

■ Postgraduate

Engineering Management

SWIN
BUR
NE

SWINBURNE
UNIVERSITY OF
TECHNOLOGY

swinburne.edu.au/postgrad



Postgraduate program in engineering management



The postgraduate program in engineering management is a management qualification designed specifically for professionals in the engineering industry who want to make the transition to managerial roles and responsibilities.

Students will enhance their technical knowledge and develop engineering-focused management and leadership skills, thus responding to the significant demand from the industry for professionals who possess a broader skill set.

This program is delivered by the Faculty of Engineering and Industrial Sciences and includes units of study from other faculties, including the Faculty of Business and Enterprise. The core units within this program have an engineering management focus that can be complemented with a range of business, technical and other management elective units to suit each student's needs.

The program has an applied industry focus and presents subjects relevant to professional practice and contemporary research in this field. Students will acquire business, management and leadership skills that are in demand from engineering organisations today.



Program at a glance

Engineering Management	
Award	Graduate Certificate in Engineering Management Graduate Diploma of Engineering Management Master of Engineering Management
Focus	Enriching engineering management knowledge areas essential to engineers and other professionals who aspire for managerial roles and responsibilities in engineering industries.
Suitable for	Recent engineering graduates and professional engineers in industry.
Average duration	Graduate certificate – six months full-time or equivalent part-time Graduate diploma – one year full-time or equivalent part-time Master – one-and-a-half years full-time or equivalent part-time
Delivery mode	On campus, with flexible options including block mode, full-time and part-time (day and evening). Some elective units are also delivered by distance education.
Location	Hawthorn campus
Entry requirements	A four-year undergraduate degree in engineering or equivalent, or qualifications or experience of a satisfactory standard and deemed suitable preparation for entry to the program by the selection committee.
Work experience	Preferred; three years' experience is required for elective units offered by the Faculty of Business and Enterprise.
Structure	Graduate certificate – four units Graduate diploma – eight units Master – 12 units, or 10 units plus a research project
2012 fees	\$2350 per 12.5-credit-point unit (FEE-HELP is available for eligible students)
Intake	February and August

Program details

Graduate Certificate in Engineering Management

Graduate Diploma of Engineering Management

Master of Engineering Management

Swinburne's postgraduate engineering management program aims to enhance engineering knowledge and develop management skills essential for engineers and other professionals who aspire for managerial and leadership roles in the engineering industry. Graduates will possess an advanced understanding of management theories and concepts that can be applied in the engineering industry to effectively and efficiently manage time, cost, quality, safety and risks, as well as resource objectives.

The engineering management program aims to develop:

- an understanding of the ethical, professional, social, cultural, global and environmental responsibilities of the industry
- the ability to use a systematic approach for design, production, maintenance and operational performance
- the skills to plan and manage people, systems and resources
- the competence to demonstrate creativity, innovation and entrepreneurship
- the adaptability and ability to manage changes and risks
- the ability to communicate effectively.

Career opportunities

Graduates of the engineering management program will have the opportunity to advance their careers to high-quality engineering or managerial positions in the engineering industry. Employment opportunities include roles as site managers, project managers, consultants, contract administrators and planners.

Admission requirements

An undergraduate degree in engineering from a recognised tertiary university, or equivalent. Candidates with qualifications or experience which, in the opinion of the selection committee, is of a satisfactory standard will also qualify for entry.

Location

Hawthorn campus

Program length

Graduate certificate: Six months full-time or equivalent part-time

Graduate diploma: One year full-time or equivalent part-time

Master: One-and-a-half years full-time or equivalent part-time

Program delivery

On campus, with flexible options including block mode, full-time and part-time (day and evening). Some elective units are also delivered by distance education.

Program structure

Each unit of study is valued at 12.5 credit points unless otherwise indicated.

Successful completion of the graduate certificate requires students to complete four units of study to the value of 50 credit points. Students undertake two discipline-specific (core) units and a further two discipline-specific or elective units.

Successful completion of the graduate diploma requires students to complete eight units of study to the value of 100 credit points. This qualification comprises five discipline-specific (core) units and a further three discipline-specific or elective units.

Students undertaking the master degree can complete either the coursework program or the coursework with research project program .

