



The University of the West Indies

Department of Mechanical and Manufacturing Engineering

Quality Manual

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INTRODUCTION

The Quality System employed in the Department of Mechanical and Manufacturing Engineering is designed to do the following:

1. Focus on and define all aspects of the Department's business process: vision and mission, objectives, organisational structure and operational procedures.
2. Through 1, provides a well-defined, commonly accepted vision along with a well elucidated set of norms of practice.
3. By virtue of 2, reduces levels of uncertainty in the work environment so as to foster a strong organisational team, a fundamental requirement for higher performance levels among staff and students alike.

This Quality Manual serves to document all aspects of the Department of Mechanical and Manufacturing Engineering Quality System. Previously this Manual was presented in two separate parts. However, following Department-wide consultation, these two parts are now combined into a single document.

Section I describes the Quality Management Framework that establishes the structures and regulations which make up the Department's Quality System. In particular, it outlines a framework for the assurance and enhancement of the quality of education provided through statements defining quality policy, organisation and responsibilities for quality, implementation of processes for review and enhancement of quality.

Section II provides guidelines for the operation of different aspects of teaching and describes the operational features of the quality system. In particular, this Section codifies the norms that reflect Departmental consensus on what is good practice in the conduct of teaching and assessment. The basic principles of fairness, transparency and consistency underpin all of the procedures described in this section.

The Department of Mechanical and Manufacturing Engineering offers the following programmes:

1. Bachelor of Science (BSc)Hons in Mechanical Engineering
2. Bachelor of Science (BSc)Hons in Mechanical Engineering with a minor in Bio-systems
3. Bachelor of Science (BSc)Hons in Industrial Engineering
4. Master of Science (MSc) in Manufacturing Engineering
5. Master of Science (MSc) in Production Engineering and Management
6. Master of Science (MSc) in Production Management
7. Master of Science (MSc) in Engineering Management
8. Master of Science (MSc) in Engineering Asset Management
9. Master of Philosophy (MPhil) in Mechanical, Manufacturing, Industrial and Agricultural Engineering
10. Doctor of Philosophy (PhD) in Mechanical, Manufacturing, Industrial and Agricultural Engineering

This Manual covers the BSc and taught postgraduate programmes only.

Mechanical and Manufacturing Engineering Quality Manual

It is hoped that this document will provide a meaningful and useful reference for all stakeholders in the Department of Mechanical and Manufacturing Engineering as we seek to build on our tradition of professional service and academic excellence.

SECTION I – THE QUALITY SYSTEM

1. Quality Policy and Objectives

The Mission of The University of the West Indies is:

“The enduring mission of The University of the West Indies is to propel the economic, social, political and cultural development of West Indian society through teaching, research, innovation, advisory and community services and intellectual leadership”.

The Department of Mechanical and Manufacturing Engineering therefore sees its own **Mission as**

“To provide a sound education in mechanical, manufacturing, industrial, and bio-systems engineering, encouraging entrepreneurship, innovation, and development to improve the quality of life of West Indian people.”

Its strategy for doing this includes:

- Effective delivery of subject content that is of significant relevance to regional development;
- Continuous improvement of the academic management structure for:
 - Implementation of strong, effective quality assurance measures in teaching, research and development that encourage a self-sustaining high calibre world-class learning environment.
 - The encouragement of a departmental culture that continually seeks to improve quality through continuous learning and growth, and which is always open to new approaches and ideas.
- Development of programmes that fully encourage and exploit the latent creative and innovative talents of West Indian people and which, at the same time, fully tools them for life in the engineering and business professions in the two key dimensions of knowledge and hands-on skill.

As such, elements of the Department’s culture must include:

- A Department that operates as a close-knitted team with common goals and objectives;
- A work atmosphere in which all levels of staff are clear about the Department’s direction as well as their roles and responsibilities;
- Department staff that operate professionally and competently;
- Faculty who can freely express themselves and respect one another’s points of view;
- Departmental staff who are respectful of students as adult human beings and who view the personal and professional growth of each student as a key end product;
- Faculty who maintain international standards in their teaching and assessment practices and who ensure that the content and delivery of courses are always up to date;

- Administrative, Technical and Support staff (ATSS) who pride themselves on being the best in their field and who work assiduously at achieving and maintaining the highest standards;
- Effective strategies for nurturing the overall personal development of students in addition to the fundamental requirement of transferring technical knowledge;
- An environment that nurtures and supports meaningful, relevant, world-class development and research activity that supports the growth and sustainability in the Caribbean region;
- An environment that is completely open to new paradigms, concepts and ideas.

The Quality System described in this Manual is designed to meet these objectives and is guided by the following publications:

- | | |
|---|--|
| 1. <i>Quality Assurance at The University of the West Indies: The Self-Assessment</i> , 5 th Edition, Quality Assurance Unit, Office of the Board for Undergraduate Studies, The University of the West Indies, 2002 | Provides guidance on UWI expectations of quality systems established in University departments, notably the quality model adopted by the UWI Quality Assurance Units, as one of 'fitness for purpose.' |
| 2. <i>Specification for Quality Management at the Departmental Level</i> , The Engineering Professor's Council, Occasional papers No 9, December 1996 | Provides widely accepted specifications for quality management frameworks in University departments. |
| 3. <i>The UKSPEC Chartered Engineer and Incorporated Engineer Standard</i> , Engineering Council UK, Updated 2010 | Describes the Requirements for Registration as Chartered or Incorporated Engineers, in particular the output standards for academic programmes in engineering |
| 4. <i>Subject Benchmark Statement: Engineering</i> , Quality Assurance Agency for Higher Education, UK, 2006. | Provides an external source of reference and general guidance for articulating learning outcomes and programme specifications against agreed general expectations about standards. |
| 5. <i>Subject Benchmark statement: Engineering - Annex B4: MEng Degrees</i> , Quality Assurance Agency for Higher Education, UK, 2006. | Provides special consideration of benchmark statements for MEng programmes. |

2. Organisation for Quality and Standards

This Section describes the organisational aspects of the quality framework. In particular, it describes the Department's committee structure as well as the authorities, roles, and responsibilities of staff and the various committees within the framework. To a large extent what is described below also describes the departmental business process.

2.1 Departmental Committees

The quality framework of the Department of Mechanical and Manufacturing Engineering comprises ten (10) committees. The Department Management Board is the ultimate decision-making body and, in this regard, provides the interface between the Department and the University at large. It is guided by recommendations and general information from the other supporting committees i.e., the Academic Management Committee, the Technical Support Committee which is supported by a Laboratory Operations Committee, the Staff/Student Liaison Committee, Industry Liaison Committee and Four Programmes with one of the programmes subdivided into Subject Groups.

The Department's committee structure is detailed in Figure 1. It should be noted that this figure displays decision based relationships. Extra-departmental committees that impact on quality issues are also included. Of note is the fact that Departmental decisions are routed through the Faculty and University by different committee paths depending on whether these decisions pertain to undergraduate or postgraduate matters.

2.1.1 Department Management Board

The Department Management Board is chaired by the Head of Department and comprises all Academic Members of Staff in the Department. Its main duties are strategic planning and formulation of recommendations to the Head on matters relating to courses, programmes, funding and other relevant issues. The Board advises the Head of Department on:

1. The organisation, policy, structure and operation of the Department;
2. Strategic planning;
3. All academic matters including matters pertaining to examinations, quality assurance and academic standards;
4. All matters pertaining to development, research and consultancy;
5. Resources, budget and funding, resource allocation;
6. Staff recruitment, induction, appraisal and development;
7. All other matters that impact on the quality of the delivery by the Department.

2.1.2 Programme Coordinators

The Department is organized such that there are four Programme Coordinators covering the undergraduate and postgraduate programmes. Figure 2 outlines this structure.

1. Coordinator for the Bachelor of Science (BSc) Hons in Mechanical Engineering programme. Leaders are appointed for the following Subject Groups within this Programme as follows:
 - The **Manufacturing Engineering Group** which conducts teaching and research in industrial automation, control and instrumentation as well as the general Manufacturing Engineering area.
 - The **Thermal Engineering Group** which conducts teaching and research in the Thermodynamics and Energy areas.
 - The **Engineering Mechanics Group** which conducts teaching and research in machines, strength of materials, vibration, engineering design and other related areas.
2. Coordinator for the Bachelor of Science (BSc) Hons in Mechanical Engineering with a Minor in Bio-systems programme
3. Coordinator for the Bachelor of Science (BSc) Hons in Industrial Engineering programme
4. Coordinator for the Postgraduate Programmes. Leaders are appointed for the following MSc. Programmes as follows:
 - Master of Science (MSc) in Production Management
 - Master of Science (MSc) in Production Engineering and Management
 - Master of Science (MSc) in Engineering Management
 - Master of Science (MSc) in Engineering Asset Management
 - Master of Science (MSc) in Manufacturing Engineering

2.1.3 Undergraduate Programmes and Subject Groups

From 2.1.2 above, there are three undergraduate programmes offered by the Department. The Mechanical Engineering programme is organised into three (3) Subject Groups. Each Subject Group represents a major area of expertise in Mechanical Engineering that is assessed to be of strategic importance to regional industry or to the operation of the Department. The Mechanical with a Minor in Bio-systems Programme conducts teaching and research in traction and power hydraulics, farm machinery and equipment, soil and water engineering, food and process engineering and related areas. The Industrial Engineering Programme conducts teaching and research in industrial engineering, engineering management and related areas.

Each Programme/Subject Group has its Coordinator/Leader who has the responsibility of managing and developing the Programme/Subject Group's areas of expertise. Each Programme/Subject Group comprises members of staff in the area and is chaired by a Coordinator/Leader.

Programme/Subject Groups are delegated by the Academic Management Committee to treat with issues of quality assurance and enhancement, course development and review,

the sharing of good practice and teaching and learning strategies in courses that pertain to the respective programme or subject area. In this regard, the Programme/Subject Groups operate at the ground level and are therefore expected to provide a depth of treatment of the pertinent issues that would not be practicable at the higher levels of the organisational hierarchy.

More specifically, the Programme/Subject Groups are to:

1. Develop the programme/subject areas through teaching, development and research, consultancy and workshop provision, recognising the requirements of industry and the profession;
2. Design, maintain, deliver and review the assigned portfolio of courses that support the various departmental programmes;
3. Design and maintain laboratory exercises to support courses that reflect the requirements of industry and the professional bodies;
4. In the conduct of the above, maintain service links to other Programmes/Subject Groups – What do other Programmes/Subject groups require from the courses offered?
5. Determine the need for staff development (at all levels) required to support programme/subject group activities;
6. Conduct an annual review of the programme/subject group area and produce an action plan;
7. Review and approve booklists;
8. Suggest additional resources for programme/subject group support, e.g. literature for library acquisition, laboratory equipment.

2.1.4 Academic Management Committee

The Academic Management Committee comprises the four Programme Coordinators, all Professors in the Department and the Department Head who also serves as Committee Chairperson. Within its remit are issues of quality assurance and enhancement, the sharing of good practice, teaching and learning strategies and programme development and review.

The Academic Management Committee also functions as a Subject Group, monitoring all fundamental courses in the programmes such as Communication Skills and Ethics, Introduction to Engineering and Mathematics. More specifically, this Committee serves to:

1. Review the Qualifications for Entry into the various programmes;
2. Co-ordinate the activities of the Programme/Subject Groups, which includes the determination of group membership, each group's course responsibility and the preliminary evaluation of group assessments and reviews;
3. Determine and manage the courses that are fundamental to the respective programmes and are therefore not assigned to any specific group;
4. Maintain the academic coherence of Departmental programmes;
5. Review the operation of Departmental programmes annually, and produce action plans to address the future development of these programmes;

6. Ensure that programmes meet the requirements of all validating and accrediting bodies;
7. Consider resource issues affecting the quality of the programmes;
8. Advise the Head on Department related matters;
9. Report all decisions, recommendations and views to the Head of Department and Department Management Board.

2.1.5 Technical Support Committee

The Technical Support Committee is responsible for the strategic development and proper management of the Department's main technical support services – laboratories, laboratory equipment and computers. The Technical Support Committee reports to the Department Management Board and is chaired by the Laboratory Coordinator. Other members of this committee include the Chief Technician, the next most senior Technician, the Computer Systems Technician and the Computer Systems Coordinator. In its deliberations, the Committee must be mindful of the academic standards of the Department along with financial and other resource requirements and constraints.

