

MSc Software Engineering Projects and Management - E562

1. Introduction

Available in both full and part-time mode, the MSc Software Engineering Projects and Management programme will provide graduates from IT and related fields with the necessary skills to lead and manage software development projects in a manner consistent with current standards. This programme is a response to the increasing need for leaders who can manage people and processes, who communicate well and who are knowledgeable about the best software development practices in industry. The course has been designed to permit a high degree of flexibility in that students may take varying combinations of modules.

2. Aims and Objectives

The programme aims at developing skills in managing the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software. The successful graduate will be a competent manager who can communicate well and who can train and lead software developers in producing products that meet quality, schedule, and budget objectives.

3. General Entry Requirements

Successful completion of an undergraduate degree with at least a Second Class or 50%, whichever is applicable, or a GPA not less than 2.5 out of 4 or equivalent, from a recognised Higher Education Institution, or alternative qualifications acceptable to the University of Mauritius.

4. Programme Requirements

Any undergraduate degree in Computer Science or other related areas.

5. Programme Duration

The normal duration of the programme will be as detailed below.

	Full time (yrs)	Part Time (yrs)
Minimum	1	2
Maximum	2	4

However students wishing to exit earlier, with a Postgraduate Diploma, can do so subject to their meeting the requirements specified in item 6.

The programme will be run on a semester system, where an academic year consists of two semesters. A semester is of 15 weeks duration (excluding Exam Period).

6. Minimum Credits Required for Award of:

Master's Degree : 36
Postgraduate Diploma : 24

Breakdown as follows:

	Minimum Core Taught Modules	Dissertation	Electives Optional Modules
Master's Award	18 credits	12 credits	6 credits
Postgraduate Diploma	18 credits		6 credits

7. Assessment

All modules are of 45 hours duration and carry equal weightage [i.e. of 3 credits] except for CSE 6000.

All modules will carry 100 marks and will be assessed as follows (unless otherwise specified).

- A written examination of 3 hours and
- Continuous assessment carrying a range of **30% to 40%** of total marks.
- Continuous assessment may be based on laboratory works, and/or assignments and tests but should include at least 2 assignments/tests per module.
- An overall total of **40%** for combined continuous assessment and written examination components would be required to pass the module, without minimum thresholds within the individual continuous assessment and written examination.

Students are required to register for modules which they intend to follow in a given semester on date(s) specified by the Faculty.

Submission Deadlines for Project:

	Full time	Part Time
Start	January – Level I	January – Level 2
Submission	Last working day of August –Post Level 1	Last working day of August – Post Level 2

8. List of Modules

CORE MODULES

CSE 6209 - Software Project Management
CSE 6075 - Requirements Engineering and Management
CSE 6076 - Software Verification and Validation
CSE 6011 - Software Quality Management

ENGG 6101 - Principles of Project management
MGT 5212 - Human Resources and Quality Management
CSE 6000 - Project

ELECTIVE MODULES

Group A

CSE 6078 - Software Metrics (3L)
CSE 6080 - ERP & Change Management (2L + 2P)
CSE 6027 - Enterprise Applications Development (2L + 2P)
CSE 6077 - Software Engineering Tools (2L + 2P)

Group B

ACT 5112 - Project Economics and Finance (3L)
ENGG 6305 - Procurement Management (3L)
LAW 7000 - Legal Aspects of Project Management (3L)
MGT 6011Y - Marketing management (3L)

Note: Students will take six core modules and two electives (one elective from group A, one from group B).

9. **Programme Plan – MSc Software Engineering Projects and Management**

(Full time)

	Module Code	Module	Hrs/WK L + P	Credits
Semester I	CSE 6075	Requirements Engineering and Management	3+0	3
	CSE 6011	Software Quality Management	3	3
	ENGG 6101	Principles of Project management	3+0	3
	CSE 6076	Software Verification and validation	3+0	3
		Elective 1	(See section 8)	3
Semester II	CSE6209	Software Project Management	3+0	3
	MGT5212	Human Resources and Quality Management	3+0	3
	CSE 6000	Elective 2	(See section 8)	3
		Project		12

(Part time)

	Module Code	Module	Hrs/WK L + P	Credits
Semester I	CSE 6075	Requirements Engineering and Management	3+0	3
	CSE 6011	Software Quality Management	3	3
	ENGG 6101	Principles of Project management	3+0	3
Semester II	CSE 6209	Software Project Management	3+0	3
	MGT 5212	Human Resources and Quality Management	3+0	3
		Elective 1	(See section 8)	3
Semester III	CSE 6076	Software Verification and validation	3+0	3
		Elective 2	(See section 8)	3
Semester IV	CSE 6000	Project		12

Note 1: An elective will be provided only if sufficient number of students have opted for it and depending on availability of resources.

