University of Pretoria Yearbook 2020

MSc Project Management (Coursework) (12251078)

Minimum duration of study	2 years
Total credits	180
NQF level	09

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MSc degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BSc as well as a BSc Honours degree (four study years), in a suitable scientific field, and an average of at least 60% calculated on the grades of all the final-year modules, failed and passed. The average of 60% is not applicable if the applicant has already completed another master’s degree, or completed the ETM/MOT degree at the University of Pretoria with a minimum average of 55%.
- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript, work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Other programme-specific information

Details regarding the curricula as well as syllabi of the respective domains are available from the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.
Guidelines for the preparation and examination of mini-dissertations are available from the department.

i. The examination in each module for which a student is registered, takes place during the normal examination

period after the conclusion of lectures (i.e. October/November or May/June).

ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.

iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.

iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.

v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Project organisation 801 (IHR 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module takes an in-depth look at the conscious and unconscious human dynamics that affect the performance of project teams. The importance and complexity of the project manager's leadership role in containing and transforming anxiety into creative and productive energy is emphasised. The systemic relatedness between project teams and the social systems (organisation, industry, nation state) they form part of, and what this asks of the project manager, are explored. The module looks at the dynamics of authority, delegation, roles, boundaries, change, diversity, inclusion and exclusion and how the less obvious dimensions of these dynamics can be observed and responded to. The idea of the system-in-the-mind and how this influences the 'mind-of-the-system' is studied and experienced in class. The module draws on literature form the fields of organisational behaviour, leadership, systems psychodynamics and group relations. The module consists of self-study, experiential discussions in class, group work and individual work.

Project planning 802 (IMP 802)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Project Planning introduces the learner to the basic concepts of project management. This module will set the scene for the rest of the MPM programme and addresses project management principles, standards, guidelines, institutes, certifications, professionalism and best practices. Defining and designing a project life-cycle is discussed followed by the process of initiating and planning a project. The importance of a well-defined scope statement and work-breakdown structure are explained which will include needs analysis, user requirement definitions and systems thinking. Time management remains integral with different scheduling techniques addressed and applied. The last part of the module provides an overview of the module to follow and how each will fit into the total discipline of project management.

Finance and cost management 802 (IPF 802)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The role of the engineer is to apply the wealth of scientific knowledge to produce products and services for the benefit of mankind. A design can demonstrate excellence in technical achievements but if the end user cannot afford it, the whole project will be one of futility. Taking into account the vast sums of money involved in the design, development of products and establishment of production facilities, poorly managed projects can seriously damage the profitability and survival of a company.
This module creates an opportunity for the learner to be acquainted with the theoretical principles and practical applications of finance and cost management aspects as applied to projects and programmes.
To achieve this objective, it is necessary to:

- Firstly, clarify the study field of engineering economics and its function in the decision-making process,
- Secondly, to understand the elementary principles of cost estimation, allocation of cost elements and, financial risk management,
- Thirdly, to understand the cost control principles in the management of a project or programme

Procurement and contract management 801 (IPJ 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Most projects contract out some if not all project work to other organisations or internally. Procurement is the process of selecting, contracting and acquiring goods, services or works from an external source and is thus a vital part of project management. The objective of this module is that learners are able to select and apply a meaningful and sensible procurement strategy appropriate to the project. Topics to be covered include the procurement decision; law of contract, the procurement process; various aspects of procurement planning such as procurement methods, source selection, risk allocation, contracting strategies, contract payment types, standard forms of contract; control and dispute resolution.

Information technology and service project management 803 (IPK 803)

Module credits	10.00

Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

IT and service project management looks at the process of planning, organising and executing projects that achieve an organisations' specific information technology (IT) and/or service goals. Given the growth of these two industries, the objective of this module is that learners gain a practical and theoretical foundation for managing IT and service projects, while also being exposed to the latest trends, innovations and techniques (e.g. Agile) in these two related management fields. At the completion of this module learners will have gained the knowledge and skills to lead effectively and creatively by using systems thinking to solve challenges in IT product and/or service design, development, and innovation.

Risk management 801 (IRI 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on insight in the field of risk management and the application of the basic principles of risk identification, assessment, treatment and control in the business enterprise and also systems technology innovation and project management. Theory and practice are important and a number of case studies are used to illustrate the application of risk management in various functional areas of the enterprise. Risk can be defined as "the presence of adverse events or conditions that can threaten the survival of the system, or prevent the objectives of the system to be achieved". All systems including project or technology systems, natural and human-made, are exposed to risk and this risk should be managed in a responsible way by any business enterprise. The risk exposure of modern organisations is increasing due to complex technical systems, resource structures, processes and interactions. The risk management process involves establishing the goals and objectives for the organisation or functional unit, identifying the risks, quantifying and prioritising the risks, developing responses to the high priority risks, and monitoring the operations. Business enterprises in the manufacturing and service industries have a number of functional areas and processes that are interlinked. Risk management and decision analysis are therefore applied in development of new products or services, operations, maintenance, projects, safety and security. The module also includes aspects of detailed risk analysis such as risk simulation, etc.