2.1.6 Staff/Student Liaison Committee

This comprises Levels/Year 1, 2 and 3 Coordinators, student representatives of each of the three years of the undergraduate programmes and the postgraduate representative. It is chaired by the Head of Department. The terms of reference for this Committee are:

1. To identify issues affecting the operation of the programmes or courses that are raised by the student body;
2. To identify actions which might resolve students' concerns and enhance the students' learning experience;
3. To inform students of proposed future developments and seek their feedback;
4. To alert students to temporary changes which may affect the programmes or courses.

2.1.7 Laboratory Operations Committee

The Laboratory Operations Committee comprises all technical support staff assigned to the Laboratory. This Committee is chaired by the Chief Technician. The remit of this committee is to make recommendations to the Chief Technician on all aspects of laboratory operations with the objective of providing a safe and efficient laboratory environment that contributes to the achievement of the Department's objectives. This Committee reports to the Technical Services Committee. Head of Department or his representative should be invited to the meetings of this Committee.

2.1.8 Industry Liaison Committee

The Department has an Industrial Liaison Committee which comprises personnel from Industry as well as the Head of Department, all Professors and some other academic staff from the Department. The Committee meets at least once every semester. Before this, the interaction with industry had been maintained informally through contact with industry personnel particularly with part-time academic staff members in the Department who work in industry.

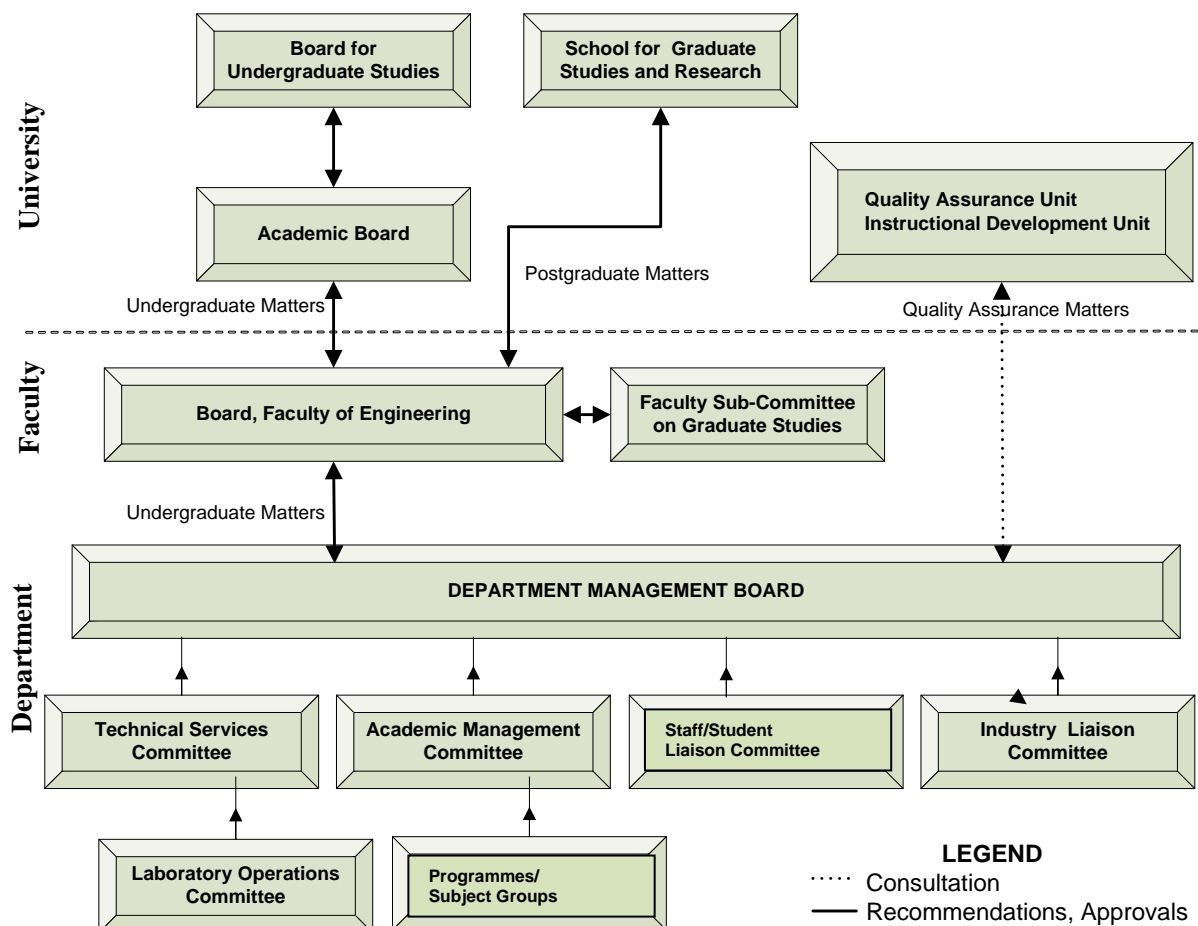


Figure 1: Committee Structure for Quality Assurance

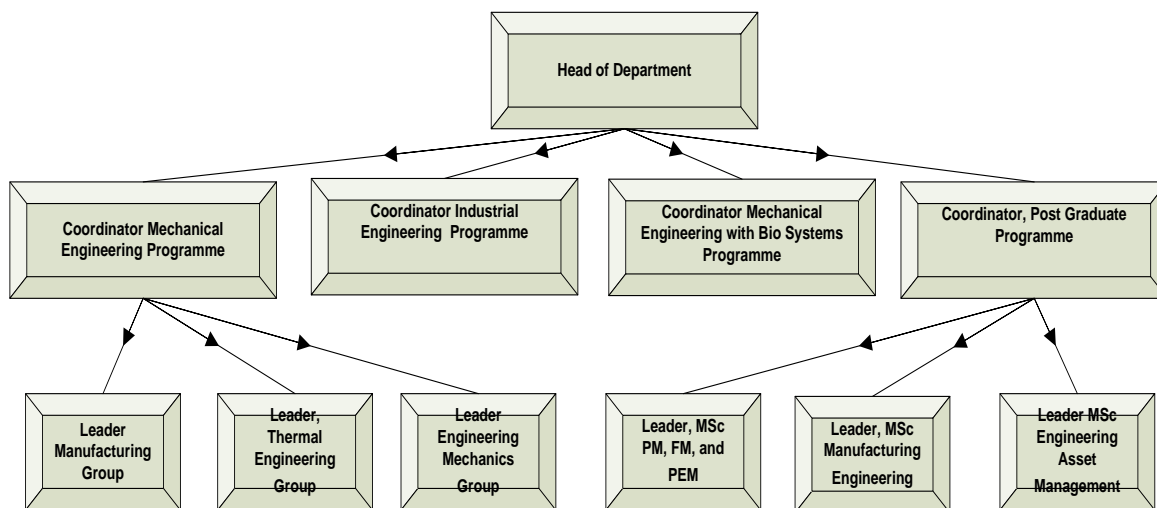


Figure 2: Programme Coordinator Structure for Quality Assurance

2.2 Summary of Roles and Responsibilities

Responsibilities of Department Faculty

2.2.1 Head of Department

The Head of Department's role is defined by the University and includes duties and responsibilities relating to academic management and quality assurance. The Head has overall responsibility for the Department's academic affairs, quality assurance, internal organisation and management of staff.

2.2.2 Coordinator/Group Leader

For Undergraduate programmes, the Coordinators/Group Leaders are responsible for the Programme/Subject Group to which he/she is appointed by the Head of Department. This is in respect of the academic management, subject area development through the design and improvement of courses and quality assurance. Specifically, the Coordinator/Group Leader's responsibilities are:

- To perform the role of University Examiner for some of the courses under the purview of the Programme/Group, as stated in "The University of the West Indies Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates";
- To lead and co-ordinate the administration of the Programme/Group;
- To seek to ensure the academic coherence of the subject area and that the requirements of internal and external validating and accrediting bodies are being met.
- To review annually the operation of the Programme/Group and to plan its future development;
- To monitor the delivery and quality of the courses in the Programme/Group;
- To advise the Head of Department, through the Academic Management Committee, on staffing matters relating to the Programme/Group;
- To ensure that the students, particularly in the final year, have the necessary guidance and pastoral support.

2.2.3 Course Lecturer

Course Lecturers are appointed by the Head of Department and have the primary responsibility for the delivery, assessment and review of courses. If more than one person is involved in the delivery of the course, the Primary Course Lecturer will determine the division of the syllabus. The Course Lecturer has the following responsibilities:

- To perform the role of First Examiner for the relevant course (s) as stated in "The University of the West Indies Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates";
- To exercise academic overview of the course and be responsible for the quality and consistency of delivery;
- To package and deliver the course according to the guidelines for good practice and an existing course outline, approved by the relevant Group;
- Scheduling and timetabling of laboratory sessions;

- Coordination of the marking of laboratory scripts.

2.2.4 Level/Year Coordinator

Level/Year Coordinators are appointed by the Head of Department. The responsibilities of the Level/Year Coordinators include:

- Offering academic guidance to the students in their Level/Year. Special attention is given to those students who are experiencing academic challenges, whose consultations are recorded on a special form.
- Identifying specific issues which may affect (a) the operation of the programme at the specified Level/Year and/or (b) the learning experience of any student within that Level/Year .
- Advising the Head of Department on requests (e.g. Leaves of Absence, Special consideration requests from AADLU, some Override requests) from specific students within the Level.
- Coordinating examination data for presentation at the Departmental and Faculty Board of Examiners meeting.

2.2.5 Time-table Coordinator

The Time-table Coordinator is appointed by the Head of Department. The responsibilities of the Time-table coordinator include:

- To allocate a suitable time-slot and class-room for each course in consultation with the concerned lecturers.
- To contact the Dean's office for confirmation of the class-rooms.
- To ensure distribution of the time-tables to the students and to the teaching staff before beginning of each semester.

2.2.6 Tutor

Tutors are assigned to students by the Head of Department and provide a level of personal guidance to students in the aspects of academic progress, regulations and procedures, appeal mechanisms. The roles of the Tutors are:

- To establish and maintain contact with Tutees;
- To maintain a record of information communicated by Tutees, using the Tutor/ Tutee Form;
- To ensure Tutees are aware of relevant UWI assessment regulations and procedures, including extenuating circumstances and appeals;
- To offer initial and ongoing advice and guidance appropriate to Tutees' welfare and progress at UWI.

2.2.7 Laboratory Coordinator

The Laboratory Coordinator is appointed by the Head of Department and is responsible for overseeing the general operation of the laboratory, ensuring that all aspects are in place to support the Department's teaching and research. The major responsibilities of the Laboratory Coordinator are:

- To liaise with the Chief Technician in the management and development of the laboratory facilities and Technicians;
- To liaise with Academic Staff in the assignment of duties to support staff, i.e. Teaching Assistants, Demonstrators, Student Assistants and other short term employees;
- To advise the Head of Department on issues relating to the laboratory facilities. This includes all requests for laboratory expenditure.

2.2.8 Computer Systems Coordinator

The Computer Systems Coordinator is appointed by the Head of Department and is responsible for giving general guidance and direction in the management of the Department's computer system. Specifically, the Computer Systems Coordinator:

- Provides general guidance to the Computer Systems Technician on issues relating to the supervision and development of the Department's computer system;
- Advises the Head of Department on issues relating to the departmental computer facilities; this includes all requests for expenditure in this area.

2.2.9 Final Year Project Coordinator

The Final Year Project Coordinator is appointed by the Head of Department and has overall administrative responsibility for the organisation and management of the final year project courses MENG 3019 and IENG 3012 Mechanical/Industrial Engineering Project. (N.B. All academic staff supervise final year projects). Major responsibilities of the Final Year Project Coordinator include:

- Soliciting project proposals from other Faculty;
- Serving as the First Examiner of the Final Year Project courses
- Hosting of a start-of-year session to distribute the Special Project course outline and to discuss various aspects of the Special Project with students;
- Assignment of projects to students;
- Issuance of general guidance to students in the conduct of their projects. This could take the form of workshops, handouts, website etc.;
- Notification to staff and students of relevant deadlines;
- Appointment of first and second markers and moderators for oral presentations;
- Arranging the preliminary and final oral presentations;
- Collection and submission of final grades;
- Recommendations to the Department for revisions to the course outline and the co-ordination/ examination processes.