Coursework program: Successful completion of this master-level program requires students to complete 12 units, comprising seven discipline-specific (core) units and a further five discipline-specific or elective units.

Coursework with project program: Successful completion of this master-level program requires students to complete six discipline-specific (core) units and a further two discipline-specific or elective units. Students must also complete one of Research Methods (HIT9010) or Research Design and Methodology (HES7605) plus two research units, Engineering Management Research Paper (HES6920) and Engineering Management Research Project (HES6921).

Program structure

Discipline-specific (core) units	
HES6120	Work Systems in Manufacturing
HES6121	Six Sigma
HES6122	Sustainable Design and Manufacture
HES6174	Resource Planning and Management
HES6401	International Good Manufacturing Practices and Quality Assurance
HES6791	Project Management
HES6798	Procurement and Risk Management in Projects
HIR506	Technology Management
HES6727	Introduction to Risk and Due Diligence
HES6900	Management Workshops for Engineers
HES6901	Reliability-based Management of Engineering Assets

Each unit of study is valued at 12.5 credit points unless otherwise indicated.

Recommended elective units	
Technical management elective units	
HES6720	Risk Perception and Analysis*
HES6131	Procurement and Inventory Management*
HES6132	Managing Modern Distribution*
HES6175	Project Costing
HES6403	Validation Principles
HES6405	Contamination Control
HES6744	Physical Human Factors*
HES6745	Psychological Human Factors*
HES6607	Safety Management Systems*
HES6721	Risk Management Principles*
HES6723	Financial Risk Management*
HES6793	Construction Law

*Units are available via distance education only.

Business management elective units**	
HBM480	Strategic and Entrepreneurial Marketing
HBC480	Accounting Information and Managerial Decision-making
HBO480	Leading
HBR480	Enterprise Project 1
HBS580	Business Strategy
HIT8036	Business Information Systems for a Rapidly Changing World
HBO580	Managing Diversity and Culture

**Three years of work experience is required for students enrolling in business management elective units.

Management elective units [#]	
LMC504	Technology Knowledge and Global Integration
LMC601	Leading and Managing People in Chaos and Complexity
LMC701	Corporate Social Responsibility: The Quest for Business Sustainability
LMC703	Public-Private Interface for Sustainable Infrastructure

[#]Units are available online only.

Research units	
HIT9010	Research Methods
HES7605	Research Design and Methodology*
HES6920	Engineering Management Research Paper
HES6921	Engineering Management Research Project*

*Units are available via distance education only.

*Unit is valued at 25 credit points.

Units of study outlines

Discipline-specific (core) units

HES6120 Work Systems in Manufacturing

Students will develop an understanding of human-machine systems within advanced manufacturing environments. Topics include work systems, methods engineering and layout planning, human factors of work and human-machine systems. The unit also covers work management, including work organisation, worker motivation, job analysis and design.

HES6121 Six Sigma

The aim of this unit is to introduce the basic principles of quality management and Six Sigma-based tools and methodologies. Topics include quality control and assurance, quality management systems, basic tools and techniques of quality assurance, quality standards, problem-solving, Six Sigma and quality assurance, Six Sigma and statistical control, Sigma Lean, waste elimination in manufacturing and engineering, and asset management processes.

HES6122 Sustainable Design and Manufacture

This unit provides students with an understanding of integrating environmentally conscious technologies in the modern manufacturing environment. The focus of this unit is on employing environmentally responsible systems for production in order to limit environmental impact. Topics include design for the environment, air pollution and waste materials in manufacturing, disassembly for end life of products and energy storage.

HES6174 Resource Planning and Management

This unit covers essential planning skills for the engineering and project management professional. Upon completion, students should be able to conduct the necessary planning for the procurement of a major infrastructure or engineering facility. Topics include planning concepts; planning and programming techniques; estimating, allocation and levelling of resources; constrained resource scheduling; resource planning and management in linear projects; multi-project resource management; metrics-based monitoring and control; material resources planning and inventory control; and an introduction to computer applications for resource planning and management.

