



**UWI**  
ST. AUGUSTINE  
CAMPUS

# **FACULTY OF ENGINEERING**

---

2024/2025

POSTGRADUATE

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# HOW TO USE THIS HANDBOOK

The Faculty Handbooks (also known as Faculty Booklets) are available on the Campus website in PDF format at <http://sta.uwi.edu/faculty-booklet-archive>. The Handbooks include:

- Relevant **Faculty Regulations** – e.g. Admission Criteria, Exemptions, Progression, GPA, Leave of Absence, etc.
- Relevant **University Regulations** including the Plagiarism Regulations and Declaration Forms
- Other Information on **Co-Curricular** courses, **Language** courses and **Support for Students** with physical and other disabilities or impairments.
- **Programme Descriptions and Course Listings** which include the list of courses to be pursued in each programme (degrees, diplomas and certificates), sorted by level and semester; course credits and credits to be completed for each programme – majors, minors and specials.
- **Course Descriptions** which may include details such as prerequisites and methods of assessment.

*Students should note the following:*

The Regulations and Syllabuses issued in the Faculty Handbooks should be read in conjunction with the following University Regulations:

- The Undergraduate Regulations and Syllabuses should be read in conjunction with the University Regulations contained in the [Undergraduate Handbook and the University's Assessment Regulations \(with effect from August 2018\)](#) and any subsequent amendments thereof.
- The Postgraduate Regulations and Syllabuses should be read in conjunction with the University Regulations contained on the [Postgraduate Admissions website](#) and the [Board for Graduate Studies and Research Regulations for Graduate Certificates, Diplomas and Degrees \(with effect from August 2018\)](#) and any subsequent amendments thereof.

Progress through a programme of study at the University is governed by Faculty Regulations and University Regulations. Should there be a conflict between Faculty Regulations and University Regulations, University Regulations shall prevail, where appropriate.

## ACADEMIC CALENDAR 2024/2025

Get important dates such as the beginning and end of each semester, matriculation, examinations, graduation and ELPT. Also, take note of deadlines for the payment of fees, registration, and applications for overrides, leave of absence, admissions, and scholarships & bursaries.

To download the latest calendar, visit <https://sta.uwi.edu/registration/academiccalendar.asp>

## LEGAL NOTICE – PROGRAMME & COURSES

1. Notwithstanding the contents of Faculty Handbooks, Course Outlines or any other course materials provided by the University, the University reserves the right at any time to altogether withdraw, alter or modify its programmes or courses and/or vary its modes or methods of teaching, delivery and assessment of its programmes or courses, as deemed necessary in the following circumstances:
  - (a) As a result of any changes imposed by national laws, legislation or governmental regulations or orders made from time to time.
  - (b) In response to the occurrence of a force majeure event, including but not limited to, war (whether declared or not), riots, civil disorder, epidemics, pandemics, quarantines, earthquakes, fire, explosions, storms, floods or other adverse weather conditions, strikes, lockouts or other industrial action, confiscation or any other action or authority by governmental or regulatory agencies or acts of God.
  - (c) In the event of an emergency where there is risk to life and property.
  - (d) Where the exigencies of the circumstances require such action to be taken by the University.
2. Whilst it is anticipated that teaching, delivery and assessment of the University's programmes and courses during Academic Year 2024/2025 will be conducted primarily in person, the University reserves the right to implement virtual/online/electronic modes and methods of teaching, delivery and assessment or hybrid teaching and learning, if deemed necessary due to public health regulations, governmental order or health and safety protocols associated with the COVID-19 pandemic and any other possible threats to public health and safety.

## DISCLAIMER – PRIZES & AWARDS

In the case where Faculty/Student Prizes or Awards may be listed, the Faculty does not bind itself to award any or all of the listed prizes/awards contained herein or its stated value and reserves the right to modify or altogether remove certain prizes/awards as described in either or both the electronic and printed versions of the Faculty Handbook.

# IMPLEMENTATION OF THE POSTGRADUATE GPA SYSTEM

Information for both **NEW** and **CONTINUING** students

First published August 2021. Updated October 2021.

As part of continued efforts to align the standards of The UWI more closely with international norms and best practice, a Grade Point Average (GPA) system will be introduced with effect from the 2021/2022 academic year.

## ***Will the new PG GPA apply to all postgraduate students and programmes?***

No. It applies **ONLY** to students who were admitted and commenced **TAUGHT** postgraduate programmes (see exclusions below) **in or after the 2021/2022 academic year**, referred to below as “New (GPA) Students”. Taught postgraduate programmes refer to postgraduate certificates and diplomas, masters and professional doctorates, with some exclusions (see below).

It does **NOT** apply to **ANY** students admitted to postgraduate programmes (taught or research) **prior** to the **2021/2022 academic year**, referred to below as “Continuing (non-GPA) Students”.

*Please remember that each student is bound by the regulations in force **on the date of admission to their programme**, as stated in their Faculty’s Regulations Handbook published in that year. To find your applicable handbook, visit [sta.uwi.edu/faculty-booklet-archive](http://sta.uwi.edu/faculty-booklet-archive).*

## ***Excluded Programmes***

The new PG GPA system does **NOT** apply to students pursuing the following:

- i. Research degrees (MPhil and PhD degrees) – all campuses
- ii. Doctor of Medicine (DM) programme – all campuses
- iii. Diploma in Family Medicine and Diploma in Emergency Medicine (DM) – all campuses
- iv. Master of Fine Arts (MFA) – St. Augustine Campus

## ***Exemptions & Variations***

Exemption/variations within the application of the new PG GPA system will be applied to the following areas and programmes in the Faculty of Humanities and Education:

- i. The Master’s in Fine Arts (MFA) in Creative Writing – **Exemption**
- ii. The MA Spanish (Research Paper – SPAN 6009) – **Variation**
- iii. The Diploma in Education (Practicum Paper – EDTP 5002) – **Variation**
- iv. The Master’s in Education – **Variation**

## ***How will Continuing (non-GPA) Students be affected?***

Continuing students at the St. Augustine Campus need to be aware of the introduction of new Course Registration Numbers (CRN) to be used by new students only (see Changes to the Registration Process below). Otherwise, there are no changes for continuing students.

## ***How will New (GPA) Students be affected?***

- GPA is a representation of student performance on transcripts.
- Whether you pass a course or not, the quality points earned still count towards your GPA, meaning that all your efforts are considered.
- Quality points are earned even if students do not reach the threshold of a pass with coursework and/or final exam.
- If a student fails a single course twice, an automatic Required to Withdraw (RTW) will no longer apply.
- A student is not required to earn a ‘Distinction’ for their research projects in order to receive an overall ‘Distinction’.
- An additional award category of ‘Merit’ has been introduced along with ‘Pass’ and ‘Distinction’ (see Award of Degrees below).
- It allows more efficient performance tracking, for both students and faculty.
- It provides a measurement of academic performance that makes for easy comparison by other international universities for the purposes of transfer and admission.

***What does the PG GPA look like?***

The introduction of the PG GPA follows the successful introduction of the GPA system at the undergraduate student level in 2003/2004. The grade bands for the PG GPA system are almost identical to those for the undergraduate GPA, except for the introduction of a new band – FCW/FWE, which is described below.