2.2.10 Undergraduate Final Year Project Supervisor

The Undergraduate Final Year Project Supervisor is responsible for the academic supervision of Final Year Project students to whom he/she is assigned. The responsibilities of the Project Supervisor include:

- Giving guidance on:
 - the nature of the required research and development activity and the standard of performance expected,

- the planning of the research programme,
- the objectives and scope of the work to be undertaken,
- literature and sources, about requisite techniques (including arranging for instruction where necessary), and about attendance at classes and laboratories where relevant;
- Arranging regular meetings with the student, usually once per week;
- Being accessible to the student at other times, and as the need arises;
- Giving detailed advice on the completion dates of successive stages of the research so that the completed research may be submitted within the scheduled time;
- Requesting written work as appropriate and returning such work with constructive criticism in reasonable time and within the time period stated and/or promised;
- Ensuring that the student is made aware of inadequacy of progress or of standard of work below that generally accepted; also reminding students of the time limits for the completion of the particular programme of study or research;

2.2.11 First and Second Examiners

First Examiners are responsible for the setting of examination papers in the courses to which they are assigned. Second Examiners are responsible for the moderation of examination papers. The roles of First and Second Examiners are defined in the University's "Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates."

2.2.12 Postgraduate Programme Coordinator

The Programme Coordinator for postgraduate programmes is appointed by the Head of Department and is responsible for the overall management of all postgraduate programmes offered by the Department. Leaders are appointed for the MSc programmes by the Head of Department. In particular, the Postgraduate Programme Coordinator in collaboration with the Leaders of MSc programmes is responsible for:

1. Co-ordinate the review of applications to the postgraduate programmes;
2. Co-ordinate and manage the MENG 6600 Final Project: project definition, project assignment; supervision and examination;
3. Coordinate examination data for presentation at the postgraduate Examiners' Meeting;
4. Provide general monitoring and guidance on the postgraduate programmes with regard to quality, delivery and relevance and make representation to the Academic Management Committee on matters relating to programme improvement.

2.2.13 Examination Coordinator

The Examination Coordinator's major role is to ensure the timely submission of examination papers and mark sheets and to co-ordinate the post examination review process. This role is also detailed in the "Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates."

2.2.14 Academic Support Staff – Teaching & Research Assistants ,Demonstrators, Instructors and Development Engineers

The role of Academic Support Staff is to assist lecturers in the delivery of lectures, organization of field trips, tutorial sessions and laboratories. In this regard, Academic Support Staff such as may be involved in some aspects of teaching, providing guidance at laboratory and tutorial sessions and grading exercises.

Responsibilities of Administrative and Technical Staff

2.2.15 Computer Systems Technician

The Computer Systems Technician is appointed by the Head of Department and has the responsibility of overseeing the Department's computers and the interconnecting network on a day-to-day basis. The Technician is also responsible for:

- Securing all software and associated licenses required by the Department;
- Liaising with the Computer Systems Coordinator on issues relating to the supervision and ongoing improvement of the Department's computer resources;
- Ensuring that the computer facilities are properly maintained for reliable access by staff and students.

2.2.16 Administrative Assistant

The Administrative Assistant is appointed by the Senior Assistant Registrar (Human Resources) upon recommendation by the Head of Department. He/ she has a wide range of responsibilities associated with the day-to-day task of running the Department, these include:

- General co-ordination of the Department;
- Managing and co-ordinating the acquisition and maintenance of data, information and records for student, staff and administrative matters of the Department;
- Managing, co-ordinating and maintaining the systems, procedures and documentation associated with quality in the Department;
- Administrative and secretarial support for Groups, Committees and Coordinators;
- Assisting Group Coordinators in the preparation of course and programme reviews and action plans;
- Support for the admissions and examination processes;

2.2.17 Chief Technician

The Chief Technician is appointed by the Senior Assistant Registrar (Human Resources) upon recommendation by the Head of Department. His/ her responsibility is to ensure that the Laboratory is always fully prepared to support the practical aspect of the Department's programmes. The responsibilities of the Chief Technician include:

- Day to day management of laboratory facilities and supervision of Laboratory staff;
- Procurement of equipment, parts and services as approved by the Head of Department;
- Ensuring that the Laboratory facilities are safe, fully functional and conducive for work and study;

2.2.18 Engineering Technician

Engineering Technicians are appointed by the Senior Assistant Registrar (Human Resources) upon recommendation by the Head of Department. Their responsibility is to provide technical support in the operation of the Laboratory. This includes:

- Day to day supervision and operation of laboratory facilities to which they have been assigned;
- Ensuring the readiness of the laboratory to support laboratory exercises so designated;
- Management and maintenance of the inventory of parts and equipment in the laboratory facilities to which they have been assigned. Identification of requirements in respect of replacements or upgrades of laboratory equipment;
- Ensuring that the Laboratory facilities are safe, fully functional and conducive for work and study;

In the discharge of their duties, Engineering Technicians report to the Chief Technician.

2.2.19 Senior/Laboratory Assistant

Senior/Laboratory Assistants are appointed by the Senior Assistant Registrar (Human Resources) upon recommendation by the Head of Department. Their responsibility is to support Engineering Technicians and the Chief Technician in the conduct of their duties. Laboratory Assistants report to the Chief Technician.

Responsibilities of other non-academic appointees

2.2.20 Honorary Consultants

Honorary Consultants are appointed by the University. They are practicing professional engineers who are expected to bring their industrial expertise to assist in the development of the Department's curriculum, thus ensuring a high degree of relevance in the programme. An Honorary Consultant is assigned to a particular Group in the Department and works along with Faculty on the following activities, which are addressed at the Groups' annual course review sessions:

- Critical assessment of the Group's Aims and Objectives;
- Feedback on performance of graduates in industry and their readiness for industrial work;
- Recommendations on undergraduate and postgraduate project areas of industrial relevance;
- Recommendations on revisions to the programme Aims, Objectives, structure and management.

2.3 Committee Meeting Schedules

At the beginning of each academic year, the Department Head, in conjunction with the Administrative Assistant, produces a calendar of committee meetings. Schedules are drafted according to the template described in Table 1 below. The timing of course and programme reviews is especially important so that problems can be rectified promptly. In addition, critical appraisals can be forwarded in sufficient time to inform relevant Faculty and University Committees.

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Committee	Frequency of Meetings	Reporting Relationships
Academic Management Committee	Once per semester (additional meetings as required)	Department Management Board
Department Management Board	Twice per semester (minimum)	Faculty Board Academic Board Board for Undergraduate Studies Committee for Graduate Studies and Research
Programme/Subject Group	Twice per year (Group Review Sessions)	Academic Management Committee
Technical Support Committee	Twice per semester	Department Management Board
Student Liaison Committee	Once per semester (additional meetings as required)	Department Management Board Faculty Board Academic Board
Laboratory Operations Committee	Once per semester	Technical Services Committee
Industry Liaison Committee	Once per semester	Department Management Board

Table 1: Summary of Meetings Frequency (Typical) and Reporting Relationships

3. Quality Assurance Processes

This Section describes the quality assurance processes employed in the Department.

3.1 Student Admissions: Quality of Intake

The policy of the Department is to admit students with backgrounds and qualifications which will assist them in realising their full potential. All applications at the BSc level are considered by the Entrance Committee of the Faculty of Engineering on which the Department has representation. All applications at the MSc level are considered for approval by the Head of Department, guided by the respective Group Leaders.

3.1.1 Entry Requirements

For the BSc (Hons) in Industrial, Mechanical and Manufacturing and Mechanical Engineering with a minor in Biosystems, the following apply:

- A minimum total of eight(8) qualification points as calculated from Table 2 below;
- A pass in Chemistry at GCE “O” Level or CXC, and
- Passes in Pure Mathematics (preference will be given to passes in Applied Mathematics in addition to Pure Mathematics) and Physics at ‘A’ Level/CAPE(1&2) /N1/N2, or
- NEC Mechanical Engineering Technician’s Diploma, or
- TTIT/UTT or COSTAATT Associate Degree, or
- Barbados Community College Ordinary Mechanical Technician’s Diploma, or
- Any other equivalent qualification that is considered by the Department, in addition to those listed in Regulation 2, Appendix 1 : Faculty of Engineering Admissions Criteria 2010/2011.

NEC: National Examinations Council;

TTIT: Trinidad and Tobago Institute of Technology;

UTT: University of Trinidad and Tobago;

COSTAATT: College of Science, Technology and Applied Arts of Trinidad and Tobago;

MET: Mechanical Engineering Technician;

Qualification by performance in approved individual examinations (e.g. CXC, GCE, UWI) ¹				Qualification by performance in approved programmes (e.g. Diplomas, Associate Degree etc.) ²		Qualification Score
A' Level	CAPE (1/2 \sum Unit Scores)	N1	N2	NEC, MET, COSTAATT	BCC, TTIT/UTT, CAST/UTECH	
A	I	A + A	A + A	A + A	>3.8	5
B	II	A–	A– B+	A– B+	3.8 3.5	4
C	III	B+ B	B B–	B B–	3.4 3.0	3
D	IV	B–	C+ C	C+ C	2.9 2.5	2
E	V	C+ C	C– D	C– D	2.4 2.0	1

Table 2: Qualification Scores for GCE, CAPE, UWI Approve Certificates & Diplomas

- For CAPE subjects, the final score for assessment of suitability for entry into programmes is derived by adding the scores for each Unit of examination and dividing by 3. For other qualifications in this category the qualification points are obtained by adding qualifying scores for each subject;
- Qualifications points used for determination of suitability for entry for qualifications with a single letter grade are obtained by doubling the individual equivalent scores.

Applicants with qualifications that are not listed will be assessed on a case by case basis.

Within overall Faculty Regulations, the minimum requirements for the MSc Programmes are any of the following:

1. BSc (Hons) in Mechanical Engineering.
2. BSc (Hons) in Industrial Engineering.
3. BSc (Hons) in Mechanical Engineering with a Minor in Biosystems.
4. Such other qualifications deemed by the Department as equivalent to any of the above.

Only in exceptional circumstances will candidates with Pass Degrees be considered.

All applicants may be required to pursue additional pre-requisite coursework and undertake examinations in these courses. The additional coursework requirements will be determined by the Head of the Department.

3.1.2 Non-Standard Entry

For the BSc programme, the Department will also consider the following minimum qualifications for entry into the B.Sc. programme:

- Transfers from the UWI Faculty of Science and Agriculture with a 'B+' average or above in Introductory Mathematics and Preliminary Physics;
- NEC Mechanical Engineering Technician's Diploma with an overall B+ average;
- TTIT/UTT or COSTAATT Associate Degree with 3.5 GPA or above;
- CAST/ UTECH Diplomas (Jamaica) in Mechanical Technology with an overall B+ average;
- Barbados Community College Ordinary Technician Diploma in Mechanical Engineering with 3.5 GPA or above;
- Pre-Engineering programme at UWI with an average of B;

For the MSc programmes, candidates with a BSc Third Class (Hons) or Pass Degree in Mechanical Engineering may be considered eligible for entry, subject to an evaluation of the BSc degree and relevant post-graduation industrial experience.

3.1.3 Admissions Process

The Department follows the procedures established by the University:

1. Entry criteria and deadline dates, which is usually the end of January of the year of entry, are published. However, late applications are sometimes accepted in special circumstances.
2. The Department advises the Senior Assistant Registrar - Admissions through the Dean of the Faculty of Engineering of the number of students that can be accommodated. This is determined by the availability of resources, but may also be influenced by other factors, such as University or Governmental requirements.
3. Students are accepted on the basis of the published Qualifications for Entry for the various programmes.
4. In reviewing BSc applications, special consideration is given to:
 - (i) Re-entries - students who were forced to withdraw due to poor performance (these can only be re-admitted after a one-year absence) or other mitigating circumstances (e.g. health or financial problems).
 - (ii) A-Level/ CAPE entrants from the smaller islands (most of the Department's entrants are from Jamaica and Trinidad). Students from the other islands are

normally automatically accepted once their performance is judged to be “good.”

3.2 Delivery and Management of Courses

The major components of the delivery process are:

- The Programmes/Subject Groups (See Section 2.1.2)
- Course Outlines. Course Outlines are prepared using an approved template and provide aims and objectives, syllabus details, delivery and assessment schedules and statements of expectations for timing and standards of work;
- A computerised student administration system;
- Section II of this Manual sets the standard for professional practice in the delivery and assessment processes. In addition, a system of peer evaluation, consultation with the IDU and independent appraisal provide the opportunity for staff development in teaching.
- Teaching support in the form of Demonstrators and Teaching/ Research Assistants/Instructors/Development Engineers.

