MSc Software Engineering Projects and Management - E562 (Subject to Approval)

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).

- o A written examination of 3 hours and
- o 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.
- o A minimum of at least 30% should be attained in each of continuous assessment and Written Examination, with an overall total of 40% for a candidate to pass a module.

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
		Elective1	(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 contract. 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