GRADE	Grade Point	% Range	Grade Definition	Grade Descriptor
A+	4.30	90 - 100	Exceptional	Demonstrates exceptional performance and achievement in all aspects of the course. Exceptional application of theoretical and technical knowledge that demonstrates achievement of the learning outcomes. Goes beyond the material in the course and displays exceptional aptitude in solving complex issues identified. Achieves the highest level of critical, compelling, coherent and concise argument or solutions within the course.
A	4.00	80 - 89	Outstanding	Demonstrates outstanding integration of a full range of appropriate principles, theories, evidence and techniques. Displays innovative and/or insightful responses. Goes beyond the material with outstanding conceptualisation which is original, innovative and/or insightful. Applies outstanding critical thinking skills.
A-	3.70	75 - 79	Excellent	Demonstrates excellent breadth of knowledge, skills and competencies and presents these in appropriate forms using a wide range of resources. Demonstrates excellent evidence of original thought, strong analytical and critical abilities; excellent organisational, rhetorical and presentational skills.
B+	3.30	70 - 74	Very Good	Demonstrates evidence of very good critical and analytical thinking in most aspects of the course. Very good knowledge that is comprehensive, accurate and relevant. Very good insight into the material and very good use of a range of appropriate resources. Consistently applies very good theoretical and technical knowledge to achieve the desired learning outcomes.
B	3.00	65 - 69	Good	Demonstrates good knowledge, rhetorical and organisational skills. Good insight into the material and a good use of a range of appropriate resources. Good integration of a range of principles, techniques, theories and evidence.
B-	2.70	60 - 64	Satisfactory	Displays satisfactory evidence of the application of theoretical and technical knowledge to achieve the desired learning outcomes. Demonstrates sound organisational and rhetorical skills.
C+	2.30	55 - 59	Fair	Demonstrates fair breadth and depth of knowledge of main components of the subject. Fair evidence of being able to assemble some of the appropriate principles, theories, evidence and techniques and to apply some critical thinking.
C	2.00	50 - 54	Acceptable	Demonstrates acceptable application of theoretical and technical knowledge to achieve the minimum learning outcomes required in the course. Displays acceptable evidence of critical thinking and the ability to link theory to application.
FCW/FWE	1.70	40 - 49		Fail Exam/Fail Coursework

F1	1.70	40 - 49	Unsatisfactory	Demonstrates unsatisfactory application of theoretical and technical knowledge and understanding of the subject. Displays unsatisfactory ability to put theory into practice; weak theoretical and reflective insight. Unsatisfactory critical thinking, organisational and rhetorical skills.
F2	1.30	30 - 39	Weak	Weak overall performance with very limited knowledge and understanding of the subject. Little evidence of theoretical and reflective insights. Weak organisational and rhetorical skills.
F3	0.00	0 - 29	Poor	Overall poor or minimal evidence of knowledge and understanding of the subject. Displays little ability to put theory into practice; lacks theoretical and reflective insights. Incomplete breadth and depth of knowledge on substantive elements of the subject. Little or no evidence of critical engagement with the material. Responses are affected by irrelevant sources of information, poor organisational and rhetorical skills.

### ***Changes to the Registration Process***

As the GPA system is phased in, we will have two categories of students (new GPA and continuing/legacy (non-GPA) registering for the same courses. The difference will be reflected in the course registration number (CRN) for each course.

**When registering for courses, you will see two sets of CRN codes** – one for continuing (non-GPA) students, and another for new students registering under the GPA system. All other course information is the same. Only the CRNs are different.

**Please pay careful attention and use the codes that correspond with your status as either a new or continuing student.** The Banner registration system has been set up to deal with this duality, and once grades are input via the Banner Software, GPA is calculated automatically.

For more on the registration process and to see the updated CRN codes and instructions, download the [Online Registration Guide](#).

### ***Award of Degrees***

**New students** entering participating taught programmes in the 2021/2022 academic year as detailed above will be assessed and awarded degrees based on the Postgraduate GPA grading scale as follows:

GPA	CATEGORY
≥3.70	Distinction
3.30 – 3.69	Merit
2.00 – 3.29	Pass
< 2.00	Fail

Please note that

- the award of degree is based on the overall programme GPA.
- research projects will be considered similarly to other courses, so for a student who does not earn a 'Distinction' in their research project, it is still possible to be awarded a 'Distinction' in their overall programme once their programme GPA is ≥3.70.
- if a student fails or repeats a course, they will still qualify for a 'Distinction' if their overall programme GPA is ≥3.70.
- [special requirements apply](#) for the award of 'High Commendation' to professional doctorates (see regulation 14).

**Continuing students and new students** entering **programmes that are currently excluded** will be assessed and awarded according to the non-GPA systems included in this booklet for students' convenience.



***Where can I get help or find out more?***

- Visit [www.uwi.edu/postgradgpa](http://www.uwi.edu/postgradgpa) to learn more and find answers to frequently asked questions about the postgraduate GPA system.
- To see the full regulations governing the PG GPA, download [the GPA Regulations for Graduate Certificates, Diplomas, Taught Masters and Professional Doctorate Programmes](#).
- For answers to specific questions, contact the [Office for Graduate Studies & Research online](#).

## **VISION STATEMENT**

To be recognised as a world class Faculty of Engineering.

## **MISSION STATEMENT**

To provide internationally recognised degrees in Engineering and to engage in impactful research and innovation.

## DEAN'S MESSAGE

I extend a warm welcome on behalf of the Faculty of Engineering at The University of the West Indies, St. Augustine Campus. The Faculty of Engineering (FoE) seeks to equip the next generation of engineers with the necessary skills and knowledge to effectively address the evolving demands of society. This is achieved through the provision of unparalleled educational programmes, facilitated by esteemed professionals, within a dynamic learning environment, practical laboratory and field experiences, as well as valuable internship opportunities, to enhance their professional development. This handbook offers comprehensive details regarding our postgraduate programme offerings.

The FoE provides a diverse spectrum of postgraduate programmes, including Postgraduate Diplomas (PGD), Master of Science (MSc), Master of Applied Science (MAsc), Master of Philosophy (MPhil), and Doctor of Philosophy (PhD). They are designed to enhance students' knowledge, professionalism, and preparedness for the evolving demands of industry and society. The FoE fosters a robust and innovative research environment, serving as a foundation for these programmes. The strong ties we maintain with our industry partners and local and regional government agencies facilitate our community's ability to provide consultation on relevant issues to address real-world challenges. The FoE comprises a dedicated and proficient team of academic, administrative, technical, and support personnel. Our collective group is deeply committed to guiding students in their pursuit of knowledge and learning, aiming to deliver an educational experience that aligns with an increasingly interconnected global society.



**Professor Bheshem Ramlal**  
**Dean, Faculty of Engineering, St. Augustine Campus**

## A HISTORICAL NOTE

The University of the West Indies was founded in 1948 at Mona, Jamaica as a College in special relationship with the University of London, to serve the British territories in the Caribbean area. It achieved full University status by Royal Charter in 1962, thereby becoming a degree-granting institution in its own right.

A second campus of the University was established in 1960 when the Imperial College of Tropical Agriculture (ICTA) at St. Augustine, Trinidad was incorporated into the University College. On August 25, 1959, a Plan of Operation was signed which provided for a United Nations Special Fund allocation and a Government counterpart contribution for the establishment of a Faculty of Engineering. The then Vice-Chancellor and Principal of the University College, Nobel Laureate Sir Arthur Lewis had the overall responsibility of securing funding for the financing of the Engineering buildings and for expediting the final decision to locate the Faculty of Engineering at St. Augustine.

The initial layout comprised five (5) blocks with a total of 5,400 square metres of floor space of which the laboratories occupied 3,030 square metres.

Construction commenced in 1961 and was completed by the end of 1962. During the 1961/62 Academic Year (the first year of teaching), the Faculty was housed in temporary accommodation on the campus. The formal opening of the new buildings of the Faculty took place on February 1, 1963.

Initially, undergraduate and graduate research degrees were offered in the main branches of Engineering - Chemical, Civil, Electrical and Mechanical. The Faculty steadily grew over the years with a major expansion of both physical infrastructure and academic programmes in the 1980s with additional disciplines at the BSc level and several specialist MSc degrees. Floor space now occupies close to 53,181 square metres of classrooms, laboratories and offices, with expansion continuing almost on a yearly basis.

The semester system was introduced on a phased basis in 1990 at the undergraduate level, followed by the MSc programmes later.