Note 2: Some courses may be run during/after office hours depending on availability of resources.

10. Outline Syllabus

CSE 6209- SOFTWARE PROJECT MANAGEMENT

Features of Software Projects, Project-Life Cycle, Team Organisation and People Management, Software Processes, Evaluation and Estimation Techniques, Scheduling Principles, Budgeting, Procurement and Contract Management, Resource Allocation, Risk Management, Testing Goals and Plan, Defects, Hypotheses, Testing Strategies and Methods, , Capability Maturity Model, Configuration Management, Project Management Software Tools, Best practices for SPM

CSE 6075 – REQUIREMENTS ENGINEERING AND MANAGEMENT

Issues of the early stages of systems development; explores different approaches that can be used to identify, record and manage requirements within the systems lifecycle; architectural requirements, model business context into which information systems must fit, Requirement change management issues, Requirement traceability issues, AGILE Modeling

CSE 6076 - SOFTWARE VERIFICATION AND VALIDATION

The three interdisciplinary thematic blocks: Software inspection (verification metrics, requirements, design and code inspection); Software testing (levels, methods and types of test, informal and formal validation, test planning, validation metrics) AND Software reliability engineering (reliability predictions, operational profiles, test efficiency deployment, software reliability models, step-by-step process implementation). All three blocks will cover the history (background), concepts (techniques) and applications, and applied usage of at least one technique from each theme respectively. Framework for V&V (providing a crude systematic review of V&V) and improvements

CSE 6077 - SOFTWARE ENGINEERING TOOLS

Select appropriate software engineering tools for different situations; develop a strategy for introducing tools into an organisation; and get hands-on experience of a modern integrated development environment (increasingly adopted by software engineers who want to improve software productivity as well as quality).

ENGG 6101 - PRINCIPLES OF PROJECT MANAGEMENT

Introduction to Principles of Project Management. Planning and Programming. Procurement Budgeting and Estimating. Project Control. Quality Management. Risk Management. Strategic Management. Project Appraisal. Project Completion Report. Case Studies.

MGT 5212 - HUMAN RESOURCES AND QUALITY MANAGEMENT

Managing and the Environment: the Management Challenge, the Evolution of Management Environment, Social Responsibility, and Ethics, the Global Management Environment. Planning: Decision Making, Planning, Strategy. Organising: Organisational Structure and Design, Job Analysis, Design, and Redesign Human Resource Management. Leading: Group Dynamics and Team Building, Motivation, Leadership, Interpersonal and Organisational Communication. Controlling: Control Systems, Managing Production and Operations, Managing Services, Managing Organisational Change. Growth, Technology and Innovation: Entrepreneurship and Growth, Technology and Innovation. Behavioural Issues in Quality Management: The role of management in sustaining continuous quality improvement, Culture Change & Quality, Building Commitment for Quality, Teamwork & Total Quality, Employee Involvement & Empowerment for Quality, Communication for Total Quality, Quality Training.

CSE 6080 - ERP & CHANGE MANAGEMENT

Based on CSE3008: ERP Systems, Core Business Processes, System Thinking, Transition from MRP to ERP, Basic ERP model, Benefits and Challenges of ERP, BPR, ERP System Selection, ERP Design, ERP Implementation, ERP Standards, ERP Bolt-ons, ERP System Maintenance, Technology and International Considerations, Change Management, ERP and Supply Chain.CSE

6027 - ENTERPRISE APPLICATIONS DEVELOPMENT

Design Patterns and Abstraction Layers in Enterprise Applications, organizing Domain Logic, Inversion of Control, Cross-Cutting Concerns, Mapping to Relational Databases, Transaction Management, Web Presentation Layer, Remoting and Web Services, Concurrency, Scripting, Testing, Using an Enterprise Framework, Tool Support, Latest Research in Enterprise Applications Development.