3.3 Student Assessment

The assessment of student progress is carried out within the regulatory framework described in “The University of the West Indies Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates” and the year’s Faculty prospectus.

Detailed requirements for the setting and marking of continuous assessments and examinations are set out in Section II, 9–16.

A student’s achievement is assessed at the level of the course. Each course is defined by a Course Outline that records the learning outcomes, details of the assessment schedule, type of assessment, timing and contribution to the final mark. The Course Outline is made available on the first day of each course and/ or posted on the Department’s web-site. The Course Lecturer is responsible for preparing the assessment, including the collation of any examination paper.

The University allows various types of assessment including the solving of appropriate problems, written assignments, project work, computing assignments, laboratory reports, formal reports, oral examinations, in-class tests and final examinations.

At the end of each semester, a Department Examiners’ Meeting is held to review the results of the examinations in every course under its purview. The Department then proposes the status of each student’s progression or degree standing, as the case may be. For the BSc Programme these proposals are carried forward to the Faculty Board of Examiners, which comprises Examiners in every Department of the Faculty. For the MSc programmes, proposals are forwarded to the Examiners’ Meeting of the Faculty Sub-Committee for Graduate Studies which is delegated by the Faculty to oversee

postgraduate affairs. The results of these meetings are made known to students and forwarded to the University Senate for final approval.

3.3.1 Role of External Examiners

External Examiners are accomplished senior academics who play an essential part in the University's quality assurance system. Their duties are set out fully in "Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates." Their role is to verify that the standards set are appropriate for the awards of the University, and to ensure that the assessment process is fair.

The formal mechanism by which External Examiners discharge their role is by submission of a report that comments on the standard of all examination material referred to him/ her by the University Examiner through the Campus Registrar. These reports are regarded as an essential element of the annual review of programmes and courses. It is the responsibility of the Academic Management Committee, the Subject Groups and individual Lecturers to take appropriate action based on these reports.

In addition, External Examiners make a valuable contribution to the process of quality enhancement, by providing expert advice and assistance to academic staff concerning the development and delivery of their courses.

External Examiners are expected to visit the Department once in a three-year term.

3.4 **Student Support and Guidance**

The network of support includes:

3.4.1 Departmental Support

At the start of each year, prior to registration, guidance is offered to students about their academic programme and professional development. This is particularly the case at the start of final year when students must specialise in at least one of the main subject areas. The Group Leader of the relevant subject area then provides the necessary guidance. The Head of Department delegates this responsibility to various Faculties for students in the first and second years of the programme.

3.4.2 University Support

The University provides a broad range of student services, including the Library, Student Advisory Service (accommodation listings, career guidance and job placement), the Student Activity Centre, the Students' Disabilities Unit, UWI Health Centre and Counselling and Psychological Services. The University also provides Bursaries to deserving students; regional Governments provide Student Loans. In addition, the Guild of Undergraduate Students functions as a Students' Union providing a variety of services including representation in UWI academic and administrative affairs. The Engineering Students' Society works with the Guild as a first point of contact for engineering students in these matters, providing rapid feedback to the Faculty administration on student issues. Within the Faculty of Engineering, the Head of Department and the Deputy Dean

(Undergraduate Student Affairs) provides additional guidance beyond that provided by Tutors in matters relating to progression and performance.

The University is also the channel through which the Department obtains the resources it requires to successfully operate its programme. In the main, this includes the budget allocations for staff, equipment and consumables and, through the Faculty, building and infra-structural enhancement and repair. The IDU and the Human Resources Section of the Registry also play a role in the training and development of staff.

3.5 Service Providers of Programme Components

Some programme components are taught by other Departments in the University, for example, courses in Engineering Mathematics and some final year computer science courses are taught by the staff of the Mathematics Department and the Computer Science Department at the Faculty of Science and Agriculture; it should be noted that as of the 2003/2004 academic year, the Faculty has appointed a staff member to administer all aspects of the Engineering Mathematics programme and to assist in delivery. In all cases, relevant issues are addressed by inclusion of representatives at Departmental Group review sessions and at Faculty Board meetings.

3.6 Student Communication

The Department recognises that continuous dialog with students is essential to the maintenance and enhancement of quality. This communication is formally effected via student representation on the Department's Staff/Student Liaison Committee, the Faculty Board and the University Academic Board. This is complemented by the Tutor-Tutee system, course evaluation questionnaires which are administered towards the end of each course offering, and informal exchanges between Lecturers and students. Lecturers are also required to post designated consultation times for students.

3.7 Course Development and Review

3.7.1 Overview

Course development and review is carried out by the Programme/Group responsible for the particular subject area. The aim is to improve the quality of the courses. The present University system requires that some review be carried out by the University Examiner who must file a report after each end-of-semester examination for the respective course. The Department's procedures dovetail with this University requirement through the appointment of each Programme/Group Leader as University Examiner for some of the courses for which the Programme/Group is responsible.

3.7.2 Procedures

The specific procedures for course development and review are:

- (i) Course evaluation questionnaires are to be administered in each course at the end of each semester as per University regulations.
- (ii) Immediately after the final examination marks are formally submitted, Lecturer(s) complete a Course Report Form. This Form serves as a mechanism to record

various significant aspects of a course, such as, comments and statistics (pass rates, average mark) on in-class tests, practical components, final exams as it is delivered and assessed. It is expected that the Form would be kept in the Department Office except for those times when it is to be updated.

The Forms, course outlines, External Examiner comments and summaries of course evaluations, are to be considered at each Programme/Group's course development and review meeting. The meeting is to identify and suggest steps to rectify problems in the curriculum, delivery and throughput of each course and consider the following questions: Are course aims still relevant? Should new topics be added or should some be removed? Are there topics that would benefit from a change in teaching technique? Are the learning measures (exam etc.) appropriate? Are the learning outcomes satisfactory? These meetings are to be held in September/ October for courses offered in the previous academic year.

- (iii) The Coordinator/Group Leader must forward the Minutes of the meeting to the Head of Department for consideration by the Academic Management Committee. Proposals for significant changes in courses or the programme could then be submitted for Faculty's approval in time for the following academic year.

3.7.3 New Courses

- (i) Proposals for new courses must be submitted to the Head of Department for preliminary discussion with the Academic Management Committee. Proposals must be in the form of a course outline using the approved format;
- (ii) The Academic Management Committee decides which Programme/Group should be given academic responsibility for the course;
- (iii) The proposal is forwarded to the Programme/Group identified for comment and possible modification for final submission to the Department;
- (iv) The Department discusses the proposal. If approved, the proposal is submitted for consideration as per University procedures. Otherwise, the proposal is referred back to the Programme/Group for further consideration.

3.8 **Programme Development and Review**

3.8.1 Overview

A Programme Review exercise is to be carried out at the end of each academic year by the Academic Management Committee to critically review the content and operation of the Department's programmes. The purpose is to maintain, and where possible improve, the quality of education provided.

3.8.2 Procedure

The review should include consideration of the following areas:

- (v) The academic coherence of the programme;
- (vi) Matters affecting the programme arising from course reviews;
- (vii) The effectiveness of the delivery of the programme from the point of view of students;
- (viii) The effectiveness of the pastoral support and guidance available for students;
- (ix) The adequacy of resources and administrative support for the programme;
- (x) Matters arising from student feedback on the programme's performance;

- (xi) Matters relevant to the requirements of internal and external validating and accrediting bodies;
- (xii) Performance indicators for the programme – throughput, alumni feedback, graduate placement, other external feedback;
- (xiii) Assessment, loading, scheduling, and marking;
- (xiv) Production of an action list to correct matters identified during the review.

3.8.3 Reporting and Records

Minutes of the Programme Review are forwarded to the Department Management Board for discussion. The Head of Department or nominee is then responsible for ensuring that the action items are dealt with.

3.8.4 New Programmes

- (i) Proposals for new programmes must be submitted to the Head of Department for preliminary discussion and consideration by the Academic Management Committee;
- (ii) Proposals may be advanced by an individual staff member or a Programme/Subject Group;
- (iii) Proposals must describe:
 - a) The aims and objectives of the new programme, the rationale for its introduction
 - b) The component courses
 - c) Course Outlines (new and existing)
 - d) Student entry qualifications
 - e) The type of degree sought
 - f) The resources required to support the programme;
- (iv) The Academic Management Committee may seek to make revisions to the proposal or may appoint a suitable Committee to do so. It must also decide the Programme/Group responsibility of the new programme; does it require the formation of a new Programme/Group;
- (v) When the Academic Management Committee is satisfied with the proposal, it can then be forwarded to the Department Management Board for formal approval and eventual submission to the relevant University academic committees;
- (vi) If a single Programme/Group (existing or new) is given responsibility for the new programme, the Coordinator/Group Leader will normally automatically be appointed as Programme Coordinator. Otherwise, the Academic Management Committee will appoint a suitable Programme Coordinator.

4. **Quality Improvement, Audit and Review**

The Department recognises that Quality Assurance Systems, like all other systems, require continual assessment and review to ensure optimum functionality at all times.

Internal audit and review fall within the remit of the Academic Management Committee. As such, once a year, this Committee will conduct a critical self-assessment exercise that will seek to determine:

1. If all provisions of the quality system are utilised;
2. The effectiveness of the various components of the quality system;

3. Actions required to address any deficiencies in the system.

In addition, the University provides for external, objective audit and review of the Department's quality system through the Campus' Quality Assurance Unit. This Unit goes through a cycle of audits, rotating this exercise among all Campus Faculties, Departments and Units. Typically this cycle takes about five years. The Review process can be seen as comprising three phases (adopted from *Quality Assurance at the University of the West Indies: The Self-Assessment*, Quality Assurance Unit):

1. Self-Assessment Exercise The Department submits a Self-Assessment Report that examines its Aims and Objectives and determines the extent to which they are being realised.
2. Review Team Visit This serves to test the validity of the Self Assessment. The team is comprised of a mix of regional and extra-regional professionals. The team meets with staff and students, senior Faculty and management personnel of the campus, graduates of the programmes and employers of graduates and postgraduate students. The team also inspects teaching and learning facilities and observes teaching sessions.
3. Reporting and Follow-Up “The team provides oral feedback to the academic staff and its written report is distributed widely. The Campus Principal has overall responsibility for the monitoring of the follow-up processes. As a result of the Self-Assessment exercise and the visit and report of the Review Team, the academic staff identifies issues for further consideration. The Head of a department/section reports on action taken to the Faculty Board, which reports to the campus Academic Board. A year later, the department reports to Board of Undergraduate Studies and Board of Graduate Studies and Research, through the Campus Academic Board, outlining the activities that have occurred.”

5. Integration and Externality

Figures 1 and 2 described the structural elements pertaining to decisions that impact upon programme structure, quality and delivery. On the other hand, Figure 3 describes the key elements that play a role in the more procedural aspects of the business process.

The Bursary is the ultimate authority for accounting and financial matters, including procurement of components and equipment, salaries and remunerations, budget estimates and approvals etc. The Registry is the final authority for approval of all matters

pertaining to all staff and students: appointments, assessment and promotion, registration, examinations, academic records, status etc.

Recommendations made by the Head with regard to each of these lines of authority must be routed through the Dean of the Faculty.

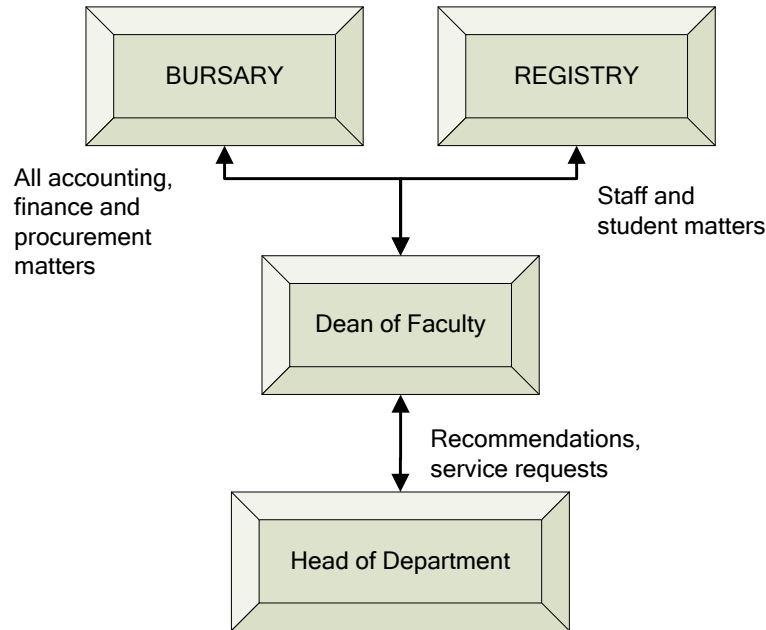


Figure 3: Operational flows

5.1 University-wide Integration

Interaction with other Engineering Departments through Faculty Board and Departments outside of the Faculty through Academic Board, supports the exchange of good practice and provides a level of objective critical assessment of Departmental decisions relating to quality.