# STAFF LISTING

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### DEAN

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## DEPARTMENT OF CHEMICAL ENGINEERING

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# SECTION 1 - POSTGRADUATE STUDIES IN THE FACULTY OF ENGINEERING

## 1.1 Introduction

- 1.1.1 It is generally accepted that a Bachelor's degree is the first step in the learning process that a professional person should continue throughout his/her career.
- 1.1.2 A first degree is an indication of a basic ability to understand and apply the concepts underlying that discipline. It does not indicate competence as a practitioner of the associated profession. That can only come with experience and training within the profession itself.

## 1.2 Furthering Knowledge - MPhil, PhD

- 1.2.1 One important element of any profession is that one should be devoted to furthering the knowledge and understanding contained within the concepts that define the discipline.
- 1.2.2 The task of furthering the frontiers of knowledge normally falls upon those in academic fields and specifically upon those undertaking postgraduate studies towards research degrees.
- 1.2.3 It is therefore critical to both industry and the University that graduates pursue research studies; this is reflected in continuing active enrolment for the MPhil and PhD research degree programmes.
- 1.2.4 The Faculty of Engineering offers MPhil and PhD research degrees in the following subjects: -
- i. Agricultural Engineering
  - ii. Chemical Engineering
  - iii. Civil Engineering
  - iv. Construction Engineering
  - v. Construction Engineering & Management
  - vi. Construction Management
  - vii. Electrical & Computer Engineering
  - viii. Food Science & Technology
  - ix. Geoinformatics
  - x. Geoscience
  - xi. Industrial Engineering
  - xii. Mechanical Engineering
  - xiii. Petroleum Engineering
  - xiv. Petroleum Geoscience
  - xv. Project Management
  - xvi. Surveying & Land Information
  - xvii. Urban and Regional Planning
- 1.2.5 It should be noted that these research degrees are not normally considered to be qualifications for professional practice in the broader sense, as they may not necessarily allow for registration as a professional engineer.
- 1.2.6 As a consequence, the Faculty of Engineering may allow suitably qualified non-engineering graduates, who obtained their degrees at the Honours level, to register for higher degrees by research.
- 1.2.7 However, such students may be required to take a qualifying examination within the Department concerned, on topics that would enhance the student's academic competence in the area of the proposed research.
- 1.2.8 Applicants wishing to register for the PhD who do not already have a Master's degree by research will be required to register for the MPhil first and may be allowed to upgrade their registration to the PhD upon satisfying the appropriate regulations.
- 1.2.9 Candidates who have obtained a Master of Science (MSc) degree with distinction maybe allowed to register for the PhD provided a substantial part of the MSc project has been carried out in the relevant area.

**1.3 In Career Training - Diploma, MSc, MASc**

- 1.3.1 It has often been demonstrated that the emphasis of the work undertaken by professional engineers changes as their careers progress. Normally their work becomes either more specifically technical within a closely defined subject area, or it becomes more oriented towards management responsibilities rather than technical ones. Sometimes it involves both.
- 1.3.2 As a result, professionals often require retraining or further training during the course of their careers. For this purpose, it is important to industry that there is a wide ranging and active programme of postgraduate studies available at the University.
- 1.3.3 To this end, the Faculty of Engineering offers a range of MSc, MASc and Postgraduate Diploma courses which are primarily taught courses. The details of these are included in this booklet.
- 1.3.4 The Faculty of Engineering currently offers the following **Postgraduate Diploma** programmes through examination by written papers and a project:
- i. Coastal Engineering & Management
  - ii. Construction Management
  - iii. Civil Engineering
  - iv. Civil with Environmental Engineering
  - v. Land Administration
  - vi. Petroleum Engineering & Management
  - vii. Geoinformatics
  - viii. Water and Wastewater Services Management
- 1.3.5 The Faculty of Engineering currently offers the following **MSc degree programmes** through examination by written papers and a project:
- i. Chemical & Process Engineering
  - ii. Chemical & Process Engineering with Management
  - iii. Chemical & Process Engineering with Environmental Engineering
  - iv. Civil Engineering
  - v. Civil with Environmental Engineering
  - vi. Coastal Engineering & Management
  - vii. Construction Management
  - viii. Electrical & Computer Engineering (MASc)
  - ix. Engineering Asset Management
  - x. Engineering Management
  - xi. Food Science & Technology
  - xii. Geoinformatics
  - xiii. Manufacturing Engineering & Management
  - xiv. Petroleum Engineering
  - xv. Petroleum Engineering & Management
  - xvi. Project Management
  - xvii. Reservoir Engineering
  - xviii. Urban and Regional Planning
- 1.3.6 Normally, entry to such programmes is available to those who have a Lower Second Class Honours degree or its equivalent in the specified subject area or in a related area with a record of experience in the subject area.
- 1.3.7 Students with Third Class or Pass degrees or equivalent in the relevant field of study shall only be accepted for admission to an MSc/Diploma programme provided they have obtained at least two years' experience in the field and have a satisfactory confidential reference from their employer.

**1.4 Course of Study – MSc/MASc/Diploma**

- 1.4.1 The courses of advanced study for a postgraduate Diploma or a Master's degree by examination by written papers include, in addition to the courses of instruction, supervised research development or industry-oriented work culminating in the submission of a Project Report. Guidelines for submission of Project Reports are indicated under the relevant programmes.

1.4.2 Full-time MSc/MASc/Diploma students must normally submit their Project Reports nine (9) months after completion of the written examinations, while part-time MSc/MASc/Diploma students are required to do so within twelve (12) months.

- Candidates who fail to submit their Reports in good time shall be removed from the Register of Postgraduate Students.
- Candidates are required to pass both written examinations and coursework of the MSc/MASc/Diploma programmes at the first attempt. Candidates failing the coursework or written examination at the first attempt may be allowed a second attempt at the examination on the recommendation of the Board of Examiners.
- Candidates permitted a second attempt at a course, having failed either the coursework or the written examination at the first attempt, will be required to rewrite only that component (written examination or coursework) failed, unless the Campus Committee in any particular case otherwise decides. Marks allotted to the component passed at the first attempt will be credited to the candidate at his or her second attempt at the course.

1.4.3 A proportion of the marks which make up the final result of a particular course examined by a written Paper may be derived from the candidate's performance in course work assignments, in course tests, etc. All such assignments must be completed and submitted to the examiners before the date of the written examination.

1.4.4 Candidates whose work is at any time reported by their Supervisors to be unsatisfactory or who do not satisfy the Examiners on Courses or Project Reports that form part of the postgraduate programme may be removed from the Register of Postgraduate Students.

1.4.5 Such students shall not normally be readmitted for at least two years thereafter. Students readmitted to MSc/MASc/Diploma programmes shall be eligible for credits for those courses passed creditably during their previous registration, provided that not more than five years have elapsed since the applicants withdrew from the University and that the course content has not changed significantly in the interval.

### **1.5 Completion Time – MPhil/PhD**

1.5.1 A candidate for the MPhil degree shall submit a thesis for examination within three (3) calendar years of initial registration for full-time studies, or five (5) calendar years for part-time studies.

1.5.2 A candidate for the PhD degree shall submit a thesis for examination within five (5) calendar years of initial registration for full-time studies, or seven (7) calendar years for part-time studies.

### **1.6 Research Seminars**

1.6.1 All students registered for an MPhil degree must satisfactorily complete at least two (2) research seminars, prior to submission of the MPhil thesis. Students registered for the PhD degree must satisfactorily complete three (3) such seminars. Assessment of the students' seminars must be included in their Progress Reports.

1.6.2 This seminar is assessed normally by the Supervisor of the student's studies and is reported as being satisfactory or unsatisfactory on the student's annual Progress Report. It is intended to:

- i. provide a forum for the critical appraisal of the objectives, methodology, direction and progress of the research being undertaken.
- ii. create a wider awareness in the University community of the research activities within the Faculty.
- iii. provide additional means of monitoring the progress of postgraduate students doing research theses.
- iv. create and foster an appropriate research culture within the Faculty.

