis and modelling, system reliability modelling, system maintainability & availability, design for reliability, reliability testing, reliability growth testing and reliability management.

## **Maintenance Requirement Analysis**

Maintenance concept design methodology; reliability theory; data recordings and analysis; identification and analysis of failure modes; maintenance rule selection; preventative replacement policies; optimisation of inspection frequencies; clustering of tasks; opportunity maintenance; specification of resource requirements.

### **Construction and Contract Management Stream**

## **Construction Management**

Introduction to risk management and ongoing management issues with a focus on the development of a credible business plan design with identification of potential risks. Within the site construction management context, students will develop skills in planning and scheduling, construction economics, construction safety and equipment maintenance. Students will be introduced to analytical tools for improving productivity and performance applied to the project scope, time, cost, risk and contractual issues. Introduction to BIM (Building Information Modelling) concepts and processes and how they interact with construction industry. Students will develop the ability to read plans/blueprints and learn how to visualise the structural components relationships between 2D and 3D representations with the aid of software tools. Incorporating BIM in the context of estimations of quantities and cost and construction analysis and design.

## **Project Implementation and Outsourcing**

Employment law, contract law, issues such as types of interface i.e. contract types (cost plus, schedule of rates): HR structure and sourcing arrangements, management of the interface, performance measurement, monitoring and management, managing the client, managing the supplier, legal implications, employment law and safety law implications, duty of care, transmission of business, industrial relations, intellectual property, ownership and use of maintenance data and know-how.

## **Sustainability for Engineers Scientist and Professionals**

This subject is designed to provide skills and understanding to incorporate sustainable development principles and practices into everyday decision making and planning processes. It provides an overview of the major sustainable development issues facing professionals such as engineers, scientists, economists, when they make choices as to particular products, processes and systems to adopt in their workplaces.

### **Other Electives**

## **Data Mining and Knowledge Discovery**

Introduction to Data Mining, Knowledge Discovery, and Big Data with coverage of Data Structures, role of Data Quality and per-processing, Association Rules, Artificial Neural Networks, Support Vector methods, Tree Based Methods, Clustering and Classification Methods, Regression and Statistical Methods, Overfitting and Inferential issues, Evaluation, Use of Data Mining packages with applications for benchmark and real world situations.

## **Supply Chain Management**

Increasing marketplace competitiveness has ushered in the era of shape-up or get run over. End-to-end Supply Chain Management holds the promise of an effective response to such a business environment when managed appropriately. This subject explains how demand amplification negatively affects the supply chain. It demonstrates how the four strategies (1) Relationship Management; (2) Information Flow; (3) Lead time compression; (4) Supply Chain integration and synchronisation mitigate the negative effects in an industry context. Note that in today's world it is not companies competing against each other but in fact a company's supply chain competing against another company's supply chain.

## **Organizational Analysis**

This subject provides students with an understanding of the key theoretical concepts used to analyse work organisations as complex socially constructed entities. The subject approaches organisational analysis using multiple perspectives, each with a dominant metaphor. Emphasis is placed on the theoretical foundations of the perspectives. In conjunction with the work of major organisational theorists, each perspectives metaphorical roots are explored in depth. Students then learn to use the perspectives to identify the dynamics of real organisations.

## **Cross Cultural Management**

The subject addresses key challenges and opportunities associated with managing across cultural boundaries in the context of an increasing multicultural business environment. Topics include understanding the challenges that cultural differences pose for international managers, cross-cultural communication and negotiation, leading and motivating in cross-cultural settings, diversity management, and comparative management practices ... For more content click the Read More button below. The subject addresses key challenges and opportunities associated with managing across cultural boundaries in the context of an increasing multicultural business environment. Topics include understanding the challenges

that cultural differences pose for international managers, cross-cultural communication and negotiation, leading and motivating in cross-cultural settings, diversity management, and comparative management practices in global settings.

## **Sustainable Roads and Railway Engineering**

This subject addresses the mechanics, analytical approaches, and design principles associated with road and infrastructure. The subject covers traffic loadings, rigid and flexible pavements, and trends in road and rail transport technologies. Topics are addressed with a particular focus on environmental, economic and social sustainability in design and selection of materials.