Links with student support services (Student Advisory Services, Chaplaincy, UWI Health Centre, Halls of Residence) provide a mechanism for dealing with problems of a non-academic nature.

The Quality Assurance Unit on the St Augustine Campus provides ongoing assessment of the Department's performance in the areas of quality management and enhancement.

5.2 Externality

Visits by External Examiners and accreditation teams of the Institution of Mechanical Engineers (IMechE) provide extra-regional feedback on quality issues. The Department's Industry Advisory Committee, which comprises industrial personnel, provides additional insight on the needs of regional industry in general and some reference for the standards which the Department seeks to achieve. This Committee meets annually or every semester to provide general Faculty direction, building on the deliberations and decisions at the departmental level. Honorary Consultants appointed to the Department also participate in the development and informal assessment of Departmental Programmes.

6. Academic Standards

This Section provides Programme Statements for both the BSc and MSc programmes offered by the Department. The Programme Statements make reference to the following documents:

1. *Subject Benchmark Statement*, The Quality Assurance Agency for Higher Education 2006
2. *UK Standard for Professional Engineering Competence: Chartered Engineer and Incorporated Engineer Standard*, Engineering Council UK

The BSc and MSc programmes are motivated by the Department's Mission:

“To provide a sound education in mechanical, manufacturing, industrial, and bio-systems engineering, encouraging entrepreneurship, innovation, and development to improve the quality of life of West Indian people.”

As such they are designed to provide students with a level of competence that allows them to provide leadership in Caribbean industry in Mechanical, Industrial and Biosystems (Agricultural) Engineering while preparing them for possible entry into postgraduate programmes and professional activities internationally.

All programmes in the Department therefore seek to adequately expose students to basic principles underlying the discipline, provide a strong mathematical background and to develop “realisation” skills that are characterised by the ability to competently, creatively apply theoretical principles to develop “economically viable and ethically sound sustainable solutions.” The treatment of aspects relevant to the engineering profession is complemented by strategies for nurturing the overall personal development of students. The only difference between the undergraduate and postgraduate programmes is in the level of challenge and depth of exposure. Postgraduate programmes also provide students with management and financial tools to carry out their daily work in Industry.

6.1 Programme Outcomes and Objectives

Mechanical Engineering Graduates should be able to:

- Design basic mechanical components, products and systems.
- Fabricate/manufacture components and products.
- Operate and maintain mechanical and production systems.
- Troubleshoot and develop appropriate solutions to mechanical components, products and systems.
- Be oriented towards positions of supervisory, middle and senior level management through courses in Business and Management and to participate in decision making in multi-disciplinary project teams.

Industrial Engineering Graduates should be able to:

- Formulate and analyze problems, then synthesize and develop appropriate solutions and improvements to production operations.
- Design and operate effective systems and procedures for using the basic resources of production (people, materials, machines and capital) in organizations.
- Function in a wide range of industrial organizations such as banks, regulatory agencies and other institutions in the context of techno-economic evaluations, project management and systems implementation.

Industrial Engineers are more oriented to the interaction between components of a system rather than the individual components themselves. Their professional training is such that they can function effectively in a wide variety of positions in manufacturing, production and the service industries.

Mechanical Engineering Graduates with the Minor in Bio-systems should be able to:

- Function competently and effectively as Mechanical Engineers within any type of organization, private or public or as individual entrepreneurs.
- Work effectively within multi-disciplinary teams in agriculture or agro-business enterprises in food/feed storage, in handling and processing of crops and foods, in soil and water and environmental engineering or rural engineering, or in other related fields, bringing to the team the ability to apply engineering knowledge, skills and techniques to solving problems in those areas. Such areas may include design, operation and maintenance of engineering systems used in agriculture and food production, environment and processing.
- Start his/her own enterprise to offer services/products, which bridge the various areas of study, to governments, other enterprises or to the public directly.
- Acquire sufficient knowledge and ability to enter and successfully complete any Graduate Studies Programme leading to higher degree(s) in the fields of Mechanical or Manufacturing Engineering, Agricultural/Biological/ Environmental Engineering or Engineering Management, as well as other fields.

The objectives of undergraduate programmes seek to:

1. Motivate students towards the practice of engineering in a stimulating, intellectually challenging environment;
2. Understand the importance of the human element and teamwork in design, analysis, execution and management;
3. Emphasise engineering design both in the theory taught, that provide a strong analytical component, and coursework assignments;
4. Collect, evaluate and present data and clearly communicate results, ideas, conclusions/recommendations and instructions orally and in writing;
5. Demonstrate professional, ethical, environmental and societal responsibilities;
6. Inform on current industrial practice while showing how these practices are motivated by relevant theoretical considerations;

7. Develop student awareness of the responsibility of engineers to the society and the impact engineering decisions can have on that society. In this regard particular reference is made to the Caribbean region;
8. Develop awareness of the environmental, social, legal, economic and regulatory atmosphere within which engineers must operate;
9. Provide a foundation for the personal and professional development of students after graduation (lifelong learning);
10. Embrace industry as a partner in shaping the engineers of the future.

The primary aims of the Master's degree programmes in Production Engineering and Management (PEM), Production Management (PM), Engineering Management (EM) and Engineering Asset Management programmes are:

- 1) To provide students with greater depth of technical knowledge in management of Production, Manufacturing and Maintenance Engineering a greater breadth via options in related areas.
- 2) To synthesize and apply the taught course materials in project work that provides experience in business, systems, processes and design projects.
- 3) To provide a deeper understanding of the knowledge required for management of Design, Tools and systems in a cooperative / team perspective.
- 4) To develop an understanding of the multi-disciplinary nature of industry and commerce through projects; and
- 5) To develop an understanding of the use of tools for managing production, manufacturing systems, maintenance and people.

The courses, coursework, and projects of the taught MSc. Programmes in the focus areas of EM, PM, PEM, and EAM are designed to provide in the four general learning outcomes for their respective focus areas:

1. Knowledge and Understanding: This is achieved by addressing current concepts and best practices, equipping the students with the analytical abilities in identifying and solving problems, application of knowledge to improve and innovate, and the use computer based technologies to support decision making.

2. Intellectual Abilities: Developed via application of engineering, maintenance and management principles to develop novel designs, approaches for collecting, collating and evaluating data relevant to problem situations and ability to synthesize innovative solutions for continuous improvement

3. Practical Skills: Addressed via experimentation and simulations to assess and remedy problem situations, developing ability to lead and work in teams, capability to assess the health, safety and environmental impacts of work practices.

4. General Transferable Skills: Various courses also address this by developing ability to communicate effectively with all organizational levels, ability to mentor and coach subordinates, and ability to design and implement programmes, projects and change/ improvements.

The assessment methods deployed in all courses in all MSc. programmes show the above general outcomes aspects are addressed by various activities such as case studies, group projects, research projects, etc.

Specifically, the purpose of the Masters in Engineering Asset Management is to industry with competent engineers capable of the acquisition, operation/maintenance, and disposition of the physical assets of the organisations. On completion of the Programme, participants will be able to:

- Competently discuss the strategic role of physical assets in creating and sustaining a competitive edge
- Formulate maintenance objectives to support corporate objectives and strategies
- Develop maintenance plans and programs to achieve maintenance objectives
- Prepare and implement annual budgetary control systems
- Select and implement effective maintenance technologies
- Design organisational structures, processes, and procedures for managing physical assets
- Develop work systems to achieve effective use of human resources for managing physical assets
- Plan and schedule maintenance work to optimise resources
- Develop measurement and reporting systems for assessment of performance of assets and operations
- Formulate and execute long and medium term plans for improvement in asset performance
- Apply analytical and optimisation models to support decision making
- Plan and control major plant overhauls and turnarounds
- Select and use Computerised Maintenance Management Systems effectively and
- Improve asset reliability and maintainability on a continuous basis

Specifically, the purpose of the Masters in MSc in Manufacturing Engineering (MfgE) is to:

- To provide students with greater depth of technical knowledge in manufacturing and greater breadth and options in related areas;
- To develop an understanding of manufacturing systems, modeling and simulation;
- To provide a deeper understanding of the knowledge required for designing products, tools and manufacturing systems in concurrent engineering perspective;
- To synthesise and apply the knowledge and techniques in the taught courses in project work; and
- To develop an understanding of the multi-disciplinary nature of manufacturing through group design projects that provides experience in team-based business and design projects.

6.2 Teaching and Learning Environment

The Department strives to achieve its programme objectives through a range of teaching and learning approaches. Every effort is made to maximise the knowledge transfer process by encouraging deep learning and to cater for a range of learning styles. The mechanisms used in the formal programme include: traditional teaching, multimedia based teaching (video, multimedia presentations, writing tablet technologies), e-learning

(e.g. using myElearning etc.), group work, practicals, studio sessions (comprehensive teaching laboratories), mini projects, research papers, oral presentations, seminars or workshops. The formal programme is complemented by a system of not-for-credit complementary workshops that address the following:

1. Learning skills
2. Creative thinking skills
3. General computer skills
4. Additional technical skills (addresses issues that support the formal programme)

The Teaching and Learning strategies and procedures are summarised in the following Table 3 of Mutual Responsibilities:

Department Responsibilities	Student Responsibilities
<ul style="list-style-type: none"> • To clearly define subject goals, assessment methods and lecture schedules the course outline published for each course; • To use appropriate teaching methods that most efficiently and effectively promote the learning process among students; • To select a combination of assessment methods that meet the criteria of validity, fairness, and appropriateness for subject goals; • To provide constructive and timely feedback on student progress; • To arouse students' curiosity and creative interest in the subject; • Where appropriate, to draw on life and relevant work experiences and, where appropriate and possible, link theory with professional practice and societal concerns; • To keep abreast of developments in the discipline, profession, and higher education teaching and learning; • Continuously seek ways of improving teaching and assessment methods; 	<ul style="list-style-type: none"> • To approach each course with the intention of maximising their knowledge and understanding of the specific material; • To fully apprise themselves of the learning objectives of each course and to devise appropriate learning strategies; • To fully participate in all components of the course; • To be supportive of colleagues especially in seminar and group activities; • To be considerate and mature in interacting with those who are involved in the course; • To seek feedback on progress in each of the course modules; • To strive to develop a deeper understanding by exploring course topics beyond the bounds of the formal lecture;

Table 3: Table of Mutual Responsibilities – Teaching and Learning Environment

The Department's mission of creating innovative engineers is of special significance. The academic programmes in the Department are geared to developing an ethos of creativity and innovation through: Focus on theory, applications and design within the programme. Emphasis is placed throughout the programme on sound reasoning based on scientific knowledge and engineering standards rather than on the ability to regurgitate information. To this end, the programmes include courses that carry project-based continuous assessment components. In addition, wherever feasible, the Department augments practical aspects with rigorous advanced theory. In addition, the theory/applications/design philosophy is complemented by continuous discussion and experimentation on effective teaching pedagogies.

6.3 BSc Programme Structure

The BSc programme is organised in three levels:

The Level 1 aims at developing an understanding of the basic knowledge, principles and concepts of Mechanical Engineering, while introducing the student to the wider engineering profession including social and environmental issues, critical thinking and responsibilities and communication skills as well as practical skills.

At Level 2, there is a greater emphasis on developing skills of analysis and synthesis while further developing the key mechanical engineering subject domains, particularly in the areas of design.

Level 3 seeks to establish strategic awareness, independent research skills and the ability to develop engineering solutions while gaining an appreciation of the need for effective management and sustainability. In addition to the core courses, the student does elective courses within particular themes including engineering mechanics and design, thermal science or manufacturing. Teamwork is stressed throughout the programmes. Design is a thread running throughout the programme, starting at Level 1 with Engineering Drawing, and Machine Drawing, and Design, continuing throughout Level 2, leading to Product Design and Development, Computer Aided Design and Manufacture and Final Year Projects at Level 3.