### **1.7 Procedural Guidelines for the Upgrading of an MPhil to PhD**

1.7.1 Postgraduate students who are registered for the MPhil Degree and who are contemplating the upgrading of their registration status to that of the PhD are required to do so within two (2) or three (3) years of first registration.

1.7.2 The following are the procedural guidelines for upgrading of one's registration status:

- i. The student should consult with his Supervisor (s) on this matter.

- ii. The student will apply through his Supervisor (s) to the Head of Department, formally seeking upgrading, copying both the Assistant Registrar (Graduate Studies and Research) and the Chairman, Faculty Sub-committee on Graduate Studies.
- iii. The Head of Department, if in agreement, consults with the Supervisor and Chairman, Faculty Sub-Committee on Graduate Studies and Research and establishes an Upgrading Assessment Committee.
- iv. The Upgrading Assessment Committee should normally comprise the Supervisor(s) plus two Independent Assessors.
- v. Assessors should be chosen on the basis of their knowledge and experience at the appropriate level in the area of the student's research and may be drawn from outside of The University of the West Indies.

The Chairman, Faculty Sub-Committee requests from the student, a copy of his Proposal for upgrading for each of the Assessors, and a mutually agreed date is set for the oral presentation by the student of his:

- (i) Report on work done under MPhil registration, and
- (ii) Research proposal to upgrade the work to PhD.

- vi. The Chairman, Faculty Sub-Committee chairs the oral presentation by the student of his Research proposal and later receives from each Assessor, a report with a recommendation regarding the requested upgrading.
- vii. The Chairman, Faculty Sub-Committee reviews the Reports and forwards a recommendation on upgrading to the Campus Committee on Higher Degrees, through the Faculty Board.

### **1.8 Theses and Project Reports**

1.8.1 The form of presentation of Theses and Project Reports must conform to the University's General Regulations governing Higher Degrees. Students should consult the University Library on this matter as well as the University's publication "Theses and Research Papers."

1.8.2 The maximum length of Theses/Project Reports shall be as follows: -

- PhD - 500 pages including Appendices.
- MPhil - 250 pages including Appendices.
- MSc/MASc/Diploma Project Reports - 125 pages including Appendices.
- PG Diploma Project Reports - 100 pages including Appendices.

1.8.3 Essential, elements/components/constituents of the proposed MSc Project Report should include the following:

- Introduction
- Background
- Motivation
- Scope and limitations
- Underlying principles/literature review/theory and fundamentals
- Methods/approach adopted/used and why
- Results
- Discussion of results/review of methodology
- Conclusions and recommendations
- Closure/comment on the significance of the findings from work, its contribution to knowledge in the area, and the lessons that should be learned from the project experience

The above items are listed in typical sequence. The sequence itself is not fixed and may be adjusted to some extent as appropriate to each particular case.

**1.9 Prizes**

The Faculty prides itself on its strong tradition of nurturing top-class graduates who have gone on to accomplish themselves as regional and international industry professionals or in degree programmes in other universities. Student motivation plays a significant role in this regard. The Faculty of Engineering thanks the following industry stakeholders and individuals who have partnered with us to recognize and reward our students/graduates who have excelled in their respective programmes during the 2023/2024 Academic Year.

- PLIPDECO
- Alpha Engineering & Design (2000) Ltd
- Angostura Limited
- Arawak and Company Limited
- Association of Professional Engineers of Trinidad & Tobago (APETT)
- BP Trinidad & Tobago (bpTT)
- Caribbean Airlines Limited (CAL)
- Caribbean ICT Research Programme (CIRP)
- Caribbean Supplies & Limited
- Coastal Dynamics Ltd
- Coosal's Construction Company Ltd
- Danny's Enterprise Co. Limited
- Dr. Maura Imbert - Desmond Imbert Prize
- EOG Resources Trinidad Ltd
- Fenix Testing Services Limited
- Fine Choice Meats Limited
- GISCAD
- Institute of Surveyors of Trinidad and Tobago
- Ixanos Ltd
- Kee-Chanona Limited - Thomas Chanona
- Kiss Baking Company Limited
- KS & P Limited
- KVR Energy Limited
- L & S Surveying Services Limited
- Lauriston Lewis Associates Ltd Bill Massiah/Percy Phillips Memorial
- Lee Young & Partners
- Madam Nai Wah Chow
- Ministry of Energy and Energy Industries
- Mrs Florette Smith-Felix
- National Energy Corporation of Trinidad and Tobago
- Nu-Iron Unlimited
- Process Management Limited
- Project Management Institute (PMI) Southern Caribbean Chapter
- Proman Trinidad & Tobago (Proman Limited)
- PROMASERV
- Raymond & Pierre
- Society of Caribbean Industrial Engineers (SCIE)
- Teleios Systems Limited
- The Asset Maintenance & Reliability Consultants Company (AMREC)
- The Baksh Family of Engineers
- The Geographic Information Systems Society of Trinidad and Tobago
- The Geological Society of Trinidad & Tobago
- The Institution of Engineering and Technology (IET)
- The Power Generation Company of Trinidad & Tobago Limited (PowerGen)
- The Society of Petroleum Engineers Trinidad and Tobago Section (SPETT)
- The Telecommunications Authority of Trinidad and Tobago (TATT) Prize
- Touchstone Exploration (Trinidad) Limited
- Trinidad & Tobago Electricity Commission (T&TEC)
- Trinidad and Tobago Network Information Centre (TTNIC)
- Trinidad and Tobago Society of Planners
- UNIPET
- Virtana Inc.
- Voltec Engineering & Surveying Services Ltd

# DEPARTMENT OF CHEMICAL ENGINEERING

## **Research**

The Department of Chemical Engineering is part of the single campus Faculty of Engineering with a commitment to providing national and regional service to the process industries. These industries include the full spectrum available in the Caribbean including petroleum and petrochemicals, bauxite, sugar and food-processing. The Units of Food Science & Technology and Petroleum Studies are included in the Department of Chemical Engineering with specific remits to serve those industries.

The Department recognises the need to promote industrial linkages, applied research, fundamental research and the continuing education of persons in the relevant disciplines. The research efforts are essentially geared to the solving of problems relevant to the entire Caribbean region.

Research in the Department of Chemical Engineering is aimed at the development of the indigenous resources of the Caribbean region. The broad areas of research in the Department are as follows:

### Chemical and Process Engineering

- Energy Studies: Hydrogen, Renewable and Sustainable Energy
- Corrosion Studies
- Membrane Technology
- Flow Assurance and Computational Fluid Dynamics
- Bio-fluid mechanics and Cardiovascular Technology.
- Supercritical Fluid and solvent Extraction
- Carbon Dioxide Capture and Utilisation
- Process Control and Optimisation
- Life Cycle Sustainability Assessments
- Waste Valorisation and Resource Circular Process systems

### Food Science and Technology Unit

- Food Preservation, Processing and Packaging
- Food Microbiology, Sanitation and Quality Assurance
- Food Product Development
- Nutrition, Health and Wellness
- Postharvest Technology
- Good Agricultural Practices to facilitate Agro processing
- Good Manufacturing Practices and HACCP
- Food Regulations and Compliance
- Culinary Development and Innovation for the Food Service Industry
- Techno-economic Studies for the Food and Beverage Industry

### Petroleum Studies Unit

- Geochemistry, Mineralogy and Petrology
- Rock Mechanics, Rock Preparation and Thin Sections
- Unconventional Reservoirs: Heavy Oil, Shale Oil, Tar Sands and Gas Hydrates
- Sedimentology, Stratigraphy and Sequence stratigraphy
- Seismic Studies
- Biostratigraphy and Environmental Paleontology
- Oil and Gas PVT and Phase Behaviour Studies
- Carbon Dioxide Sequestration, EOR and CERM
- Reservoir Characterisation with Nano-Particle Technology Application
- Drilling Technology and Wellbore Stability

The Department offers programmes of study by research leading to the MPhil and PhD degrees in Chemical Engineering.

