

MSc Total Quality Management & Performance Excellence – E543 (Subject to Approval)

1. Aims and objectives

Total Quality Management is recognised as an important concept which cuts across all sectors of activities, be it in, public, parastatal and private sectors. The current trend is now to move towards a culture of excellence in all activities undertaken by any organisation in order to minimise/eradicate wastes and non-value added activities.

The programme has been designed to meet the requirements of a wide range of applicants including those:

- involved in quality improvement programmes
- requiring new tools, methods, and techniques for day to day problem solving such as waste minimisation.
- In charge of quality management projects such as ISO certification.
- responsible for the setting up of TQM initiatives such as Quality Circles.

This programme covers the complete range of topics, from quality concepts, basic and advanced quality tools & techniques, quality management systems, quality excellence methodologies, continuous improvement methodologies, to the human development and motivation of people across an organisation.

The programme is very practical in nature, and aims at providing strong personal quality management skills to the students.

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, organisational and people management skills and techniques to enable them to make a significant contribution to an organisation's quality policy.

2. General Entry Requirements

Successful completion of an undergraduate degree with at least a Second Class or 50 % which ever applicable or a GPA not less than 2.50, or equivalent, from a recognized higher education institution Or alternative qualification acceptable to the UoM.

3. Programme Requirements

Preference will be given to candidates with relevant work experience.

4. 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 2 and 3 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 2 and 3 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 practising professional qualification obtained by examination.

5. 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
Postgraduate Certificate:	2 Semesters	8 Semesters

6. **Credits per Semester:** Minimum 3 credits per semester and Maximum 24 credits per semester subject to Regulation 5.

7. Minimum Credits Required for Awards

Master's Degree:	39
Postgraduate Diploma:	24
Postgraduate Certificate:	12

Breakdown as follows:

	Core Taught Modules (Min)	Project	Electives/ Optional Modules
Master's Degree:	24 credits	9 credits	6 credits
Postgraduate Diploma:	21 credits		3 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 30% to 40% of total marks.

Continuous assessment may be based on laboratory work, and/or assignments and should include at least two class tests/assignments per module.

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 weight.

The Project carries 9 credits.

Submission Deadlines for Dissertation

- First Draft: End of July of Final Year.
- Final Copy: Last working day of August of Final Year.

9. 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.

10. Important Note

The rules as stipulated in this Programme Structure and Outline Syllabus will replace all other rules and regulations found in previous Programme Structures.

11. List of Modules

Code	Module Name	Hrs/Wk L+P	Credits
<u>CORE MODULES</u>			
ENGG 6001	Foundation Statistics	3+0	3
MECH 6251	Total Quality Management	3+0	3
ENGG 6202	Research Methods	3+0	3
MECH 6201	Quality Systems & Auditing	3+0	3
MECH 6252	Quality Engineering	3+0	3
MECH 6301	Quality Costing	3+0	3
MGT 6286	Performance Evaluation	3+0	3
MGT 5212	Human Resources and Quality Management	3+0	3
<u>PROJECT</u>			
ENGG 6000	Project	-	9
<u>ELECTIVES</u>			
MECH 6409	Maintenance Management	3+0	3
MECH 6204	Occupational Health and Safety	3+0	3
ACT 5112	Project Economics and Finance	3+0	3
MECH 6306	Production and Operations Management	3+0	3
ENGG 6305	Procurement Management	3+0	3
CSE 6005	Management Information Systems	3+0	3
CIVE 6102	Environmental Management I	3+0	3
MGT 6211	Business Ethics and Corporate Governance	3+0	3

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

NOTE:

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 450 hours. The Project will involve an equivalent of 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 (3 hours on weekdays and 3 hours on Saturday). However, candidates are expected to attend daily normally after 4.00 p.m., for intensive modules taught in a period of two/three weeks by visiting lecturers.

13. Outline Syllabus

CORE MODULES

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

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.

Organizing: Organizational Structure and Design, Job Analysis, Design, and Redesign Human Resource Management.

Recruitment: Human Resource Planning, Recruitment & Selection, Induction training.

Leading: Group Dynamics and Team Building, Motivation, Leadership, Interpersonal and Organizational Communication.

Controlling: Control Systems, Managing Production and Operations, Managing Services, Managing Organizational 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 6286 – PERFORMANCE EVALUATION

Theoretical Framework – Behavioural Theories and Understanding of High performance Workplace as a Concept

Job Evaluation and Analysis: Concept, process and objectives of job analysis and evaluation. Advantages and Limitations., Essentials of successful Job Evaluation, Methods of Job Evaluation.

Performance Appraisal: Performance Management System, Concept and objectives, Goal setting process, Use and process, Problems in performance appraisal, Essentials of effective appraisal system, Method and techniques of appraisal, Appraisal of managers, Appraisal techniques, , Feedback and Interviews.