The Industrial Engineering programme includes the above but emphasizes Engineering Management subjects such as Operations Research, Human Factors, Quality Management and Production Management. The Biosystems Minor is rooted in Mechanical Engineering with additional subjects in the third year being in the areas such as Food Engineering/Technology, Soil and Water Engineering, Drainage and Irrigation Engineering, Infrastructure for Biosystems, Agricultural Machinery and Post-Harvest Technology.

The Final Year Project is one compulsory Year 3 course that requires mention. The Special Project is designed to forge a more ready engineer by engaging the student in a year-long analysis and design activity. Projects are specially selected by the Department to deliver an appropriate level of challenge.

The structure of the entire undergraduate and the postgraduate programmes in the Department can be found in the Faculty Undergraduate and Postgraduate Booklets.

6.4 Staff Recruitment and Development

An effective system of staff recruitment and development is crucial to the maintenance of academic standards. The Department follows the University's procedures for recruitment, appointment and induction of staff. As part of its commitment to continuous improvement, there is also a University requirement for staff development and appraisal of academic, administrative and technical and support staff. This appraisal process, which includes peer observation of teaching, is confidential and is directed towards improving staff performance and meeting the aims of the Department.

In addition, the University provides guidance to its Lecturers on modern teaching and assessment techniques through its Instructional Development Unit (IDU). The Department requires ALL new staff to take part in the IDU's annual workshop.

The University has a system of awards, grants and loans to facilitate staff development. These include:

- Institutional Visit Allowance grant approved by the Department Head;
- Study Leave and Travel Grant;
- Book Grant;
- Free tuition for studies at the UWI (both ATSS and Faculty);
- Sabbatical Leave;
- Leave for scholarly activities;
- The UWI/ Guardian Life Premium Teaching Award – based on the preparation of a teaching portfolio;
- The BPTT Senior Scholarship Award to facilitate research at a US institution;
- Commonwealth Scholarship Awards, including the Split-Site PhD Award, for helping young staff improve their qualification to the PhD level;
- LASPAU/Fulbright Awards for helping young staff improve their qualification to the PhD level.

As part of its aim of maintaining its levels of quality, the Department makes every attempt for its staff to take advantage of these awards.

SECTION II – GUIDELINES FOR GOOD PRACTICE

1. Preparing the Course

1.1 Objective

To provide guidance on structuring the course in order to achieve the learning outcomes specified by the Department.

1.2 Responsibilities

Course Lecturer (recommended by the Coordinator/Group Leader, appointed by Head of Department).

Courses are owned by the Department and managed by a Programme/Subject Group or the Academic Management Committee.

Individual Lecturers are charged with the responsibility of preparing, delivering and evaluating particular courses under the general direction of the Department Head and the appropriate Committee or Group. It is therefore expected that in delivering the course, all lecturers would follow the approved course outline. Course Lecturers should ensure that they are familiar with the most current issue of the relevant detailed course outline. They should ensure that they appreciate what the Department requires of the course, its prerequisite dependencies and deliverables.

1.3 Guidelines

- (a) Every new faculty member must attend the first available offering of the Instructional Development Unit (IDU)'s Course Development Workshop.
- (b) If required to deliver the course for the first time, the Lecturer should find out as much as possible about how it was previously taught and examined and how it integrates into its Programme/Group. The detailed course outline should be reviewed by the Programme/Group and revised as appropriate and adopted.
- (c) The course should rely significantly on any essential texts that have been specified.
- (d) Course Lecturers should identify and utilise other sources of useful material, e.g. texts, journals, conference proceedings, videos, web references, reports, etc.
- (e) Course Lecturers should identify the most appropriate approaches for dealing with each topic e.g. lecture, group sessions, field trip, demonstration, etc. Guidance can be sought from the IDU on this issue.
- (f) Course Lecturers should identify suitable teaching aids, e.g. models, photographs, diagrams, etc.
- (g) Course Lecturers should draft a week by week programme to enable students to achieve learning outcomes in the allotted time. Topics and activities should be sequenced in a way most likely to facilitate learning, taking account of the average load carried by students. Consideration should be given to using a diagram to show the relation between various course topics.

- (h) Course Lecturers should schedule makeup hours at the beginning of the semester, taking account of public holidays and other Department activities.
- (i) Course lecturers should ensure that online facilities are developed to support the teaching of the course. The facilities may include a dedicated web site or an appropriate management system.
- (j) Course Lecturers are required to lodge soft-copies of class notes with the Department Office on a yearly basis (subject to IP restrictions).
- (k) Course Lecturers
- (l) should prepare notes for Tutors as appropriate and conduct Tutor-orientation sessions.
- (m) Course Lecturers should review and make recommendations on revising the course outline to reflect the appropriate objectives and content as well as the delivery and evaluation procedures.
- (n) Course Lecturers should welcome and be guided by feedback from the relevant Subject Group as well as students.

1.4 Records

2. Teaching the Course

2.1 Objective

To provide guidance on good classroom teaching practice in order to enhance students' understanding.

2.2 Responsibilities

All Academic Staff of the Department.

2.3 Guidelines

- (a) All new staff must attend the first available offering of the Instructional Development Unit (IDU)'s Higher Education Instruction Workshop.
- (b) Sessions should be planned so that the pace is suited to the topic.
- (c) A variety of student activities is desirable - listening, thinking, observing, writing, calculating, group discussions *etc.*, with as much **active** learning as possible.
- (d) A brief introduction should be given to explain the content of the session.
- (e) The Lecturer's voice should be clear and audible at the back of the room, and presentation materials should be clearly visible.
- (f) Students' questions should be treated sympathetically, but care must be taken that they are not allowed to redirect the flow of the presentation.
- (g) The use of worked examples, case studies *etc.*, is helpful for preparing students to solve similar problems/questions themselves.
- (h) Questions should be posed as one way of checking that students have understood the material. Lecturers should seek to achieve a balance between questions addressed to individuals and those asked of the class as a whole. Dominant students should be respectfully constrained and responses invited from those who tend not to contribute.
- (i) Dictation and time consuming copying from board/screen should be kept to a minimum.
- (j) Complex diagrams and equations are often best presented in a handout or slide.
- (k) Gaps in handouts can be effective; students are more likely to understand and remember a derivation or equation after writing it down.
- (l) Overhead projector slides should not contain too much material. Gradual revealing of the content by covering the lower part with a sheet of paper is generally preferable to sudden presentation of a screen-full of information.
- (m) Use of key words and bullet points either on a slide or the blackboard helps to focus the attention of the students, helps note-taking and serves as a cue/ reminder for the Lecturer.

- (n) Computer-generated slides give a professional look. At least 10 minutes should be allowed for setup and testing. Unfamiliar technology, such as writing tablets, tablet PCs and dual monitor displays for PowerPoint, should be evaluated beforehand.
- (o) The use of **appropriate** video clips, computer programs, internet resources and demonstrations adds variety, realism and interest. Equipment should be checked prior to the actual lecture.
- (p) A guest lecturer may occasionally be used to advantage with the proviso that the students can be assessed on the topics covered. Guest lecturers should be briefed to increase the chances that they will deliver what is expected.

2.4 Records

3. Problem Sets (Assignments)

3.1 Objective

To provide guidance to academic staff on the preparation of problem sets, supplying example problems to give students practice in the application of principles, concepts and techniques introduced in the course.

3.2 Responsibilities

Course Lecturer

3.3 Guidelines

- (a) Each problem set should have a suitable title and should give the course title and code.
- (b) Problem sets should cover all major topics of the lectures and directed learning component(s).
- (c) There should be a number of graded problems, including typical "examination standard" questions, and possibly others which are too complex for solution using the limited tools and time available in a formal examination.
- (d) Problems requiring numerical answers should normally be given to build student confidence and to indicate a correct solution.
- (e) Answers should be given to intermediate stages where the problem involves a defined sequential solution process.
- (f) Worked solutions should be done for all questions. Copies must be provided for other staff supervising parallel seminar/tutorial sessions, and may be made accessible to students, either through library set texts or on the Internet.

3.4 Records

4. Tutorials

4.1 Objective

To guide staff who provide tutorial support.

4.2 Responsibilities

All staff involved in providing tutorial support to lectures – Demonstrators, Teaching Assistants, Lecturers.

4.3 Guidelines

- (a) It must be made clear to students that they are expected to bring problems arising from their studies/ tutorial sheets to the tutorial sessions, and not to expect the problems to arise from the work they undertake in the tutorial sessions.
- (b) The Tutor should be fully active throughout the session rather than simply available to deal with difficulties should they arise.
- (c) Opinions vary on the best format to encourage the interchange of ideas and highlight difficulties perceived by the students. Tutors should therefore experiment with a variety of approaches.
- (d) Techniques adopted should be such that the students find the time spent worthwhile.
- (e) Individual assistance should be given as far as is practicable, however, tutors should recognise when group guidance can be more effective.
- (f) Maximum opportunity should be taken to obtain feedback from students regarding their level of understanding. Significant difficulties should be discussed as soon as possible with the Course Lecturer.
- (g) Orientation and readiness programmes for Academic Support Staff with Course Lecturer, members of the Subject Group and IDU should be scheduled.

4.4 Records

5. Laboratory Experiment Development

5.1 Objective

To provide guidance to academic staff on the development of laboratory activities.

5.2 Responsibilities

All Academic Staff of the Department involved in the development of laboratory experiments.

5.3 Guidelines

(a) The development of laboratory investigations should be motivated by the aims and learning objectives of the course and, where appropriate, those of the programme.

(b) Laboratory sessions should have the following general objectives:

- Handling equipment;
- Application and reinforcement of lecture material already covered;
- Introduction to and coverage of material not yet addressed in lectures;
- Development of experimental competence and confidence;
- Development of instrumentation/ equipment knowledge and skill;
- Development of oral/ written communication skills;
- Development of self through active involvement and arousal of interest;
- Investigation of the limitations of theoretical models and/or computer simulations;
- Familiarity with safety issues.

(c) There should be some degree of coherence in the laboratory programme. In developing new/ modified experiments for a course, regard should be paid to the wider objectives of the whole experimental programme.

(d) Investigations should be achievable in the time allocated.

(e) Pre-lab exercises should be utilised as much as possible to maximise knowledge delivery.

5.4 Records

6. Laboratory Instruction Sheets

6.1 Objective

To achieve a consistent layout of laboratory sheets to provide students with appropriate instructions for the safe completion of the laboratory exercise.

6.2 Responsibilities

All Academic Staff of the Department with responsibility for providing laboratory support material.

6.3 Guidelines

- (a) Laboratory experiment instruction sheets should bear the name of the institution, Faculty and Department, a title and a statement of the purpose/ objectives, and the name or initials of the originator and date or revision date.
- (b) Further information will normally be given. This may include:
 - Introduction - explaining, for example, the relevance/ applications
 - Equipment
 - Procedure
 - Results expected
 - Discussion - suggested topics for consideration
 - References - relevant papers, text books etc
 - Performance Assessment sheet with marks weightings
- (c) The style and content of the sheet will be determined by, for example, the difficulty level of the experiment and the stage/ year of the course for which it will be used.
- (d) Laboratory instruction sheets should be updated regularly to take advantage of new equipment, student suggestions for improvement, etc.
- (e) When the laboratory sheets are revised, ensure that all outdated stock is destroyed and that the master file copy is replaced.
- (f) **Where any element of risk is involved, this must be stated clearly e.g. use of voltages greater than 50 V.**
- (g) As far as possible, laboratory sheets should be compiled into a comprehensive laboratory manual for each course.

6.4 Records

7. Running Laboratory Sessions

7.1 Objective

To provide guidance to academic and technical staff with respect to the effective execution and supervision of laboratory sessions in order to enhance the students' learning experience.

7.2 Responsibilities

Lab Coordinator, Course Lecturer, Technicians, Teaching Assistants, Demonstrators

7.3 Guidelines

(a) The Lab Coordinator should:

- i. Inform Teaching Assistants/ Demonstrators/Instructors of their responsibilities at least a week prior to the commencement of laboratory exercises.
- ii. Inform the Course Lecturer(s) about the Teaching Assistants/ Demonstrators/Instructors who have been assigned to the laboratory exercises.
- iii. Hold a briefing session with all Teaching Assistants/ Demonstrators/Instructors to discuss their duties. The Course Lecturer(s) must also be present at this session.
- iv. Appoint one Teaching Assistant/ Demonstrator/Instructor as head in the event that several are assigned to one lab (in consultation with Course Lecturer).

