

MSc Quality Management - E540

1. Introduction

Quality Management is increasingly recognised as an important discipline within a wide range of sectors. Opportunities exist for those who wish to develop their quality management and process improvement skills within their current professional discipline, as well as opportunities for those who seek a specialist quality management role.

2. Aims & Objectives

The aim of the programme is to enable those employed in a specific quality management role or other technical discipline to make a more effective contribution to their organisation, particularly in the field of continuous improvement of processes.

The main objective of the programme is to provide students with quality, organizational and people management skills and techniques to enable them to make a significant contribution to an organization's quality policy.

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

Preference will be given to candidates with relevant work experience.

5. Programme Duration

The duration of the Graduate Programme should normally not exceed 4 years (8 semesters).

	Normal	Maximum
Master's:	4 Semesters	8 Semesters
Postgraduate Diploma:	4 Semesters	8 Semesters
Postgraduate Certificate:	2 Semesters	8 Semesters

6. Credits per Semester – Minimum 3 Credits subject to Regulation 5.

7. Minimum Credits for Award of :

Master's Degree :	36
Postgraduate Diploma :	24
Postgraduate Certificate	12

Breakdown as Follows

	(Minimum) Core Taught Modules	Dissertation	Electives/ Optional Modules*
Master's Award:	18 Credits	9 Credits	9 Credits
Postgraduate Diploma (where applicable)	18 Credits		6 Credits
Postgraduate Certificate	12 Credits		

8. Assessment

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

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 40% of total marks.

Continuous assessment may be based on laboratory work, and/or assignments and should include at least one class test.

For a student to pass a module, a minimum of 30% should be attained in both of Continuous Assessment and Written Examination separately, with an overall total of a minimum of 40% in that module.

All modules carry equal weightage irrespective of levels.

The project is equivalent to 9 credits.

Submission Deadlines for project:

- 1st draft: end July of final year
- Final copy: Last working day of August of final year.

11. Planning

Students are required to submit at the end of Semester I 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).

12. List of Modules

CORE MODULES			Hr/wk	Credits
ENGG 6001	Foundation Statistics*		3+0	- (I or S)
MECH 6101	Managing Quality		3+0	3
ENGG 6202	Research Methods		3+0	3
MECH 6201	Quality Systems & Auditing		3+0	3
MECH 6302	Statistical Process Control (SPC)		3+0	3
MECH 6301	Quality costing		3+0	3
MGT 5212	Human Resources and Quality Management		3+0	3
ENGG 6000	Project			9
SPECIALISED ELECTIVES			Hr/wk	Credits
MECH 6409	Maintenance Management		3+0	3
ACT 5112	Project Economics and Finance		3+0	3
MECH 6306	Production and Operation Management		3+0	3
ENGG 6305	Procurement Management		3+0	3
MECH 6402	Advanced Manufacturing & Measurement systems		3+0	3
GENERAL ELECTIVES			Hr/wk	Credits
CSE 6005	Management Information Systems		3+0	3
CIVE 6102	Environmental Management I		3+0	3
MGT 6180	Managing Human Resources		3+0	3
ENGG 6410	Asset Management		3+0	3
MGT 5116	Business-to- Business Marketing		3+0	3
MGT 6211	Business Ethics and Corporate Governance		3+0	3

* The module ENGG 6001 Foundation Statistics must be satisfactory completed for the award of the MSc Degree.

13. Programme Plan - MSc Quality Management

A proposed programme plan is shown below. The Faculty reserves the right to change the order in which the modules are offered.

Year 1 (Level 1)	Core Modules	Semester 1	ENGG 6001 Foundation Statistics* MECH 6101 Managing Quality MGT 5212 Human Resources and Quality Management
		Semester 2	MECH 6201 Quality Systems & Auditing ENGG 6202 Research Methods MECH 6302 Statistical Process Control (SPC)
Year 2 (Level 2)		Semester 3	MECH 6301 Quality Costing Elective module (Specialised)
			ENGG 6000 Project
		Semester 4	Elective module (Specialised)
			Elective module (General) Project (continued)

Each module will consist of 45 contact hours (this includes lectures, tutorials, seminars, workshops, external visits, etc.). The total contact (taught) hours of the programme therefore will be 405 hours. The Project will involve direct supervision by a member of academic staff and/or an external supervisor.