## Programmes in Chemical & Process Engineering

***MSc (Eng) in Chemical and Process Engineering***

***MSc (Eng) in Chemical and Process Engineering with Management***

***MSc (Eng) in Chemical and Process Engineering with Environmental Engineering***

***MPhil in Chemical Engineering***

***PhD in Chemical Engineering***

**NOTE:** The MSc Programmes are accredited by the Institution of Chemical Engineers (IChemE) of London en route to CEng.

### THE AIMS AND OBJECTIVES

Technical deepening and broadening beyond the level covered by the BSc Honours Degree:

- To allow students to engage in creative and innovative development of engineering technology.
- To gain experience in team-working while broadening the knowledge base through research and experimentation.
- To meet the full requisites of UK SPEC for eventual registration of our graduates as Chartered Engineers.

### OBJECTIVES BY PROGRAMME

#### **MSc in Chemical and Process Engineering**

- Enrich the undergraduate experience through advanced courses and industrial projects.
- Provide a solid foundation and understanding of the fundamental principles of mathematics, science, and engineering.
- Provide students with experience in learning and applying tools (e.g., computer skills) to solve theoretical and open-ended chemical engineering problems.

#### **MSc in Chemical and Process Engineering with Management**

- Enrich the undergraduate experience through advanced courses in Management and industrial projects.
- Provide training at postgraduate level in specialised Financial and management through teaching and solving problems.

#### **MSc in Chemical and Process Engineering with Environmental Engineering**

- To alert students to major environmental concerns at global and regional level.
- To train students in the planning and design of engineering works related to the preservation and improvement of the environment.

#### **MPhil and PhD Programmes**

- Generate innovative knowledge applied to the solution of engineering problems, in line with new economic and environmental demands.
- Lead research processes aimed at improving engineering.
- Develop and transfer methods, techniques and methodologies, tools aimed at strengthening engineering processes in the industry.

### STRUCTURE OF PROGRAMMES

Offered Part-time only.

### DURATION OF STUDY

A minimum of 36 months (two years of courses + one year research project).

### NO. OF CREDITS REQUIRED:

40 Credits

### ENTRY REQUIREMENTS

#### **Admission of Applicants with an Honours Degree**

The minimum requirement for admission to the taught Master's programme is normally a Lower Second Class Honours degree in Chemical and Process Engineering.

Final approval of applications is subject to the Department's approval. The minimum admission requirement for MPhil and PhD programmes is normally an Upper Second Class Honours degree or its equivalent.

Further information on direct admission to MPhil and PhD programmes is available in Section 1 Regulations 6 - 8 of the Regulations for Graduate Diplomas and Degrees.



**Admission of Applicants with a Pass Degree**

The admission of applicants with a Pass degree requires a statement from the Department on the suitability of the applicant to pursue graduate studies at the University of the West Indies. Candidates admitted with a Pass degree may be required to register for such supplementary courses as the Department stipulates.

**Course Listing****SEMESTER 1**

Course Code	Course Title	Credits
CHNG 6001	Advanced Process Dynamics & Controls	C4
CHNG 6102	Advanced Chemical Reaction Engineering	E4
MENG 6506	Project Management	C3
CHNG 6206	Research Methods for Chemical Engineers	C3
CHNG 6003	Process Synthesis, Analysis & Optimisation	C4
CHNG 6302*	Chemical Engineering MSc Project Part 1: Project Proposal (Literature Review & Theory where applicable) Part 2: (Experimental; Practical; Computational)	C9

**SEMESTER 2**

Course Code	Course Title	Credits
CHNG 6101	Advanced Chemical Engineering Thermodynamics	C4
CHNG 6002	Numerical Methods & Computing	C4
CHNG 6302*	Chemical Engineering MSc Project Part 1: Project Proposal (Literature Review & Theory where applicable) Part 2: (Experimental; Practical; Computational)	C9

Together with two (2) optional courses to be chosen from one (1) of the three (3) streams:

**Chemical & Process Engineering Stream**

Course code	Course title	Credits
CHNG 6201	Biochemical Engineering II	E3
CHNG 6203	Petroleum Processing Technology	E3
CHNG 6204	Utilities Engineering	E3
CHNG 6303	Desalination	C3
PENG 6007	Reservoir Engineering	E4
PENG 6012	Natural Gas Engineering	E4
PENG 6015	Production Engineering	E4

**Management Stream**

Course Code	Course Title	Credits
MENG 6402	Human Resource Management I	E3
MENG 6405	Total Quality Management	E3
MENG 6502	Financial Management	E3

**Environmental Engineering Stream**

Course Code	Course Title	Credits
ENGR 6005	Pollution Prevention, Cleaner Production & Industrial Waste Abatement	E3
ENGR 6006	Water & Wastewater Engineering	E3
ENGR 6007	Air Pollution Control	E3
ENGR 6018	Energy & The Environment	E3

In addition, existing graduate courses in the Faculty can be taken but approval has to be obtained from the Department and Faculty prior to doing so.

\*CHNG 6302: the student needs to complete ALL courses and receive authorisation from the Coordinator before he/she can register for this course

## Programmes in Food Science and Technology

- ***MSc in Food Science and Technology***
- ***MPhil in Food Science and Technology***
- ***PhD in Food Science and Technology***

### AIMS OF THE PROGRAMMES

- a. To accommodate the useful application of knowledge and practices to the developmental needs of the food and beverage industry in the region, to the real world of commerce, and to the public need.
- b. To foster scholastic achievement in graduates through quality education to produce critical and creative thinkers who are highly motivated, civic-minded, and entrepreneurial in mind-set.
- c. To pursue cutting-edge research by both theoretical and applied methods, thus producing individuals who are innovative and can solve real-world problems in the food and beverage industry, in related government, research and private institutions, and in developmental and other agencies.

### OBJECTIVES OF THE PROGRAMMES

#### ***MSc in Food Science and Technology***

1. To effectively perform technical and operational management roles in the agri-processing and food and beverage sectors;
2. To acquire the technical knowledge and practical skills required to successfully start his/her own agri-food business; and
3. To demonstrate the ability to apply knowledge and understanding to real life situations in food-related businesses, systems and processes.

#### ***MPhil and PhD in Food Science and Technology.***

The overall objectives of the programmes are that research graduates:

1. Can generate new or innovative knowledge applied to the solution of complex food science and technology challenges taking into account business, environmental and social constraints.
2. Are able to develop and lead specialised research projects in an interdisciplinary research environment, aimed at improving food products, processes and systems.
3. Have acquired discipline specific and transferable skill sets to either influence or bring about change in the workplace or profession.

#### ***MSc in Food Science and Technology***

##### ENTRY REQUIREMENTS

The Regulations for the MSc in Food Science and Technology are the same as the General Regulations for the MSc (Eng) in the Faculty of Engineering, except that candidates applying for registration should normally have:

A Bachelor's Degree in Food Science and Technology, Natural Science or Nutrition (with Mathematics and/or Statistics and Chemistry at the Preliminary and Introductory Level) or Agriculture, or Chemical Engineering or Agricultural Engineering;

Candidates for registration in this programme must first hold a degree in any of the following subjects:

- Food Science
- Food Technology
- Food Science and Technology
- Chemistry or Applied Chemistry
- Natural Sciences
- Chemical, Biochemical or Agricultural Engineering
- Agriculture
- Nutrition
- Home Economics with a major in Nutrition or Food Technology

##### **Admission of Applicants with an Honours Degree**

The minimum requirement for admission to the taught Master's programme is normally a Lower Second Class Honours degree in Chemical and Process Engineering.

Final approval of applications is subject to the Department's approval. The minimum admission requirement for MPhil and PhD programmes is normally an Upper Second Class Honours degree or its equivalent.