(b) Course Lecturer should:

- i. Meet with Teaching Assistants/ Demonstrators/Instructors and Technicians to ensure that laboratory exercises are well understood by all.
- ii. Check with technical staff to ensure that the necessary equipment is functional and available prior to the first laboratory session.
- iii. Ensure that laboratory manuals are free of error and ambiguity.
- iv. Ensure that students have received their laboratory manuals prior to the commencement of all laboratory exercises.
- v. Liase with Teaching Assistants/ Demonstrators to ensure that all laboratory sessions are running well. Feedback is imperative for the improvement of the quality of the labs.
- vi. Ensure Technicians and Teaching Assistants/ Demonstrators are aware of basic safety procedures.
- vii. Revise laboratory exercises regularly to allow students sufficient time to complete them and develop confidence in the use of the equipment.

NOTE: The above applies to courses with integrated laboratory exercise components. Where laboratory exercises of a particular course are outsourced to one of the Laboratory and Project Design (LAPD) courses, the above responsibility will lie with the lecturer of the course in question and NOT with the LAPD coordinator.

(c) Technical Staff should:

- i. Test and calibrate all laboratory equipment before the start of the exercises to ensure they are functional.
- ii. Perform every laboratory exercise prior to the first session to verify their understanding of the requirements of the equipment, to ensure that the suggested equipment is appropriate and available.
- iii. Ensure that students are equally distributed to the various laboratory groups and stations.
- iv. Record attendance by circulating an attendance register. Ensure that the names recorded correspond to the students expected to attend the session.
- v. Be present for the duration of each laboratory session.
- vi. Be alert for potentially hazardous situations during the conduct of the lab. In conjunction with the Teaching Assistants and Demonstrators in attendance, identify all hazardous aspects of the laboratory exercise to the students.
- vii. Be knowledgeable of safety procedures in the event of fire or any other life-threatening situations. Emergency phone numbers e.g. Fire Station, Police Station and Ambulance should be known and a First Aid Kit must be readily available.

(d) Teaching Assistants/Instructors and Demonstrators should:

- i. Familiarise themselves with the experiments using the specified equipment prior to the first session and resolve any problematic issues that may arise.
- ii. Provide students with laboratory instruction sheets, manuals and any other approved supporting material prior to laboratory sessions.
- iii. Correct pre-labs prior to each laboratory session. Students who have not completed or who have partially completed the pre-lab should not be allowed to perform the laboratory exercise.
- iv. Debar students who arrive fifteen minutes or later after the start of a laboratory session. Arrangements should be made to allow students to complete the exercise at another time and a penalty imposed by way of a mark deduction.

- v. Invite students to peruse their corrected pre-labs and address any concerns that may arise. This must be done in a timely fashion so that there will be sufficient time to complete the laboratory exercise.
- vi. Ensure that students are aware of basic safety practices in an electrical laboratory with emphasis on the correct dress code – no slippers, jewellery, short pants. Draw attention to any unsound or unsafe practices observed. Students should be warned when additional safety measures are necessary, e.g. the use of shrouded safety leads for voltages exceeding 50 V.
- vii. Discuss common material with all groups at the start of the session.
- viii. Remind students if marks are to be allocated for performance in the laboratory.
- ix. Start students on their task without delay, reminding them to note the ID numbers of all equipment utilised at their station.
- x. Ensure that within the first half-hour, each group is fully aware of what is expected of the investigation.
- xi. Throughout the exercise, be actively involved with the various groups, ensuring that they are progressing satisfactorily, understanding what they are doing and making appropriate records in their log books. They should also be prepared to explain any aspect of the experiment, its relevance to the course, and to answer questions posed by students.
- xii. Actively seek to identify students who choose to lend minimal support to the group and encourage these students to participate. Students are to be informed that a penalty would be imposed for continued lack of participation.
- xiii. Remind students to check that their results are in order **before** dismantling the equipment.
- xiv. Encourage group members to develop oral communication skills wherever possible, by having them explain the experimental investigation, covering purpose, method, results and conclusions.
- xv. Ensure that students are never left unsupervised during any laboratory exercise.
- xvi. Conduct make-up labs the week before final examinations are scheduled to begin. Students must submit a valid medical certificate for missing a laboratory session.

- xvii. Notify the Technician of any faulty equipment or shortages of equipment or consumables, and propose to the Course Lecturer of any modifications to the exercise that may be required.
- xviii. Sign off on all results at the end of the laboratory session.

7.4 Records

8. Submission and Assessment of Laboratory Work

8.1 Objective

To provide uniform procedures for the submission and assessment of laboratory work.

8.2 Responsibilities

Lab Coordinator, Course Lecturer, Technicians, Teaching Assistants and Demonstrators.

8.3 Guidelines

(a) The Lab Coordinator should:

- i. Establish a standard framework for the marking of pre-lab books and laboratory reports that would facilitate feedback on student performance. The framework should require students to attach a signed copy of the Plagiarism Declaration Form on each lab script.
- ii. Establish clear deadlines for the submission of marks.

(b) The Course Lecturer should:

- i. Provide students with guidelines for assessment and format of pre-lab books and reports at the beginning of each course.
- ii. Liaise with the Teaching Assistant/ Demonstrator to develop a marking scheme for each laboratory exercise.
- iii. Review mark sheets and post marks on notice boards.

(c) Technical Staff should:

- i. Collect all pre-lab books and laboratory reports. Sign submission slips verifying that the information is correct.
- ii. Ensure that a Plagiarism Declaration Form is submitted for each laboratory exercise submitted for marking.
- iii. Inform students that late submissions must be supported by a medical certificate or the report would be marked zero.

(d) The Teaching Assistant/ Demonstrator should:

- i. Liaise with the Course Lecturer to develop a marking scheme for each laboratory exercise.
- ii. Mark all pre-lab books and laboratory reports. Pre-lab books and reports containing unsigned results and those submitted late without an accompanying medical certificate are to be marked zero.
- iii. Assess books/ reports based solely on work carried out during the laboratory session and any pre-lab exercises.
- iv. Submit marks to the Course Lecturer by the deadline date.

8.4 Records

9. Preparing Examination Papers

9.1 Objective

To ensure consistency in the preparation of examination papers.

9.2 Responsibilities

First Examiners in accordance with these Guidelines and the University's regulations.

9.3 Guidelines

- (a) Examination questions should be set to provide a fair assessment of the achievement of the learning objectives specified in the Course Outline and framed in such a way as to give all students a fair chance of achieving a passing grade while allowing examiners to discern very capable students.
- (b) The duration of the examination is as specified in the Course Outline, and the paper set should be similar in standard to previous ones, except where there is a changed Course Outline or an agreed policy/ instruction to the contrary.
- (c) Due consideration should be made of what can be achieved in the time allocated for the examination
- (d) Papers for courses which prepare students for study of the subject at a higher level should give candidates only limited choice; the use of compulsory questions and/ or sections is desirable to ensure basic knowledge.
- (e) Examinations should be cross-checked against lecture notes etc. to verify that they have been adequately prepared. The Second Examiner should also be involved in this process.
- (f) Examination questions should not be set on material that was not taught except, perhaps, where it is felt that the average student can within the allocated time limit treat with the question on the basis of what was actually taught.
- (g) Papers should attempt to assess understanding rather than pure memory recall, questions should therefore ideally include elements of "*lateral thinking*", "*problem formulation and solution*", "*model representation and application*".
- (h) Formula derivation/ proof which relies heavily on pure memory should be kept to a minimum. However, short derivations of familiar equations from basic laws are acceptable.
- (i) Papers should **NOT** be dominated by tedious arithmetic/ algebra.
- (j) All tables, data sheets etc. required to solve questions should be specified in the rubric of the exam paper. The questions should be constructed so as not to give any advantage to those students who have programmable calculators.

- (k) Units and symbols should normally be in accordance with the Institution of Electrical Engineers' booklet "*Units and Symbols for Electrical and Electronic Engineering*" which is issued to all academic members of staff. However, there may be cases when alternative symbols, more familiar to the student, are used, e.g. when the course is based on a textbook using these symbols. In all cases, symbols should be defined within the question and the phrase "*where the symbols have their usual meaning*" should **NOT** be used.
- (l) Questions should be clear and unambiguous, worded carefully, grammatically correct and use terminology with which the students are familiar.
- (m) Questions should be worded such that a simple YES or NO answer is clearly not appropriate.
- (n) Questions, together with data sheets/ books supplied, must provide all the information necessary to complete the solution.
- (o) Questions involving definitions are acceptable provided that the practical application of the definition(s) is also explored.
- (p) Questions should have realistic parameter values and current financial data where appropriate.
- (q) Option questions carrying the same marks should be equally demanding.

9.4 Records

10. Examination Paper Layout

10.1 Objective

To standardise the layout of examination papers in the Department.

10.2 Responsibilities

First and Second Examiners

10.3 Guidelines

- (a) Examinations should be prepared using a text editor or typesetting tool. They must be formatted for printing directly using the University's standard examination form. If using Microsoft Word or Latex, templates are available with the required formatting. Alternatively examination papers can be printed then cut and pasted using the standard forms.
- (b) The use of a compatible Equation Editor, such as that used in Word is preferred. Handwritten equations, if used, should be clearly legible.
- (c) Diagrams should be neatly drawn, preferably using an appropriate computer tool and embedded into the document immediately following the appropriate question. Diagrams should be numbered according to the question number, e.g. Figure Q7, Figure Q7a, etc.
- (d) Font style and size: Times New Roman, 12 point, English (UK) Language.
- (e) Page setup: The UWI examination template and standard examination forms define the top and bottom margins. Left and right margins should be 0.5".
- (f) Text alignment: Justified so that the question text does not fall below question numbers.
- (g) Spacing: Single line spacing throughout text
 - 3 lines of space between questions
 - 2 lines of space between question subsections
 - 1 line of space between sub-subsections
 - Tab spacing - every 0.5 in/ 1.27 cm
- (h) Question numbering/ sectionalisation:
 - Main questions 1, 2, 3, etc.
 - Subsections (a), (b), (c), etc.
 - Sub-subsections (i), (ii), (iii), etc.
- (i) Sub-sections of questions should indicate the marks allocation breakdown (total maximum possible marks need not be 100).

10.4 Records

11. Examination Paper Solutions and Marking Schemes

11.1 Objective

To provide guidelines on the provision of examination paper solutions and marking schemes. Solutions and marking schemes facilitate:

- (a) moderation by another member of staff;
- (b) checking by the External Examiner;
- (c) uniformity in the award of marks;
- (d) review/ remarking of exam papers.

11.2 Responsibilities

First Examiner

11.3 Guidelines

- (a) Complete answers for examination questions are required to give Second Examiners and External Examiners sufficient information to know the breadth/ depth of response expected so as to earn full marks.
- (b) The solutions and marking scheme should be neatly typed.
- (c) The following are **NOT** acceptable in place of all or part of the solutions:
 - The use of terms such as '*Bookwork*' or '*Class work*',
 - a copy of a published article.
- (d) In questions which require a discursive response, the specimen solution should detail:
 - what aspects of an answer that will earn marks. This could include bulleted points that list alternative solutions,
 - how much detail, as opposed to generality, is required.
- (e) The marks for each sub-section should be shown in the right hand margin and the total of the question should be indicated at the end. A highly detailed breakdown is not necessary.

11.4 Records

12. Moderation of Examination Papers, Solutions and Marking

12.1 Objectives

- To provide guidelines for examination moderation which ensures that examination papers are of an appropriate standard and that they have been set in accordance with these Guidelines.
- To ensure that the questions are feasible, the solutions accurate and can be completed within the allotted time.
- To establish that the marking system is fair and reasonable.

12.2 Responsibilities

First and Second Examiners

12.3 Guidelines

- (a) The Second Examiner of each course must complete and sign the appropriate section of the Course Report Form, for each element of assessment requiring it. Moderators are encouraged to record suggestions for improvement of presentation, explanation, clarity or standard.
- (b) The questions, solutions and marking scheme must be checked:
 - to eliminate errors of any description,
 - for conformity with the Department Guidelines.
- (c) It is the responsibility of the First and Second Examiners to ensure that the paper given to the students is correct by following the procedures outlined in “The University of The West Indies Examination Regulations for First Degrees, Diplomas, and Certificates.”
- (d) The First Examiner should check that all agreed moderation changes and corrections are incorporated. In particular, any disagreements with suggestions from the Second Examiner should be noted on the Course Report Form and signed by the First Examiner.
- (e) The solutions and marking scheme must be kept with the examination paper at all times.
- (f) The First Examiner must ensure that all superseded versions are clearly so marked.
- (g) The copy of the paper which is submitted to the Examinations Section must be accompanied by the solutions and marking schemes.