CSE 6078 - SOFTWARE METRICS

Fundamentals of measurement: The need for measurement, scope of software metrics; Measurement theory: scales, validation, and meaningfulness; Goal-Question-Metric paradigm; Measurement data collection and analysis; A classification of software metrics; Software measures: Internal Product Attributes; External Product Attributes; Resource; Measurement; ISO 9126 software product quality characteristics; Software measurement process: Measurement process models; ISO/IEC 15939: Software; Measurement Process; CMMI's measurement requirements

CSE 6011 – SOFTWARE QUALITY MANAGEMENT

Software Quality Factors, Metrics & Models, Estimation Techniques, Benchmarking, Quality Assurance Activities, Measurement Tracking, Statistical Quality Assurance, Data Quality Control, ISO Standards Requirements & Certification, TickIt, Quality Ethics, CMM & CMMI.

ACT 5112 - PROJECT ECONOMICS AND FINANCE

Introduction to the Mauritian Economy - Major Projects in the Economy - Economics of Projects - Costing - Projects and Productivity - Estimating and Competitive Tendering - Investment Appraisal - Cash Flow and Financing Projects.

ENGG 6305 - PROCUREMENT MANAGEMENT

Basic steps in procurement, purchase planning, partners in a supply chain. Supplier audit and ethics in procurement. Public Procurement, Transparency and Equity. Risks and Relationships in Procurement Management. Cost reduction techniques including tendering procedures and negotiation. Supply contracts and common supply chain problems. Market information and sourcing for goods and services. Quality control and relevant regulations for ensuring safety in procurement. Environmentalism and green-purchasing. Product cycles and extended product responsibility.

LAW 7000 - LEGAL ASPECTS OF PROJECT MANAGEMENT

Introduction to mauritian mixed legal system. Historical development. Sources of law. Contrat. Formation du contrat. Validite du contrat. Effets du contrat. Inexecution du contrat. La responsabilite civile delictuelle. Le contrat d'entreprise. Les obligations de l'entrepreneur. La sous-traitance. La co-traitance. Les obligations du maitre de l'ouvrage. Le droit du travail. Le contrat de travail. Les obligations de l'employeur. Les obligations de l'employe. Le licenciement dans l'entreprise. Summary dismissal.

MGT 6011Y - MARKETING MANAGEMENT

The module introduces the foundation of marketing management and its key concepts: the Marketing Concept, Customer Satisfaction and Customer Value. Topics covered will include: evolution in Marketing Management philosophy; the marketing environment (Internal and External environment); the marketing research process; Consumer and Business buying behaviour; Market segmentation, positioning and targeting; The Marketing mix: product, price, promotion and distribution strategy of firms; Social Responsibility and green marketing.

CSE 6000 - PROJECT

Student research project. Includes appropriate research methods training

February 2010

Mechanical and Production Engineering Department

MSc Building Services Engineering – E 507

1. Aim

The success of the building industry depends on its ability to meet the requirements on issues such as energy management, environment, emissions, optimisation as well as use of green energies and health & safety. This programme is aimed at engineers and provides a sound knowledge of the important engineering principles that are required in the building services/Integrated Resort Scheme (IRS) or Hospitality sectors.

2. Objectives

Building Services Engineering involves the specification, design, installation and management of all the engineering services associated with the built environment. This programme is specifically useful to develop technical understanding and expertise across the multi disciplines of building services engineering such as air conditioning, ventilation, hot and cold water reticulation, sewage reticulation, drainage system, fire fighting, electrical installation, lifts, escalators, alarm systems and energy management systems among others. Environmental and safety issues form the key parameters for each module.

3. General Entry Requirements

Successful completion of an undergraduate degree with

- at least a Second Class or 50%, whichever is applicable or
- a GPA not less than 2.5 out of 4 or equivalent, from a recognised higher education institution.

OR alternative qualifications acceptable to the University of Mauritius.

4. Programme Requirements

At least a second class honours degree in any engineering discipline with GPA not less than 2.5 or alternative qualifications acceptable to the University of Mauritius.

Preference will be given to candidates having at least two years of relevant work experience.

5. General and Programme Requirements – Special Cases

The following may be deemed to have satisfied the General and Programme requirements for admission:

(i) Applicants who do not satisfy any of the requirements as per Regulations 3 and 4 above but who submit satisfactory evidence of having passed examinations which are deemed by the Senate to be equivalent to any of those listed.

(ii) Applicants who do not satisfy any of the requirements as per Regulations 3 and 4 above but who in the opinion of Senate submit satisfactory evidence of the capacity and attainments requisite to enable them to pursue the programme proposed.

(iii) Applicants who hold a full practicing professional engineering qualification obtained by examination.