Further information on direct admission to MPhil and PhD programmes is available in Section 1 Regulations 6 – 8 of the Regulations for Graduate Diplomas and Degrees.

#### **Admission of Applicants with a Pass Degree**

The admission of applicants with a Pass degree requires a statement from the Department on the suitability of the applicant to pursue graduate studies at The University of the West Indies. Candidates admitted with a Pass degree may be required to register for such supplementary courses as the Department stipulates.

#### **DURATION OF STUDY**

Full-time: Maximum – 3 years

Part-time: Maximum – 5 years

#### **STRUCTURE OF PROGRAMMES**

Offered part-time and full-time

- a. Part-time students: - must normally submit their Project Reports nine (9) months from date of registration.
- b. Full-time students: - must normally submit their Project Reports nine (9) months from date of registration.

Candidates who fail to submit their Reports in good time shall be removed from the Register of Postgraduate students.

#### **MSC PROGRAMME - COURSE OF STUDY**

Following the pattern established by the Institute of Food Technologists (IFT) in the United States of America and the Institute of Food Science & Technology (IFST) in the United Kingdom, students will be required to pursue an appropriate course of study as determined by the School for Graduate Studies and Research, UWI, St. Augustine and the Food Science and Technology Unit, Department of Chemical Engineering.

**Total No. of Credits Required: 41**

**No. of course credits - 32**

\*MENG 6508 is now compulsory for all students.

Students should demonstrate proficiency in Food Science & Technology by satisfactory completion of at least 32 credits of coursework. \*Students who have completed all taught courses must register for Research Project FOST6020 credits

#### **Course Listing**

Course Code	Course Title	Credits
<b>Semester I</b>		
FOST 6002	Food Packaging	2
FOST 6003	Food Chemistry	3
FOST 6005	Food Microbiology	4
FOST 6006	Food Quality Assurance	4
FOST 6007	Preservation and Processing of Meat and Poultry	3
<b>Semester II</b>		
FOST 6000	Fundamentals of Food Process Engineering	4
FOST 6001	Sanitation in Food Processing	3
FOST 6004	Food Processing Laboratories	3
FOST 6008	Preservation and Processing of Fruits and Vegetables	3
MENG 6508	Research Methods	3
FOST 6019	Research Project	6
FOST 6020	Research Project	9

***MPhil in Food Science and Technology***

The Regulations for the MPhil in Food Science and Technology are the same as the Faculty Regulations General Regulations for the MPhil except that candidates applying for registration should normally have either:

- a. A Bachelor's Degree in Food Science and Technology or related discipline, **OR**
- b. A Master's Degree in Food Science and Technology, or related discipline.

***PhD in Food Science and Technology***

The Regulations for the PhD in Food Science and Technology are the same as the University and Faculty of Engineering regulations for the degree of Doctor of Philosophy except that candidates applying for registration should normally have either:

- a. A Master of Philosophy Degree in Food Science and Technology or related discipline of The University of the West Indies, **OR**
- b. An equivalent academic or professional qualification acceptable to the Faculty of Engineering or a Master of Science in Food Science and Technology with a Distinction.

***Other Information***

The Food Science and Technology Unit is equipped with science laboratories that include a semi-commercial processing hall containing a range of small-scale equipment suitably instrumented for the systematic study of operations involved in the food and beverage industry; a food microbiology laboratory, a quality assurance laboratory, a food research laboratory with specialised analytical equipment, and a sensory evaluation facility.

Areas of current research include food analysis, food safety and risk assessment, food preference and sensory studies, food fermentations, milk, meat, fish and seafood, fruit and vegetable microbiology and processing, food dehydration, root crop processing and innovative food product and packaging development.

The Unit maintains links with the food processing industry and other relevant stakeholders, particularly in the areas of food product development, good manufacturing practices and food regulations. Staff are also involved in scientific and technical societies, in particular, the Institute of Food Technologists (USA), the Canadian Institute of Food Science & Technology and the Institute of Food Science & Technology (UK). Staff members also have numerous contacts with overseas institutions which they visit, and in which they sometimes conduct research. Many linkages exist with national and international development agencies. Industry internships are NORMALLY offered to students who have been successful in ALL courses (subject to vacancies in industry). Furthermore, cash Prizes from industry sponsors are awarded to students obtaining the highest mark in some courses.

Graduates of this programme have found employment in the food and beverage industry, mainly in research and development, quality assurance and production management. Some individuals are engaged in research and innovation in government and industry-sponsored research organisations. Other graduates are academic staff within universities. Many opportunities also arise within the food service establishments and pharmaceutical industries, in teaching, in libraries and information centres, and within overseas institutions and development agencies.

## Programmes in Petroleum Studies

- ***MSc in Petroleum Engineering***
- ***MSc in Petroleum Engineering and Management***
- ***MSc in Reservoir Engineering***

### THE SUBJECT

Petroleum Engineering involves the application of earth and physical sciences to the evaluation and exploitation of natural hydrocarbon resources. The dominant problems of the petroleum engineer are those of flow and equilibrium in porous media, in vertical and horizontal well bores, surface pipelines and in primary process equipment. The complexity of the hydrocarbon fluids, and geological strata involved reservoirs and production systems flow raises problems requiring sophisticated numerical techniques for their solution. This extends to engineered solutions in drilling and production engineering while in the field.

### COOPERATION WITH INDUSTRY AND GOVERNMENT

We have strong links with both industry and government which includes the exchange of ideas, expertise, supervision and financial support for both academic and students. Visiting lecturers from these entities make an important contribution to the more specialised teaching aspects of the MSc programme. The interaction between industry and government is evident in the following ways.

- Lectures in some courses are given by personnel from industry and government.
- Regular seminars are given by engineers and managers from energy companies.
- Direct recruitment from the course; there are several past students now in technical and management positions in industry and government.
- Industry and government support through student scholarships and secondment.
- The majority of project topics are proposed and partly supervised by industry.
- Industry supervised site visits.

### SOCIETY OF PETROLEUM ENGINEERS (SPE)

There is a strong interaction with the Society of Petroleum Engineers which is, a professional, international and learned society focused on petroleum engineering. The aim of the SPE is to disseminate knowledge ranging from engineering fundamentals to practical field experience and, including cost benefit analyses. Over the years, the SPE has been most generous in its support to Petroleum Engineering at UWI, including scholarship support, running a student paper and welcoming students to their meetings and conferences.

### ***MSc in Petroleum Engineering***

**Accredited by the Energy Institute (EI) of London en route to CEng**

### OVERVIEW

The Petroleum Engineering MSc Programme consists of eight (8) taught courses, a Research Methods course and an independent project. It is a conversion programme from other engineering and science-based degree foundations into the specialties of Petroleum Engineering.

### THE AIMS AND OBJECTIVES

**TO PROVIDE THE NECESSARY BACKGROUND FOR EMPLOYMENT IN THE OIL AND GAS SECTOR, OR ADDITIONAL QUALIFICATIONS FOR THOSE ALREADY WORKING IN THE INDUSTRY, AS WELL AS PROVIDE A SPRINGBOARD FOR FURTHER ACADEMIC. RESEARCH DEGREE. REGULATIONS AND ENTRY REQUIREMENTS**

1. The Regulations for the MSc (Eng) in Petroleum Engineering, Reservoir Engineering, Petroleum Engineering & Management and Petroleum Management are the same as the General Regulations for the MSc (Eng) in the Faculty of Engineering, except that the candidates applying for registration should have at least:
  - a) A Second Class Honours degree in Engineering/Natural Sciences (Physics & Chemistry majors)/Earth Sciences; **OR**
  - b) An equivalent qualification, in respect of either Engineering and/or Engineering Management.
2. A candidate applying for registration with a Pass degree may be considered for entry provided the candidate has acceptable industrial experience.