12.4 Records

13. Marking Examination Papers

13.1 Objective

To achieve a standardised marking procedure to eliminate errors and facilitate easy checking by other members of staff.

13.2 Responsibilities

First Examiner

13.3 Guidelines

- (a) Check the number of scripts received against the number indicated on the envelope.
- (b) Mark each question in turn for all the scripts.
- (c) Scripts should be marked strictly in accordance with the marking scheme.
- (d) Questions should not normally be marked on a basis of **full** marks or **no** marks:
 - Minor arithmetic/ algebraic errors **should not be excessively penalised.**
 - Where the final answer in a section is incorrect, the source(s) of the error should be found and marks deducted as appropriate.
 - A small increase in marks may be justified in cases where the student makes a suitable comment upon an erroneous result.
 - Where an erroneous answer is carried forward from one section to another, the decision on the marks to be awarded must be based on the correctness of the method used and not the detail of the arithmetic.
- (e) Where a student submits answers based upon unforeseen but reasonable interpretations of the question, due credit must be given.
- (f) The marks awarded for sub-sections should be shown – mark/ max. mark, e.g. 4/7 rather than 4, and should be entered in the right hand margin.
- (g) Mark or stroke through all work to indicate that it has been examined. No part of the script, even blank pages, should be without some form of marking.
- (h) The total mark for each question should be shown by an encircled number in the left hand margin at the end of each question and the figure transferred to the front sheet.
- (i) The total mark for each question should be double-checked by deducting the total marks 'lost' from the marks available and compare with the total marks awarded.
- (j) All scripts should be scrutinised page by page to ensure all the work has been examined.
- (k) The marks for each question should be cross-checked with the marks shown on the front of the script.

- (l) Where a student has attempted more than the required number of questions, mark all the questions and award the highest set of marks based on a selection of questions consistent with any instructions applying to sectionalised papers/ compulsory questions.
- (m) Calculate the average marks per question to highlight any unusually high or low averages for future reference and modification of teaching methods. The use of Excel is recommended in determining the appropriate statistics. In any event, some statistical detail is required for completion of the Course Report Form.
- (n) Double-check the addition of marks on the front of the script.
- (o) Review any scripts in important borderline areas, i.e. 30%, 40%, 50%, 60%, 70%, and make a decision as to whether the standard of work falls above or below the borderline.
- (p) Double-check the marks on the scripts with the marks entered on the mark sheet. It is strongly advised that Microsoft Excel be used to record marks as the course is delivered; these can then be uploaded to the University's Banner Grade book system when examiners are fully satisfied that the entries in Excel are correct.

13.4 Records

14. Specification of Assessed Coursework Components

14.1 Objective

To provide guidance to academic staff with respect to the assessed coursework components (laboratory exercises, tests, mini-projects, research papers etc) that contribute to the final mark for the course.

14.2 Responsibilities

First Examiner (See “The University of The West Indies Examination Regulations for First Degrees, Associate Degrees, Diplomas, and Certificates.”)

14.3 Guidelines

- (a) Course Lecturers should familiarise themselves with the coursework assessment breakdown approved for the course. These may be found on the most recent Application for Approval of Assessment Procedure Forms submitted for consideration by Faculty Board, copies of which can be obtained from the Department Office.
- (b) Subject Groups and Course Lecturers should ensure that the Course Outline correctly states current approved components, assessment weightings and learning outcomes.
- (c) Penalties applied for late submission of work must be clearly stated in the course outline.
- (d) Assessed coursework exercises must be given to students, in writing, no later than two weeks before the submission date. This should normally be done during a formal lecture.
- (e) Modifications to assessed coursework components should be recommended at Course Review sessions for submission to Faculty Board.

14.4 Records

15. Marking and Returning Assessed Coursework

15.1 Objective

To establish uniform procedures for feedback on assessed coursework components.

15.2 Responsibilities

First Examiner

15.3 Guidelines

- (a) Both the First and Second Examiner of each course must complete and sign the appropriate section of the Course Report Form for each element of assessment requiring it. Moderators are encouraged to record suggestions for improvement of presentation, explanation, clarity or standard. Disagreements with suggestions from the Second Examiner should be noted on the report and signed by the First Examiner.
- (b) As per Examination Regulation 50 (ii), the First Examiner will forward all marked submissions of each component to the Second Examiner for moderation. For cases where the total assessed coursework counts for more than 60%, 20% or 20 samples of the coursework must also be reviewed by the University Examiner.
- (c) Particularly in the event of any disagreement, the final mark is to be determined by the First Examiner.
- (d) Examiners should ensure that feedback is provided on the students' submissions. Feedback should address each of the objectives detailed in the specification of the work.
- (e) Marked submissions should be returned to students no later than 2 weeks after submission and prior to the start of final exams.
- (f) Every effort should be made to check submissions for instances of collusion and plagiarism. To this end, the Department will ensure the availability of an appropriate plagiarism detection utility such as Turnitin.com.

15.4 Records

16. In-class (Mid-Term) Tests

16.1 Objective

To provide guidance to Academic Staff with respect to the setting of tests.

16.2 Responsibilities

Course Lecturer

16.3 Guidelines

(a) The approved scheduling of any tests should be indicated in the Course Outline.

(b) Tests have the following purposes:

- To motivate students to study consistently;
- To give each student an indication of progress;
- To assess each student's performance and provide feedback to the Lecturer.

(c) Students should be provided with at least a fortnight's notice of:

- The date, place and time, usually one of the normal lecturing periods, in the week designated in the course outline;
- The format of the test;
- The range of material included.

(d) It is sometimes appropriate to conduct the test under 'open book' conditions or with 1 or 2 pages of information. In the latter case, these pages must bear the student's name and must not be used by other students. Students should be advised to prepare these themselves, preferably in writing so as to facilitate the learning process.

(e) Tests should be set so that an average student can perform reasonably well within the allotted time, usually fifty minutes duration.

(f) The use of question papers with spaces provided for answers will reduce the labour involved in marking.

(g) Every effort should be made to mark and return the work within two weeks.

(h) Students' queries on the test should be dealt with at the first convenient class.

16.4 Records

17. Project Proposals

17.1 Objective

To provide guidance to staff with regard to the proposal of the BSc and MSc Final Projects.

17.2 Responsibilities

Academic staff

N.B. The Head of Department will have the final say on the suitability of a proposal for the Final Project.

17.3 Guidelines

- (a) Project proposals should be submitted using the Project Proposal Form.
- (b) Project proposals must take account of laboratory space, manufacturing needs, equipment and material needs, and other likely expenditure. The resources required, particularly, physical equipment and components should be assessed. Where any of the above resources are significantly beyond what is typically available, the proposal should not be submitted without discussion with the Head of Department.
- (c) Projects making use of the results of previous projects are encouraged, as are ones linked to research and consultancy projects.
- (d) Projects suggested by industry, or linked with companies are encouraged, but before submitting such suggestions, Examiners should satisfy themselves that for all necessary inputs from the company (e.g. information, materials, components), there is a firm commitment to deliver and a full awareness of the importance of the project to the student's final-year progress. The industrial contact must be advised that the educational aspects of the project are paramount.
- (e) The project proposer should have a clear understanding of the objectives of the project and be confident that they are achievable and appropriate to the level of a final year BSc Engineering programme.
- (f) Projects which rely on purely "inspirational" solutions (e.g. solutions to certain design problems) should be avoided on the basis that the student may achieve either little, or a quick solution which leaves little scope to demonstrate his/ her ability.
- (g) Projects involving only literature review activities should not be proposed.
- (h) Projects that are heavily biased towards computer programming should have appropriate scientific and engineering content/ relevance, enabling the student to draw upon scientific and engineering knowledge/ understanding.
- (i) Projects should be as independent as possible; it should not be that the success of one project relies upon the outcome of another.

17.4 Records

18. Project Supervision

18.1 Objective

To provide guidance to Project Supervisors so that all students receive adequate support and guidance for their project.

18.2 Responsibilities

All Academic Staff of the Department.

18.3 Guidelines

- (a) Supervisors should be familiar with the documents *Course Manual for MSc Project*, and the *BSc Project Course Manual*.
- (b) At the very beginning of the project, Supervisors should establish contact with all their students and make specific arrangements to see them, usually on a weekly basis.
- (c) Students who do not regularly attend meetings or fail to make satisfactory progress must be written a warning note copied to his/ her Tutor and the Head of Department.
- (d) Students must be encouraged to plan the project as a number of tasks, so that if one is halted, another can be worked on to keep the momentum going.
- (e) Supervisors should impress upon the student the importance of steady effort throughout the project period and keeping to the proposed plan of work, of keeping the schedule of tasks under constant review, and of trying to anticipate possible delays/ problems.
- (f) Supervisors should impress upon the student the importance of keeping detailed information in the form of a log record, and insist on seeing this at intervals. This should be signed and dated when inspected.
- (g) Supervisors should encourage the student to begin thinking about and drafting the project report as early as possible, on a chapter by chapter basis.
- (h) Supervisors should encourage students to finalise their projects in such a way as to leave a completed piece of hardware or software which can be used as a teaching or project resource or as a basis for commercial development.
- (i) Supervisors should offer advice on the structure and format of the final project report without becoming too involved in the creation of the report itself. It must be remembered that this is the student's responsibility.

18.4 Records

19. Monitoring Student Attendance

19.1 Objective

To provide guidance to academic staff with respect to the monitoring of student attendance and reporting of absence.

19.2 Responsibilities

Course Lecturers

19.3 Guidelines

- (a) At orientation, students should be advised of UWI regulations pertaining to attendance of classes (See 'The University of the West Indies Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates').
- (b) The Course Lecturer should as much as possible keep attendance lists for all classes.
- (c) When a student has missed three or more consecutive sessions, the Lecturer should immediately inform the Department Head, who should immediately contact the student's other Lecturers to determine whether the absence is specific to a particular course or a more general attendance problem.
- (d) The Department Head should then attempt to contact the student to discuss the reason(s) for absence and advise the student accordingly. If the absence is without good cause, the Head of Department may decide to formally notify the student, through the Examinations Section of the Registry, that he/ she will be debarred from all University examinations if he/she cannot make satisfactory arrangements to attend classes and make up missed work.

19.4 Records

20. Annual Departmental Seminar

20.1 Objective

To define the motivation and procedures for the Annual Department Seminar.

20.2 Responsibilities

Administrative Assistant

20.3 Guidelines

A one-day Departmental Seminar is to be scheduled for the end of the academic year. The Seminar has the following objectives:

- Team-building for all members of academic, administrative and technical and support staff;
- Re-acquainting staff with the departmental mission and practices;
- Reviewing the state of the Department;
- Identifying particular objectives for the coming year;
- Ready staff for an effective, collaborative year.

The Seminar may include:

- Welcome message by the Head of Department
- Motivational presentation by a guest lecturer, treating with topics, such as, of good practice in teaching, management, team work etc.
- Group sessions, guided by guest lecturer
- Review of Department matters by Head of Department
- Feedback
- Lunch

20.4 Records

21. Control of Quality Records

21.1 Objective

To ensure that quality records are properly maintained and readily retrievable.

21.2 Responsibilities

Administrative Assistant

21.3 Guidelines

- (a) Quality Records are listed on the **List of Quality Records (ref Form QG 21.1)**. This list also indicates the active and inactive locations of the records, method of storage, the respective retention times, methods of disposal, personnel responsible for authorizing disposal, identification, method of indexing and personnel responsible for access/maintenance.
- (b) The Administrative Assistant, Course Lecturers, and the Head of Department have the authority to move their respective Quality Records from active storage within their department to inactive storage location.
- (c) The Administrative Assistant, Course Lecturers, and the Head of Department are responsible for the maintenance of records in the inactive storage, and keep track of any records that may be temporarily removed from this location.
- (d) The Administrative Assistant, Course Lecturers, and the Head of Department identify those records that have become due for disposal, and submit this list to the Departmental Meeting for approval to proceed with disposal. Once approved he/she proceeds with the disposal.
- (e) Where Quality Records are stored, they are properly labelled and indexed so as to facilitate easy retrieval. Storage facilities and handling are also designed to protect the records from being lost or from deterioration.
- (f) Where contractually agreed, relevant Quality Records are made available to a customer for a specified period.

21.4 Records

List of Quality Records **Form # QG 21.1**