6. Programme Duration

The Programme will be offered on a part-time basis. The duration of the Graduate Programme should normally not exceed 4 years (8 semesters).

	Normal	Maximum
Master's Degree:	4 Semesters	8 Semesters
Postgraduate Diploma:	4 Semesters	8 Semesters

7. Credits per Semester: Minimum 3 credits subject to Regulation 6.

8. Minimum Credits Required for the Award of

Master's Degree: 36
Postgraduate Diploma: 24

Breakdown as follows:

	Core Taught (Minimum)	Project	Elective/ Optional Modules
Master's Degree:	21 credits	9 credits	6 credits
Postgraduate Diploma:	21 credits		3 credits

9. Assessment

Each module will carry 100 marks and will be assessed as follows (unless otherwise specified):

Written examination of 3-hour duration and continuous assessment of 10% to 30% of total marks.

Continuous assessment can be based on laboratory work, assignments and at least one class test.

An overall of 40% for combined Continuous Assessment and written Examination components would be required to pass the module. All modules carry equal weighting.

Some modules may be based only on continuous assessment, which should consist of at least a class test and industry based project.

Submission Deadlines for Dissertation:

(Please refer to Regulations 7.4.4.2- <http://www.uom.ac.mu/ABOUTUS/REGULATIONS/Chap7.pdf>)

10. Plan of Study

Students are required to submit at the end of Semester 1 a Plan of Study for their whole Programme of Studies, indicating the list of elective modules and in which semester, each of them will be taken.

The University reserves the right not to offer a given elective module if the critical number of students is not attained and/or for reasons of resource constraints.

11. List of Modules

Code	Module Name	Hrs/Wk L+P	Credits
<u>CORE MODULES</u>			
MECH 6202	Fluid Systems Engineering	3+0	3
ELEC 6104	Electrical Services for Building	3+0	3
MECH 6105	Heating, Ventilation and Air conditioning(HVAC)	3+0	3
ENGG 6101	Principle of Project Management	3+0	3
ENGG 6410	Asset Management	3+0	3
MECH 6410	Sustainable Energy Management	3+0	3
MECH 6106	Legal aspects of Building Services Engineering	3+0	3
<u>PROJECT</u>			
ENGG 6000	Project	-	9
<u>ELECTIVES</u>			
MECH 6204	Occupational Health & Safety	3+0	3
MECH 6205	Managing People in Engineering Activities	3+0	3
ENGG 6305	Procurement Management	3+0	3

Students have to complete ALL core taught modules, the project work and ANY two (2) electives.

12. Programme Plan

YEAR 1							
Semester 1				Semester2			
Code	Module Name	Hrs/Wk L+P	Credits	Code	Module Name	Hrs/Wk L+P	Credits
CORE				CORE			
ENGG 6101	Principles of Project Management	3+0	3	*MECH 6202	Fluid Systems Engineering	3+0	3
*ELEC 6104	Electrical Services for Building	3+0	3	ENGG 6410	Asset Management	3+0	3
YEAR 2							
Semester 1				Semester2			
Code	Module Name	Hrs/Wk L+P	Credits	Code	Module Name	Hrs/Wk L+P	Credits
CORE				CORE			
ENGG 6000	Project		-	ENGG 6000	Project	-	9
MECH 6106	Legal aspects of Building Services Engineering		3	Two Elective Modules from			6
*MECH 6105	HVAC	3+0	3	MECH 6204	Occupational Health & Safety	3+0	3
MECH 6410	Sustainable Energy Management	3+0	3	MECH 6205	Managing People in Engineering Activities	3+0	3
				ENGG 6305	Procurement Management	3+0	3

*Continuous assessment only

Each module will consist of 45 contact hours (this includes lectures, tutorials, seminars, workshops, external visits, etc.). The total contact (taught) hours of the course therefore will be 405 hours. The Research Project will

involve 180 working hours including direct supervision by a member of academic staff and/or an external supervisor.

A minimum of 6 contact hours is scheduled per week. However, candidates are expected to attend on a daily basis, for a period of two to three weeks, normally after 4 p.m., those modules which are taught by visiting lecturers.

The Faculty reserves the right to change the order in which the modules are offered.

13. Outline Syllabus

MECH 6202 - Fluid Systems Engineering (3L+0P)

Pipe flow, Friction losses, Selection of pumps, Drainage systems, Plumbing services, Design of hot and cold water reticulation, Design of fire fighting systems, Design of sewage systems, Rain water harvesting, Design of central gas distribution, Industry based project.