A minimum of 6 contact hours is scheduled per week (3 hours on weekdays and 3 hours on Saturday). However, candidates are expected to attend on a full-time basis (after 4.00 p.m. on a daily basis) for intensive modules taught in a period of two weeks by visiting lecturers.

*The module ENGG 6001 Foundation Statistics must be satisfactorily completed for the award of the MSc Degree.

14. Outline Syllabus

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

CIVE 6102 - ENVIRONMENTAL MANAGEMENT 1

Concept of sustainable development; Environmental management tools; EIA; EMS; Environmental legislation; Environmental audits; Waste audits; Risk assessment; Case-studies; Environmental problems in Mauritius; Economic Tools to encourage pollution control

CSE 6005 - MANAGEMENT INFORMATION SYSTEMS

Introduction to Information Systems and their requirements. Early development in IS, conventional systems analysis, comparisons and problems. IS Methodologies. Systems approaches, planning approaches, participation, prototyping, structural methodologies, data analysis. Tools. Databases management systems, Query language, project management tools, expert systems. Methodologies - SSADM, SSM, etc.. Selection and use of systems. Decision support systems, distributed computing and autonomous agent technology .Databases.

ENGG 6000 - PROJECT

The candidate, in undertaking a project, is expected to demonstrate a strong ability to apply skills and techniques acquired during the programme to solve quality-related problems.

ENGG 6001 - FOUNDATION STATISTICS

Fundamentals: Data collection, Histograms and ogives, Sampling statistics: Probability concepts: Probability and its axioms, conditional probability, independent events, Bayes' theorem, permutations and combinations. Probability Distributions: Discrete distributions with emphasis on binomial and poisson distributions, Continuous distributions with emphasis on normal, t, chi-square and F distributions. Weibull distribution, Central limit theorem, Normality, Skewness, Kurtosis, Modality. Useful approximations of distributions. Kolmogorov test. Estimation and Confidence Intervals. One-sample and two-sample significance tests. Simple linear Regression and Correlation.

ENGG 6202 - RESEARCH METHODS

The Research Concept. The Research Process. Surveys and Sampling Design. The Choice of Analysis, review of basic statistics, regression analysis, analysis of variance, multiple regression, hypothesis testing, dummy variable in regression, one way ANOVA, theory and application of maximum likelihood methods.

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.

ENGG 6410 - ASSET MANAGEMENT

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 - Choosing a suitable procurement option - Information management and feedback.

MECH 6101 - MANAGING QUALITY

Background To TQM, The Gurus: Juran and Deming, Crosby and Oakland, Leadership and Strategy, Know Your Customers, Empowerment, Tools and Methodologies, Process Mapping, Functional Analysis, Taguchi techniques, Benchmarking, Quality Function Deployment, Policy Function Deployment, Quality Circles And Task Teams, Monitoring and Evaluating Organisational Performance, Promoting Continuous Improvement, Quality Measurement, The European Quality Award Model, Case Study: Mauritian Quality Award, TQM In Government: Best Value, TQM In Health Care.

MECH 6201 - QUALITY SYSTEMS & AUDITING

ISO 9000 QUALITY SYSTEMS – The requirements and guidance sections broken down into detail. The management perspective – the major role of management, the strategic implications, operational implementation. Problems outlined and discussed.

QUALITY SYSTEM PLANNING AND IMPLEMENTATION – documentation structures, breaking down barriers, communication, resource requirements, timescale etc.,

TYPES OF QUALITY AUDIT (INTERNAL/EXTERNAL) Audit Standards, Audit preparation and Planning / Conducting Audits and Review. Techniques for Auditing/Checklist for Auditors, Auditor Responsibilities, Nonconformities, surveillance,.

The advent of self assessment systems. The development of ISO 9000 beyond the millennium. Its relationship with TQM.

MECH 6302 - STATISTICAL PROCESS CONTROL

QUALITY CONTROL TOOLS. The seven statistical quality control tools. System & Process capability, Capability Indices, Measurement Capability Studies, Statistical Software Packages.

CONTROL CHART FOR ATTRIBUTES Variables and Attributes data. Attribute control charts namely P, NP, C & U Charts. The Pareto Principle and Pareto Charts.

CONTROL CHART FOR VARIABLES. Distribution of Sample Means, The X bar and R chart. Interpretation, relating to Specifications. Process Capability, Short Run SPC, X bar S charts, Interpreting Control Chart patterns. Rules for Zone analysis. Assignable and Common causes of variation. CUSUM charts.