HES6401 International Good Manufacturing Practices and Quality Assurance

This unit addresses the underlying principles of good manufacturing practices (GMP) and quality, their significance in the industry and the skills needed to develop practical strategies to apply those principles in the workplace. Students will learn how to integrate GMP and ISO 9000 elements into a quality system, and identify areas of GMP non-compliance and propose and implement corrective actions. They will develop the skills necessary to prepare a quality plan, audit their worksite for GMP compliance and prepare validation plans. Students will also gain an understanding of the current requirements and trends in international and Australian GMP compliance as well as future international trends within the industry.

HES6791 Project Management

This unit will provide students with a general understanding of the principles of management and leadership. Students will learn how to analyse an organisation's strengths and weaknesses, and develop an understanding of organisational behaviour. They will study the fundamentals of project definition, planning and implementation, and learn about some of the important tools for project management.

HES6798 Procurement and Risk Management in Projects

This unit addresses essential knowledge areas of procurement and risk management in project-based industries. It also covers project and program settings in production and process-based industries. Topics include procurement and project delivery options; project-based contracting mechanisms; bidding and tendering in project settings; source selection arrangements for project teams; relational frameworks (such as partnering and forming alliances) and value networking in projects; project procurement through public-private partnerships; e-procurement fundamentals; mapping risks in different procurement routes and contractual arrangements; managing risks in international procurement, government/quasi-government projects and public-private partnerships; and safety and security risks in project settings.

HIR506 Technology Management

The aim of this unit is to introduce manufacturing and engineering students to the basic principles of technology management. Students will gain an understanding of the nature and processes of technology and innovations, its sources, project management, intellectual property rights, decision-making and methods for integrating technology management and pioneering leadership in industrial environments.

HES6727 Introduction to Risk and Due Diligence

This unit provides students with a broad understanding of the concepts and techniques inherent to risk management. It includes fundamental risk and reliability concepts; organisational risk paradigms and models; liability; causation; and risk criteria. Students will learn how to use top-down and bottom-up techniques, ranking and modelling techniques, and generative techniques. Further topics may include risk and reliability maths; corporate governance; occupational health and safety; process industry; finance and market risk; safety case arguments; project due diligence; and safety and integrity level (SIL) allocation and availability profiling.

HES6900 Management Workshops for Engineers

This unit aims to develop students' ability to work effectively as professional managers in different practical settings of engineering organisations and projects. Through special lectures, workshops, seminars and action-based group projects, students will become familiar with management theories and principles as well as advanced techniques and practices. Topics include asset management, client and customer satisfaction, corporate social responsibility, people and organisational culture, design and construction/production management, governance, risk management, stakeholder management, sustainability, performance management, knowledge management, and value and relationships.

HES6901 Reliability-based Management of Engineering Assets

This unit develops students' understanding of the key principles and emerging practices of maintaining and managing engineering infrastructure facilities and assets. Students will develop an appreciation for the significance of balancing economic, social and environmental sustainability requirements when managing engineering facilities and assets in different industries. Students learn how to apply reliability-based maintenance concepts and plant reliability engineering methods for enhanced reliability and sustainable performance during different stages of an asset/facility life cycle.

Technical management elective units

HES6720 Risk Perception and Analysis

In this unit, students will gain an understanding of the process leading to injury, damage and loss as well as the principles of risk estimation and assessment. They will also become aware of psychological and social issues relating to risk perception and reaction. Topics include risk terminology and system modelling; human perception of risk; risk analysis and use of modelling; risk estimation and loss rate concept; and fault tree and event trees analysis.

HES6131 Procurement and Inventory Management

Students will develop an understanding of procurement concepts and inventory management fundamentals. They will also acquire the required purchasing and materials management skills for cost analysis, decision-making, quality management and value analysis.

HES6132 Managing Modern Distribution

The aim of this unit is to give students an understanding of the skills required for supply chain management and modern distribution process management. This unit covers supply chain management principles and theories, distribution process management in various industries, supply chain management strategies for distribution activities and modern distribution process management techniques.

HES6175 Project Costing

This unit introduces students to project costing and controls, focusing on civil engineering projects. It gives an overview of the main challenges and opportunities associated with project execution, risk, economics, estimating, tendering, planning and scheduling for project success. Factors that need to be familiar to and understood by project cost engineers are also outlined.