Mini-dissertation 899 (ISC 899)

Module credits	90.00

Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Project systems engineering 802 (ISE 802)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The PSE process is discussed within the context of the technology-based enterprise. The first objective is to conceptualise and model a tech-based enterprise in terms of core business processes and the interaction amongst them. SE processes are hence understood in the context of the project and organisation. The concepts of "system, project and process" are explained.
The design and development of the total system for the total system life-cycle, taking into account the requirements of all stakeholders is the heart of PSE.
All stakeholders and their requirements are identified, described and managed over time. The system life-cycle stages/phases and related system design processes are focused upon. A number of SE topics, e.g. information and configuration management, life-cycle cost, quality of design, downstream "design to" requirements and logistics are touched on. SE planning within the bigger project plan is investigated. The important and integrating role of the project manager to make SE successful, particularly in the early phases of the project, is highlighted.

Construction management 803 (KBS 803)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics

Period of presentation Semester 1 or Semester 2

Module content

The domain addresses the specific needs of the project manager active in the construction industry. An overview of the local and international best practise is provided. Organisational structures and role players within the construction industry are studied. The construction project management life cycle is addressed with specific reference to the design and construction processes.

Curriculum: Final year

Core modules

Quality and integration management 801 (IQM 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The module details the quality journey in projects and how all project knowledge areas are integrated into a final project plan to ensure the quality of project management. It further addresses the quality of the project's products through the proper definition of the project business case, scope definition and the breakdown of the project's products into manageable deliverables that will meet stakeholder expectations. Though specification development of the deliverables using quality planning (QP) techniques, the quality metrics or quality measurement criteria for the specification will be established. These criteria will form part of the project's quality assurance plan (QAC) which is integrated with the project's life cycle and schedule as well as management and approval authorities. Quality control (QC) and quality assurance (QA) processes and activities to test, verify and audit product, support as well as managerial processes and deliverables are also discussed and non-conforming elements are recommended for improvement through the use of quality improvement tools and techniques. The use of quality standards and methodologies to enhance the quality of projects is also discussed. The module concludes with the development of an integrated project plan, incorporation all knowledge areas addressed in the different modules of the programme.

Mini-dissertation 899 (ISC 899)

Module credits	90.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Elective modules

Systems thinking 801 (IBI 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The modern world consists of “systems”. This is evident from everyday discussions. Statements such as “The system failed us”, or “The national energy system is under pressure” abound. Most people have little or no understanding of what a system is, or how to deal with it. Digging deeper into the concept of “system” leads one to realise that engineers and scientists without any working knowledge of “systems thinking”, or as some describe it, “thinking in systems”, rarely succeed when attempting to solve the problems of our time mainly because they do not know how to deal with trending patterns. Peter Senge, author of the book The Fifth Discipline and well-known systems thinker, defines systems thinking as “both a thinking skill and a language for understanding and working with complexity”. This module will provide you with the know-how and tools to achieve the desired outcomes in your real-world environment, notably when that world includes complex and wicked problems. The real-world in this case includes people as well. This module will challenge almost everything you have been taught to date. After completing this module you will view the world in a different way. You will become a big-picture thinker who can transcend your own discipline with ease. The module includes the history and benefits of systems thinking, systems thinking terminology, managing interrelationships, overview of appropriate tools and methodologies including system dynamics, soft systems methodology, systemigrams, etc. These will be illustrated further by applying them to relevant case studies. This module is the ideal complement to systems engineering, which focuses mainly on hard systems whereas systems thinking focuses on soft systems.

The role of projects in realising (more) sustainable business strategies and a more sustainable society is one of the emerging topics in project management. From the literature on this topic, two types of relationship between sustainability and project management appear: the sustainability of the project’s product, the deliverable the project realises, and the sustainability of the project’s process of delivering and managing the project. The first relationship, sustainable projects, is well studied and addressed, for example in relationship to eco-design and ‘green’ construction. The second relationship, sustainable project management, is emerging as a new ‘school of thought’ in project management.

As project managers play a pivotal role in the sustainability of their projects, this module will discuss the ‘why?’, ‘what?’ and ‘how?’ of sustainable project management. The lectures will discuss the concepts of sustainability, the role of projects in sustainability, the impact of sustainability on project management, the integration of sustainability in the project management process and the structure of a ‘Sustainability Management Plan’.

Industrial marketing 801 (IIM 801)

Module credits	10.00
Prerequisites	No prerequisites.

Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module will primarily address marketing in the industrial environment, not commercial environment. It is based on the principles of business to business marketing (B2B) as well as services marketing. The primary objective of this module is to provide students from a technology or engineering background with a thorough foundation of basic marketing principles and how it can be applied in practice. The areas of market segmentation, macro and micro market environment, developing a value proposition, and understanding buyer behaviour will be explained. Services marketing will include: service development and design, pricing aspects, how services are delivered, how to manage employees and customers in service delivery, managing demand and supply, marketing communication aspects, building customer relationships and loyalty, and how to recover service failures.

Commercialisation and intellectual property 881 (IKG 881)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Modern societies increasingly depend on the development and successful commercialisation of new technology that may exist either in the form of knowledge, process, product, service, or combinations of these forms. The module addresses principles and practices required to identify and package technology so as to increase the chance of successful commercialisation. The module highlights the significance of the systems of innovation concept and emphasises the integration of innovation and technology management with entrepreneurial flair in order to facilitate successful commercialisation of technology towards the generation of economic growth, wealth and prosperity. Candidates studying the module will be required to analyse case studies and to carry out a practical exercise.

Knowledge and information management 884 (ILB 884)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Legal aspects 803 (ILC 803)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The objective of this module is to present the basic principles of the law with which the project manager has to deal with during the planning and execution of a project. An introduction is presented on the sources of law, the structure of the South African legal system and representatives sources of obligations. The general law of contract is done in great detail with special reference to clauses used in contracts, different types of contracts as well as breach and remedies. Practical examples are given to enable the student to understand how the law is applied in practice. Special attention is then given to the law of purchase and sale and to construction/engineering law (letting and hiring of work). Further attention is also given to aspects of labour law and alternative dispute resolution. Another relevant aspect discussed in less detail is representation (agency).

Sustainability 802 (ILE 802)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The role of projects in realising (more) sustainable business strategies and a more sustainable society is one of the emerging topics in project management. From the literature on this topic, two types of relationship between sustainability and project management appear: the sustainability of the project's product, the deliverable the project realises, and the sustainability of the project's process of delivering and managing the project. The first relationship, sustainable projects, is well studied and addressed, for example in relationship to eco-design and 'green' construction. The second relationship, sustainable project management, is emerging as a new 'school of thought' in project management.
As project managers play a pivotal role in the sustainability of their projects, this course will discuss the 'why?', 'what?' and 'how?' of sustainable project management. The lectures will discuss the concepts of sustainability, the role of projects in sustainability, the impact of sustainability on project management, the integration of sustainability in the project management process and the structure of a 'Sustainability Management Plan'.

New product development 880 (INP 880)

Module credits	10.00
Prerequisites	No prerequisites.

Contact time	20 contact hours
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The development of new products is a key business function. There is always a high risk of failure but the best companies manage to launch successful new products on a continuous basis. The objective of this module is to provide students with the concepts and insight necessary both to do product development and to manage it. The strategies, processes, tools and techniques used by leading-edge companies for new product development are introduced. The module examines different stages of product development, from idea generation to market testing and includes the assessment and selection of appropriate business models. The role and impact of fourth industrial revolution technologies, like rapid prototyping with 3D printing, are also considered. Key questions addressed in the module are: how does product/process development fit into the overall business context; what products, processes, systems or services should be developed; how does one go about developing a new product/process; and how should one measure performance in product/process development and improve? Further selected concepts and topics like design thinking, design management, success factors, relationship to systems engineering, reduction of uncertainty, and software for NPD are also introduced. Although the emphasis is on physical products, many of the concepts covered in the module are equally applicable to service development.

New ventures and entrepreneurship 801 (IOE 801)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module aims to provide a wider understanding of the concepts and importance of entrepreneurship and the requirements and processes in commercialising technology-based ventures.
The themes include methodology in screening opportunities and understanding the commercialisation process; compiling technology entrepreneurship strategies; product development process and business model development; understanding and protecting intellectual property; funding options for entrepreneurial ventures, and understanding the scope and content of a business plan.

Programme and portfolio management 802 (IPM 802)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English

Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module introduces programmes, portfolios, the basics of corporate strategy, as well as the processes that link projects to strategy.
The processes include: screening and selection of projects; portfolio design for strategic fit and balance; allocation (and scheduling) of funds and other key resources to selected projects; the interface to detailed planning, execution, and gate reviews; as well as benefit assessment of individual projects and programmes.
Attention is paid to the roles of PM methodologies, front-end loading, feasibility studies and business cases in the process of project screening, as well as to techniques used to assess projects individually and relative to one another.
The roles of individuals and groups such as the Corporate Board, executives, steering committees/review boards, a project management office, a project portfolio manager and the project sponsor in the processes that link strategy and individual projects are described.