THE QUALITY GURUS and their contribution to SPC. E. Deming: 94% rule. W. Shewart. K. Ishikawa : Seven SPC tools. G. Taguchi : Closeness to Target, The Quality Loss function, Concept of Control.

IMPLEMENTING SPC & TQM : Establishing a Control plan. Breakthrough Activities Applying the Deming Cycle. CASE STUDY & WORKSHOP.

MECH 6301 - QUALITY COSTING

Definition and Categorisation of Quality Related Costs, Definitions. Accepted categorisations of Quality Costs. Historical perspectives, work of Feigenbaum, Juran, Crosby. The use of alternative models. PAF and process cost, Problems in Collecting Quality Related Costs: Examination of purposes in collecting Quality Costs. Operational difficulties. Reasons for not collecting costs, Implementing A System for Quality Costs: Developing a framework, overcoming barriers and examination of current accounting practices, Reporting Quality Costs: Reporting structure. Involvement of workforce - raising awareness. Contributions from individuals and groups. Information flow. Need for further improvements, Use of Quality Costs: Quality Costs as a measure of good internal and external management. Performance measures, e.g., trend analyses, Pareto Analysis and investment opportunities, Total Cost of Ownership: The use of quality costs in life cycle costing. Supplier orientation. Cost of lost opportunity, Accounting Systems: The ease or difficulty in obtaining suitable financial data. Activity based costing. Case studies

MECH 6409 - MAINTENANCE MANAGEMENT

Overview and Historical Development of Maintenance. Maintenance Strategies: Preventive and Planned Maintenance, Computerised Maintenance Management Systems, Maintenance Engineering (Plant Availability, Reliability, Reliability-Centred Maintenance, Rehabilitation). Plant Maintenance. Maintenance Costs. Management of Maintenance. Condition Monitoring Concepts. Principles and Economics. Vibration Based Condition Monitoring. Oil Based Condition Monitoring. Life Cycle Costing. Design and Manufacture Considerations. Non-Destructive Testing Techniques. Failure Mechanisms and Safeguard against them.

MECH 6306 - PRODUCTION AND OPERATIONS MANAGEMENT

The Production and Operations function - Production Planning and Control, Scheduling, Loading, Forecasting - Work Study, Ergonomics and plant Lay-out - Materials Management: Deterministic and Probabilistic Models, MRPI, MRPII, JIT -Decision-making Techniques: Linear Programming & Sensitivity Analysis, Transportation, Queuing and Simulation - New trends in Production and Operations Management.

MECH 6402 - ADVANCED MANUFACTURING AND MEASUREMENT SYSTEMS

Introduction to non-conventional machining, CAD system, basics of CNC machining, new tool materials.

Precision Machining (ECM, EDM, Laser cutting,Ultrasonic Machining, Water jet cutting), Introduction to nanotechnology, Introduction to the fundamentals science of measurements, Limits, Fits & Tolerance, Errors, Linear measurements, Angular measurements, Introduction to Surface roughness, roundness measurements, introduction to CMM.

MGT 5116 - BUSINESS-TO-BUSINESS MARKETING

The Industrial Marketing Environment; The nature of Industrial buying; The Interpersonal Dynamics of Industrial Buying behaviour; Industrial Marketing research; Industrial Market Segmentation; Target Marketing and Positioning; Product Development, Management and Strategy; Price Planning and Strategy; Promoting and selling the Industrial Product; Distributing the Industrial Product.

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.

MGT 6180 - MANAGING HUMAN RESOURCES

History, Evolution and Developments; Comparison between HRM and Personnel Management; D.Guest, Harvard models, et c. Culture and Change management in HRM ; Strategic Human resource management . Tenets of HRM; Human Resource Strategy; Human resource Planning; Recruitment and Selection;. Tenet of HRM- Human Resource Development; Training and Development; Performance Management; Management Development; Employee Development and Self development; career Development; Tenets of HRM; Employee Relations (ER) ; Perspectives in ER; Stakeholders in ER; ER Practices; Reward Management; International HRM; HRM and IT.

MGT 6211 - BUSINESS ETHICS AND CORPORATE GOVERNANCE

The ethical organisation; Corporate governance as a way of life; Teleology; Deontology; Ethical formalism; Conception of equality; Moral versus relativistic dimensions; Cultural implications; Ethics in business; Stakeholder theory; Personal v.s. corporate values; Bribery viewed by different ethical philosophies; Reform strategies; Education and training in ethics; Economic and political reform; Institutional reform and social empowerment.