**STRUCTURE OF PROGRAMME: OFFERED BOTH PART-TIME AND FULL-TIME**

- a. Part-time students: - Normally required to complete the written examinations within two (2) years of registration - Project should be started at the commencement of the semester following the completion of the written examinations and completed within twelve (12) months.
- b. Full-time students: - Normally required to complete the written examinations within one (1) year of registration - Project should be started at the commencement of the semester following the completion of the written examinations and completed within nine (9) months.

**NB: The normal load for a part-time student is half that of a full-time student.**

**DURATION OF STUDY**

This is dependent on whether the student is part-time or full-time.

- a. Part-time students: Maximum of five (5) years.
- b. Full-time students: Maximum of three (3) years.

**CREDITS****TOTAL NUMBER OF CREDITS REQUIRED: 44**

Number of course credits - 32

Number of project credits -

Research Methods - 3 credits

Independent project - 9 credits

Sub-Total - 12 credits

**CREDITS FOR DIPLOMA COURSES TOWARDS THE MSc DEGREE**

Holders of the Postgraduate Diploma in Petroleum Engineering, Petroleum Engineering and Management or Petroleum Management will be granted credit for courses completed in the programme if they are subsequently admitted to the MSc degree, provided that not more than five (5) years have elapsed since the date on which such courses were passed.

**EXAMINATION**

As follows:

- a. Evaluation in all courses will normally be by coursework and final examination. Candidates will be required to pass both the coursework and examination components.
- b. MSc Petroleum Project - evaluation will be on a submitted report. Candidates may also be orally examined.

Students will, also be required to present a seminar paper.

**SHORT COURSES AND SEMINARS**

The programme in Petroleum Engineering and Management also includes short courses and seminars on topics of interest to supervisors, engineers and managers in the petroleum industry. These are on subjects of topical interest and are organised frequently in response to identified needs and problems. For further details on these short courses or general advice on the programme, you are invited to contact the Head, Department of Chemical Engineering.

**COURSE LISTING**

An MSc (Eng) candidate in Petroleum Engineering will be required to pursue a course of study approved by the Board of the Faculty of Engineering. Such a course of study will normally be made up of a Research Methods course, an independent project and eight (8) of the following courses:

Course Code	Course Title	Credits
PENG 6000	Petroleum Geoscience	4
PENG 6001	Advanced Petroleum Geology & Geophysics	4
PENG 6002	Drilling Engineering & Completions	4
PENG 6003	Advanced Drilling Engineering & Well Completions	4
PENG 6004	Advanced Production Engineering & Technology	4
PENG 6005	Reservoir Evaluation	4
PENG 6006	Advanced Well Test Analysis	4
PENG 6007	Reservoir Engineering	4
PENG 6008	Advanced Reservoir Engineering	4
PENG 6010	Improved Oil Recovery	4
PENG 6012	Natural Gas Engineering	4
PENG 6014	Offshore Structures & Systems	4
PENG 6015	Production Engineering	4
PENG 6016	Petroleum Economics & Management	4
PENG 6017	Selected Topics	4
PENG 6025	Group Field Project	4
PENG 6026	Directed Reading	4
PENG 6027	Petroleum Engineering Internship (Guyanese Students)	9

Each candidate will also be required to undertake PENG 6023 – (Research Methods) and PENG 6024 – Research Project.

**Notes**

1. Not all courses listed will be offered in any given year.
2. Students should register for PENG 6023 or Faculty Equivalent and PENG 6024. There may be field work on a Saturday or Sunday.

***MSc in Petroleum Engineering and Management*****OVERVIEW**

Petroleum Engineering and Management provides the option to study the management and commercial aspects of the petroleum industry. Decision-making, contractual negotiations and arrangements; financial implications and manpower management must be well understood and executed at various stages. Programme duration for part-time/full-time candidates as well as aims and objectives follow in accordance with the MSc in Petroleum Engineering programme.

**REGULATIONS AND ENTRY REQUIREMENTS**

The Regulations for the MSc in Petroleum Engineering & Management are the same as the General Regulations for the MSc (Eng) in the Faculty of Engineering, except that the candidates applying for registration should have at least:

- a. A Second Class Honours degree in Engineering/Natural Sciences (Physics & Chemistry majors)/Earth Sciences; OR
- b. An equivalent qualification, in respect of either Engineering and/or Engineering Management.

A candidate applying for registration with a Pass degree may be considered for entry provided the candidate has acceptable industrial experience.

**STRUCTURE OF PROGRAMME: OFFERED BOTH PART-TIME AND FULL-TIME**

- a. Part-time students: - Normally required to complete the written examinations within two (2) years of registration - Project should be started at the commencement of the semester following the completion of the written examinations and completed within twelve (12) months.
- b. Full-time students: - Normally required to complete the written examinations within one (1) year of registration - Project should be started at the commencement of the semester following the completion of the written examinations and completed within nine (9) months.

**NB: The normal load for a part-time student is half that of a full-time student.**

**DURATION OF STUDY**

This is dependent on whether the student is part-time or full-time.

- a. Part-time students: Maximum of five (5) years.
- b. Full-time students: Maximum of three (3) years.

**CREDITS****NUMBER OF CREDITS REQUIRED: 42**

Number of course credits - 30 (two compulsory 3-credit courses and six 4-credit courses)

Project credits - 12 (Research Methods course: 3 credits; independent project: 9 credits)

**EXAMINATION**

As follows:

Evaluation in all courses will normally be by coursework and final examination. Candidates will be required to pass both the coursework and examination components.

MSc Petroleum Project - evaluation will be on the report. Candidates may also be orally examined on the Project Report.

**COURSE LISTING**

An MSc candidate in Petroleum Engineering and Management will be required to pursue a course of study approved by the Board of the Faculty of Engineering. Such a course of study will normally be made up of eight (8) of the following courses (two of which are compulsory) a Research Methods course and an Independent Project.

**Compulsory 3 credits courses:**

Course Code	Course Title	Credits
MENG 6402	Human Resource Management	3
MENG 6502	Financial Management	3

**Electives - any six (6) of the following four (4) credits courses:**

Course Code	Course Title	Credits
PENG 6002**	Drilling Engineering & Completions	4
PENG 6005**	Reservoir Evaluation	4
PENG 6007**	Reservoir Engineering	4
PENG 6009	Strategic Petroleum Management & Organisations	4
PENG 6010**	Improved Oil Recovery	4
PENG 6011	Petroleum Economics, Law & Contract Administration	4
PENG 6012**	Natural Gas Engineering	4
PENG 6015**	Production Engineering	4
PENG 6020	Economic & Quantitative Aids to Decision-Making	4
PENG 6021	Production Planning & Control	4

\*\* Currently offered in the MSc. Petroleum Engineering Programme

**Each candidate will also be required to undertake:**

Course Code	Course Title	Credits
PENG 6023	Research Methods	3
<i>followed by</i>		
PENG 6024	Research Project	9

The objectives and learning outcomes for the Project Report will be similar to Project Report PENG6024 currently offered in the MSc Petroleum Engineering Programme. The primary difference is that the emphasis of the former project will be around the theme of management in the petroleum industry.



**MSc in Reservoir Engineering**

Accredited by the Energy Institute (EI) of London en route to CEng

**OVERVIEW**

Reservoir Engineering is a subset of petroleum engineering where understanding of the reservoir is studied in more detail. Reservoir Engineers seek to economically optimise the exploitation of the reservoir. Programme duration for part-time/full-time candidates as well as aims and objectives follows in accordance with the MSc in Petroleum Engineering programme.