HES6403 Validation Principles

This unit introduces students to the purpose and scope of validation and regulatory guidance. Students will learn how to prepare and understand validation master plans (VMPs) and how to develop installation qualification (IQ) and operational qualification (OQ) protocols for critical equipment and services. The unit provides an overview of the requirements for validation of critical process steps and provides insight into what should be covered in process validation protocols. It also introduces students to basic statistical techniques to conduct retrospective reviews of existing production processes and products.

Units of study outlines (continued)

HES6405 Contamination Control

This unit introduces students to contamination control in the storage, handling and processing of components, materials and products in non-sterile and sterile manufacturing. Topics include microbiology and good laboratory practices; contamination control, microbiological aspects of manufacturing; heating, ventilation and air conditioning (HVAC); controlled environments; and environmental monitoring programs.

HES6744 Physical Human Factors

The aim of this unit is to develop in students an understanding of how human performance, particularly the propensity for error, is affected by the physical and organisational aspects of the environment in which they work. Topics include illumination, noise, heat, toxicology, vibration, organisational stressors (fatigue, shift work, conflict and workload), and human limitations and capabilities (including anthropometrics).

HES6745 Psychological Human Factors

This unit will develop in students an understanding of how organisations create the circumstances in which human error flourishes. Topics include models of human information processing (perception, cognition and stimulus response), the study of human limitations and capabilities (stereotypes), and understanding human error.

HES6607 Safety Management Systems

Students will gain knowledge of safety management systems, its contemporary needs and multi-modal framework. The unit also addresses elements that enable the use of practical tools to manage workplace safety, instilling a just culture and a system-view towards incident and accident investigation. This unit will explore the aspects of managing reporting systems, incident and accident investigation, violation management and maintaining corporate discipline.

HES6721 Risk Management Principles

The aim of this unit is to introduce students to the fundamental principles related to loss prevention. Students will develop a comprehensive understanding of functional risk management concepts and processes, and the practical applications involved in the effective management of risks. It gives an overview of the legal structures and processes within Australia as well as a basic understanding of health and safety law, and related legal obligations.

HES6723 Financial Risk Management

This unit covers financial risk management in theoretical and practical terms. Students will develop the ability to identify and manage financial risks and the capacity to apply financial risk management techniques in commercial situations. They will gain an understanding of the elements of finance, tax and accounting which are necessary to deal with financial risks and the methods used to analyse the risks associated with investments. This unit will also cover forecasting for investment decisions, the methods used to control financial risks and financial modelling.

HES6793 Construction Law

This unit covers legal relationships including agency, partnerships, firms, companies and unincorporated associations. It addresses professional responsibility and relationships including the client, architect, engineer, contractor and sub-contractor. It also covers insurance including loss, non-completion of contract, injury, death and weather. Finally, this unit addresses the role of the lawyer in drawing up contracts, including bankruptcy of contractor or client, tendering procedure, negotiating within an existing contract, dispute avoidance and resolution, and commercial law.

Business management elective units

HBM480 Strategic and Entrepreneurial Marketing

This unit explores how marketing contributes to corporate strategy. It also addresses how marketing influences, and is influenced by, other functions within the organisation. Students will learn to be effective members of entrepreneurial teams who can comprehend a world characterised by uncertainty and change, and to identify and evaluate opportunities.

HBC480 Accounting Information and Managerial Decision-making

This unit encourages students to think more deeply about accounting and finance problems. As part of the decision-making process, students will be encouraged to interpret bias, evaluate alternatives, organise information and clearly state assumptions. Students will be motivated to think beyond numerically correct solutions. Value judgements and conflicts of interest will present ethical dilemmas for discussion. This unit aims to develop students' ability to make informed judgements and to take effective, ethical and timely actions regarding the current and future allocation of resources, in the context of a complex global business environment.

HBO480 Leading

This unit aims to provide insight into and experience of leadership, as well as how to follow and build cross-functional and diverse teams. Understand and experience teamwork as the key to working with the complexity of contemporary business and enterprise in the 21st century, whether global or local. The unit also addresses how teams can develop opportunities and, by venturing, can increase their social capital.

HBR480 Enterprise Project 1

This unit is designed to provide students with skills and tools to develop their ability to diagnose and get to the heart of a presenting problem or issue. Students will have opportunities to gain experience in constructive and robust questioning, observation, listening, diagnosis and critical thinking.