Reward Management, Types of reward Systems, Incentive Plans and Profit Sharing: Meaning of wage incentives, Advantages and Limitations of incentive plans. Essentials of a sound incentive plan, Types of incentive plans, Wage incentives plans, Concept of profit sharing, Advantages and Limitations, Fringe benefits.

Job Changes- Transfers, Promotions and Separations: Purposes of job changes, Concept and objectives of transfer, Types of transfer, Transfer Policy, Concept and bases of promotion, Promotion Policy, Demotion.

Talent Management and Branding of employees.

Absenteeism and Labour Turnover: Concept of absenteeism, Causes and Effects, Control over absenteeism, Concept and measurement of labour turnover, Causes and effects of labour turnover, Control over labour turnover.

MECH 6301 - QUALITY COSTING

Introduction: Definition and Categorisation of Quality Related Costs, Definitions.

Introduction to basic financial accounting: reading and interpreting a financial statement, balance sheet and P&L accounts.

Accepted categorisations of Quality Costs: Historical perspectives, work of Feigenbaum, Juran, Crosby.

Quality Costs models: 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.

Application of basic Quality Control Tools: Ishikawa seven quality tools and applications (case studies).

Application of new Quality Tools: affinity diagram, relations diagram, tree diagram, matrix diagram, matrix data analysis, arrow diagram, process decision program chart (PDPC).

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 & Seminars.

MECH 6252 – QUALITY ENGINEERING

Introduction: Sources of variations (random and assignable), definition of statistical parameters, measurement system analysis, procedures for assessing measurement systems, concepts of accuracy and precision in measurements, central limit theorem.

Control Chart for Attributes. Variables and Attributes data. Attribute control charts, namely P, NP, C & U Charts.

Control Chart for Variables: The X bar and R chart & Interpretation, Process Capability and Capability Indices, Short Run SPC, X bar S charts, Interpreting Control Chart patterns, Rules for Zone analysis, Moving Mean & Moving Range charts, CUSUM charts.

The Quality Gurus and their contribution to SPC: E. Deming - 94% rule, W. Shewart, K. Ishikawa.

Taguchi Loss Function and Robust Design: Closeness to Target, The Quality Loss function, Orthogonal Array, Design of experiments and ANOVA.

Six Sigma: SIPOC diagram, and DMAIC methodology as a problem solving tool for improving business performance.

Implementing SPC & TQM: Establishing a Control Plan, Breakthrough Activities, Applying the Deming Cycle, Case study & workshop.

Management of SPC, critical success factors for implementation of SPC.

MECH 6201 - QUALITY SYSTEMS & AUDITING

ISO 9000: 2008 Quality Systems: The 8 Quality Management Principles, key benefits, outcomes and improvements in performance derived from their application in an organization

The requirements and guidance sections of ISO 9001 and ISO 9004 in detail.

The role of senior management, the strategic implications, operational implementation. Management review, preventive action and continual improvement.

Quality System Planning, development and Implementation – The process approach and the systems approach, system documentation structures, breaking down barriers, communication, resource requirements, data collection and analysis requirements.

Quality Auditing (Internal/External) – ISO 19011:2002 Auditing Guidelines, Audit preparation and Planning, Conducting Audits and Reviews. Techniques for Auditing, Checklist for Auditors, Auditor Responsibilities, Nonconformities and corrective action, The International Auditing Forum website.

The ISO 9004 self assessment system. The development of ISO 9000 beyond the millennium. Its relationship with TQM.

Introduction to Integrated Management System (IMS).

Introduction to Laboratory Management System ISO 17025 and introduction to OHSAS 18001.

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.

MECH 6251 – TOTAL QUALITY MANAGEMENT

Understanding Quality : Definition of quality, quality and competitiveness, understanding and building quality chains, managing processes, quality in all functions, quality gurus & TQM: Deming, Crosby, Juran.

Design for quality: Innovation: design and improvement, Quality function deployment (QFD) – house of quality, Design control and management, specifications and standards, Failure mode effect and criticality analysis (FMECA), quality in the service sector

Total Quality Management: The meaning and principles of Total Quality Management (TQM), TQM as an element of the corporate business management process.

TQM models: Malcom Baldrige Excellence model, European Foundation for Quality Management (EFQM) Excellence model, and SERVQual (in detail about the criteria and implementation methodology for the different models).

Implementation of TQM: Benchmarking, Communications for quality, Training for quality, Implementation of TQM and management of change. Quality Circles.

ELECTIVE MODULES:

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 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.

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 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.

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.

MECH 6204 OCCUPATIONAL HEALTH AND SAFETY

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.