MECH 6105 - Heating, Ventilation and Air Conditioning (HVAC) (3L+0P)

Introduction to Refrigeration cycles, Vapour Compression Cycle, Multiple Evaporators and Compressors Systems Equipment, Properties of Refrigerant, Refrigerant and the Ozone Layer, Introduction to Air Conditioning, Psychometric Charts, Comfort air conditioning and Industrial Air Conditioning, Factors affecting Human Comfort, Air Quality and Standards, Air Conditioning, Determination of Cooling Load, Air Conditioning Systems and Equipment Selection, Design of Ducting and Piping Systems Installation, Thermal Storage Systems, Partial and Full Energy Conservation and Management, Low energy air conditioning, Heat Transfer equipment (heat exchanger, evaporator, condenser), Design of ventilation system, Industry based project.

ELEC 6104 - Electrical Services for Building (3L+0P)

Low Voltage Distribution Systems: Single-Phase and Three-Phase, High Voltage Switchgear, Transformers, Generators, Lighting Design and Systems, Daylight and Occupancy Management Lighting Control Systems, Lightning Protection Systems, Electrical Testing and Inspection, Fire Detection and Alarm Systems, Security Systems (Access Control, CCTV, Intruder Alarm and LAN), Lifts and Escalators. Industry based project.

ENGG 6000 – Project

The project will lead to the publication of a dissertation, the objective of which is to enable the students to apply the techniques and disciplines covered to a topic of their interest or to the interest of a company. The project can also be research based. No. of words -10,000 to 14,000.

ENGG 6101 – Principles of Project Management (3L+0P)

Introduction to Principles of Project Management, Planning and Programming, Procurement Budgeting and Estimating, Project Control, Quality Management, Risk Management, Strategic Management, Project Appraisal, Project Completion Report, Case Studies.

ENGG 6305 – Procurement Management (3L+0P)

Basic steps in procurement, purchase planning, partners in a supply chain, Supplier audit and ethics in procurement, Public Procurement, Transparency and Equity, Risks and Relationships in Procurement Management, Cost reduction techniques including tendering procedures and negotiation, Supply contracts and common supply chain problems, Market information and sourcing for goods and services, Quality control and relevant regulations for ensuring safety in procurement, Environmentalism and green-purchasing, Product cycles and extended product responsibility.

ENGG 6410 – Asset Management (3L+0P)

Defining the position of asset management within the corporate business - Establishing an asset maintenance policy - Role of the asset manager - Selecting appropriate maintenance management strategies - Techniques for predicting and minimising operating costs - Information management and feedback.

MECH 6106– Legal Aspects of Building Services Engineering (3L+0P)

Introduction to Law, Brief Overview of Sources of Law and the Mauritian Legal System, Building Control Legislation & Regulations, Environmental and Safety Law, Conditions of Contracts for Construction,

Building and Engineering Works, Formation and Conditions of Validity of a Contract, Inexecution of a Contract, Alternative Dispute Resolution, Arbitration, Terms and Conditions of a Few Standard Contracts in Building Services Engineering, Case Studies, Code of Ethics.

MECH 6204 Occupational Health and Safety (3L+0P)

OHSAS 18001, Occupational Safety, Health and Welfare Act Subsidiary Legislation on Health and Safety in Mauritius, Development of Positive OSH and Environment Culture, Planning a Safe Place of Work, Setting of Objectives - Establishing Performances Standards, Hazards (Civil, Electrical, Mechanical, Chemical, etc), Controlling Hazards and Risks, Organisation Structure to Implement a Safe Place of Work, Co-operation at Work - Workers Participation and Commitment, Training, Safety Committees, Safety Inspection.

MECH 6410 - Sustainable Energy Management (3L+0P)

Fundamental principles of Energy Management; Energy Auditing, Energy Technologies, Cogeneration, E5 Analysis, Building Energy Management Systems; Eco-buildings and Renewable energy sources. Standards associated to Energy Management Systems and Energy Efficiency in Buildings. Case Studies/mini projects dealing with initiating, organising and managing energy management programs.

MECH 6205 - Managing People in Engineering Activities (3L+0P)

Organisation Structure and Design, Good Governance, Job Analysis, Design, and Redesign, Group Dynamics and Team Building, Motivation, Managing Conflict, Dealing with poor performers, Internal and external relationship, Leadership, Interpersonal and Organisational Communication. Case studies

02/03/12