HBS580 Business Strategy

This unit aims to equip students with skills and practice in strategic management and critical thinking techniques in turbulent environments, as well as skills in using strategic and foresight tools. Students will learn to critically evaluate strategic alternatives in the context of small and medium sized enterprises involved in single industry, as well as strategic business units of large corporations. The focus is not just on the generation of viable strategic alternatives to gain competitive advantage, but also on the development of a viable implementation plan.

HIT8036 Business Information Systems for a Rapidly Changing World

This unit aims to provide non-IT professionals with an understanding of the major issues facing managers in the effective use of information technology in contemporary organisations. It will focus on how to ensure that investments in IT and information systems (IS) are aligned with business goals and objectives during times of rapid technological change and economic uncertainty. This is not a technical unit; it does not deal with what is technically new other than in a purely managerial sense. The unit views IT in terms of the impact technological advances may have on an organisation.

HB0580 Managing Diversity and Culture

This unit employs a multidisciplinary approach to the managerial and communication problems encountered in interactions between individuals and organisations with diverse backgrounds, as well as their interaction with global communities. An examination is made of theories and research advanced by behavioural sciences in relation to the understanding of the management of diversity and culture. The main aim is to fully explore cultural factors and their impact on the global management mindset. Other diversities will also be examined for their impact, including technological, ecological, religious, political and economic influences.

Management elective units

LMC504 Technology Knowledge and Global Integration

This unit explores technology as an enabler, driver and blocker for business sustainability and integration in an evolving global environment. It explores technology as a facilitator of financial markets and transactions, as an enabler of accountability and as a generator of risk. The unit will look at the division of labour through outsourcing and explore issues relating to access to global markets. Students will develop an understanding of business sustainability in a global environment, specifically the importance of cultures, values, threats and opportunities.

LMC601 Leading and Managing People in Chaos and Complexity

Students will develop an understanding of the influence of chaos, complexity and change on people (employees and managers), their perceptions of change and their responses to change in the context of achieving organisational outcomes. Students will learn about the critical issues for the development of effective organisational cultures and gain knowledge about the environments that facilitate optimal human functioning in complexity and chaos. Students will broaden their understanding of these issues through research into an industry and organisational perspective, and exploration of the implications for their own existing or anticipated organisational role.

LMC701 Corporate Social Responsibility: The Quest for Business Sustainability

This unit will help students to understand global debates and policies concerning corporate social responsibility (CSR), to contextualise contemporary development in Australia in this broader environment, to identify the roles of key stakeholders in this context and to explore implications for Australian organisations. Students will also consider implications for their current or future roles in their own professional and industry domains. CSR will be explored in the context of issues such as the triple bottom line, economic sustainability, social and environmental responsibility, organisation and culture, corporate citizenship and community engagement, and global initiatives.

LMC703 Public-Private Interface for Sustainable Infrastructure

This unit focuses on public debate and critical issues around public and private sector involvement in facilitating a sustainable national community infrastructure to support business and people services in today's global economy. Students will explore concepts dealing with effective public sector governance, policy making, costing and financing, and policy implementation in the areas of physical and social public infrastructure provision. Policy approaches explored will include privatisation, competition policy, outsourcing, purchaser-provider arrangements, public private partnership (PPP) arrangements and community-based partnership developments. Public accountability and risk management will be addressed. The role of private providers will be covered in relation to education, health and community services, transport and government administration.

Units of study outlines (continued)

Research units

HIT9010 Research Methods

This unit exposes students to the basic principles and concepts of academic research. They will learn to interpret and critically evaluate previously published research in a formal literature review; describe the characteristic features of common research methods and debate their relative merits; identify a research question (or project problem/objective) and justify the selection of an appropriate and ethically managed research method; produce a written proposal and research paper; and effectively present information in an oral presentation.

HES7605 Research Design and Methodology

This unit gives an introduction to the principles and processes involved in research practice. It is a skills-oriented unit; through assignments, students develop the competencies needed to undertake a research investigation. The unit has been designed to assist students to make better use of human factors training by enabling them to critically evaluate the basis upon which other researchers draw conclusions and make recommendations. Topics include framing research in practice, designing research and conducting research.

HES6920 Engineering Management Research Paper

The aim of this unit is to provide students with the opportunity to consolidate critical thinking and analysis skills developed throughout the postgraduate program and extend their knowledge by undertaking focused research on an approved research topic. In consultation with their supervisor, students are expected to identify a research problem and define the aims and objectives of their research. The research topic should be approved by relevant staff. Appropriate research methods and procedures should be followed. The paper may be completed via basic research and/or applied or industry-based research.

HES6921 Engineering Management Research Project

This research project unit is designed to enable students to undertake a rigorous research study of considerable standing. It provides students with the opportunity to conceive and develop research problems, consolidate critical thinking and analysis skills developed throughout the postgraduate program and extend their knowledge by completing focused research on an approved research problem. Advanced research will be undertaken on a topic selected in agreement with supervising staff and approved by the unit convener. The research project may be completed via basic research and/or applied and industry-based research.



General information

Facilities

As a Swinburne student you will automatically gain access to a range of facilities. These include a well-resourced library, computer laboratories, fitness and health facilities, personal and career counselling, housing, and employment and financial advice.

Fees

In 2012, tuition fees for these programs are based on \$2350 per 12.5-credit-point unit of study, with an annual fee of \$18,800 full-time and an overall program fee of \$28,200. In the event that a unit of study is derived from another program, the applicable fee will be that of the other program. All fees are reviewed each year and may increase without notice.

For all fee enquiries and up-to-date information, visit www.swinburne.edu.au/studentoperations/fees

FEE-HELP

FEE-HELP is a government-funded loan that helps eligible fee-paying students to pay their tuition fees. FEE-HELP is available to Australian citizens and holders of a permanent humanitarian visa. It is not available to New Zealand citizens and most holders of Australian permanent visas.

For further information, visit www.goingtouni.gov.au

Application procedure

You may lodge your application at any time, but each intake period has an application submission closing date. To obtain an application form, phone 1300 275 794 or visit www.swinburne.edu.au/postgrad/apply

Applications must be accompanied by a certified copy of your passport or birth certificate, a certified copy of academic transcripts and a current résumé.

To view current closing dates, visit www.swinburne.edu.au/postgrad

International students

If you want to study at Swinburne but are not an Australian resident, contact Swinburne International on +61 3 8676 7002 or 1800 897 973 within Australia, or visit www.swinburne.edu.au/international

Recognition of Prior Learning

Recognition of Prior Learning (RPL) allows students to be granted credit or partial credit towards a qualification in recognition of skills and knowledge gained through work experience, tertiary qualifications and/or formal training.

For more information, visit www.swinburne.edu.au/postgrad

Application closing dates

Semester 1 – early February
Semester 2 – mid-July

Note: Dates are correct at the time of printing, but are subject to change. Visit www.swinburne.edu.au/studentoperations/calendar for current semester dates.

Further information

Telephone: 1300 275 794
Email: postgrad@swinburne.edu.au
Website: www.swinburne.edu.au/postgrad

Information sessions

Information sessions are held regularly throughout the year. They are a great opportunity to meet and talk to staff about your postgraduate study options.

The sessions help you understand what your chosen postgraduate program entails – what you can learn, what your study options are and where your qualification may take you.

For session dates visit www.swinburne.edu.au/postgrad

■ ANY QUESTIONS?

1300 275 794
postgrad@swin.edu.au
swinburne.edu.au/postgrad



swinburne.edu.au/facebook



swinburne.edu.au/twitter



swinburne.edu.au/youtube



swinburne.edu.au/linkedin

■ CAMPUSES

Hawthorn campus

John Street, Hawthorn

Prahran campus

144 High Street, Prahran

Lilydale campus

Melba Avenue, Lilydale

Croydon campus

12-50 Norton Road, Croydon

Wantirna campus

369 Stud Road, Wantirna

Sarawak campus

Kuching, Sarawak, Malaysia



CRICOS Provider Code: 00111D

The information contained in this course guide was correct at the time of publication, September 2011. The university reserves the right to alter or amend the material contained in this guide. The information in this guide does not apply to international students. For information about courses for international students please go to www.swinburne.edu.au/international

SP1592-06-0911