**REGULATIONS AND ENTRY REQUIREMENTS**

- The regulations for the MSc (Eng) in Reservoir Engineering are the same as the General Regulations for the MSc (Eng) in the Faculty of Engineering, except that the candidates applying for registration should be in possession of at least:
  - a Second Class Honours degree from an approved university in Engineering or Natural Sciences (Physics, Chemistry, or Mathematics majors) or Earth Sciences, and
  - preferably at least one (1) year of relevant industry experience.
- A candidate applying for registration with a Pass degree may be considered for entry provided the candidate has acceptable industrial experience.
- A candidate for admission may be required to sit a qualifying examination. Candidates may be restricted by the Department to certain subject areas in the course of study. In particular, graduates must be numerate and have had some exposure to the fields of geology/geophysics, natural sciences and engineering. Candidates other than those that have had an exposure of petroleum engineering may be required to take qualifying examinations to become eligible for entry into the programme, unless such a graduate possesses adequate and practical experience in industry.
- Examinations follow the same form as the MSc in Petroleum Engineering.

**STRUCTURE OF PROGRAMME**

Part-time/Full-time

**NUMBER OF CREDITS REQUIRED: 44**

Number of course credits - 32

Number of project - 12 (Research Methods course - 3 credits; independent project - 9 credits)

**INFORMATION ON PROJECT**

Each candidate will also be required to pass a Research Methods course and submit a Project Report PENG 6024. This project would be a choice of:

- A traditional research project or
- A professional, industry-based project.

In both cases, the students will be examined by a written and, where possible, an oral presentation.

**COURSE LISTING**

An MSc (Eng) candidate in Reservoir Engineering will be required to pursue a course of study approved by the Board of the Faculty of Engineering. Such a course of study will normally be made up of eight (8) of the following courses, a Research Methods course and an independent project.

Course Code	Course Title	Credits
PENG 6000*	Petroleum Geoscience	4
PENG 6006	Advanced Well Test Analysis	4
PENG 6007*	Reservoir Engineering	4
PENG 6008	Advanced Reservoir Engineering	4
PENG 6010*	Improved Oil Recovery	4
PENG 6012*	Natural Gas Engineering	4
PENG 6017*	Selected Topics (Field Project)	4
PENG 6025*	Group Field Project	4
PENG 6028	Formation Evaluation	4

\* Currently offered in the Petroleum Engineering MSc.

Each candidate will also be required to undertake PENG 6023 - Research Methods followed by PENG 6024 - (Research Project).

## ***Postgraduate Diploma in Petroleum Engineering***

The Postgraduate Diploma in Petroleum Engineering and Management provides the option to study the management and commercial aspect of the petroleum industry. Decision-making, contractual negotiations and arrangements; financial implications and man-power management must be well understood and executed at various stages.

### **THE AIMS AND OBJECTIVES**

To provide the necessary background for employment in the oil and gas sector, or additional qualifications for those already working in the industry, as well as provide a springboard to transition into the MSc programme.

### **ENTRY REQUIREMENTS**

To be admitted to the prescribed course of study, candidates must be:

- in possession of at least a Second Class Honours degree from an approved university, in Engineering or Natural Sciences (Physics, Chemistry, or Mathematics majors) or Earth Sciences, and at least one (1) year of relevant industry experience. A candidate applying for registration with a Pass degree may be considered for entry provided the candidate has acceptable petroleum industry experience.
- in possession of an equivalent qualification which will include a combination of academic training and petroleum industry experience and which is acceptable to the Board for Graduate Studies.

A candidate for admission to the Postgraduate Diploma may be required to sit a qualifying examination. Candidates may be restricted by the Department to certain subject areas in the course of study.

### **EXAMINATION**

As follows:

- a) Evaluation in all courses will normally be by coursework and final examination. Candidates will be required to pass both the coursework and the examination components.

### **STRUCTURE OF PROGRAMMES**

Offered both Part-time and Full-time.

- a) Part-time students: - Normally required to complete the written examinations within two (2) years of registration
  - Project should be started at the commencement of the semester following the completion of the written examinations and completed within twelve (12) months.
- b) Full-time students: - Normally required to complete the written examinations within one (1) year of registration
  - Project should be started at the commencement of the semester following the completion of the written examinations and completed within nine (9) months.

### **DURATION OF STUDY**

- a) Part-time students: Maximum of five (5) years.
- b) Full-time students: Maximum of three (3) years.

### **NO. OF CREDITS: 24**

Course Load: The normal load for a part-time student is half that of a full-time student

**COURSE LISTING**

Candidates may select one of the two options below.

- i. Candidates will be required to pursue three (3) of the courses listed below, plus PENG 6023 (Research Methods) and PENG 6024 (independent project).

**OR**

- ii. Candidates may pursue six (6) of the following courses:

Course Code	Course Title	Credits
PENG 6000	Petroleum Geoscience	4
PENG 6001	Advanced Petroleum Geology & Geophysics	4
PENG 6002	Drilling Engineering & Completions	4
PENG 6003	Advanced Drilling Engineering & Well Completions	4
PENG 6004	Advanced Production Engineering & Technology	4
PENG 6005	Reservoir Evaluation	4
PENG 6006	Advanced Well Test Analysis	4
PENG 6007	Reservoir Engineering	4
PENG 6008	Advanced Reservoir Engineering	4
PENG 6010	Improved Oil Recovery	4
PENG 6012	Natural Gas Engineering	4
PENG 6015	Production Engineering	4
PENG 6016	Petroleum Economics & Management	4
PENG 6017	Selected Topics	4

*Note that not all courses listed will be offered in any given year.*

**Postgraduate Diploma in Petroleum Engineering & Management**

Candidates may select one of the two options below.

- iii. Pursue three (3) of the courses listed below and undertake PENG 6023 (Research Methods) and PENG 6024 (independent project)

**OR**

- iv. Pursue six (6) of the following courses:

Course Code	Course Title	Credits
PENG 6002	Drilling Engineering & Completions	4
PENG 6003	Advanced Drilling Engineering & Well Completions	4
PENG 6006	Advanced Well Test Analysis	4
PENG 6007	Reservoir Engineering	4
PENG 6008	Advanced Reservoir Engineering	4
PENG 6009	Strategic Petroleum Management & Organisations	4
PENG 6010	Improved Oil Recovery	4
PENG 6011	Petroleum Economics, Law & Contract Administration	4
PENG 6012	Natural Gas Engineering	4
PENG 6015	Production Engineering	4
PENG 6020	Economic & Quantitative Aids to Decision-Making	4
PENG 6021	Production Planning and Control	4

***Postgraduate Diploma in Petroleum Management***

Candidates may select one of the two options below.

Candidates will be required to pursue three (3) of the following courses, plus PENG 6023 – (Research Methods) and undertake PENG 6024 (Independent Project).

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
PENG 6009	Strategic Petroleum Management & Organisations	4
PENG 6011	Petroleum Economics Law & Contract Administration	4
PENG 6013	Financial Management & Accounting	4
PENG 6018	Petroleum Engineering Research Project	4
PENG 6020	Economic & Quantitative Aids to Decision-Making	4
PENG 6021	Production Planning & Control	4
PENG 6022	Maintenance & Safety Management	4

**OR**

Candidates may pursue six (6) of the above-mentioned courses.

## MPhil Programmes

*MPhil in Petroleum Engineering*

*MPhil in Petroleum Geoscience*

*MPhil in Geoscience*

### THE AIMS AND OBJECTIVES

- To provide innovative solutions to problems associated with Petroleum Engineering and Geoscience, taking economic, technological, environmental and social constraints into consideration.
- To continue to be at the forefront of research aimed at improving the principles, techniques and skills applied to Petroleum Engineering and Geoscience.
- To develop, maintain, and transfer skills, methodologies, learning and critical thinking tools towards the continued improvement in the field of Petroleum Engineering and Geoscience.

### REGULATIONS AND ENTRY REQUIREMENTS

The Regulations for the MPhil in Petroleum Engineering, Petroleum Geoscience or Geoscience are the same as the General Regulations for MPhil, except that candidates applying for registration should normally have either:

- a Bachelor's degree in Petroleum Engineering OR a Diploma in Petroleum Engineering with a Pass with Credit (at least 60%) of The University of the West Indies **OR** an equivalent qualification for MPhil in Petroleum Engineering
- a Bachelor's degree in Petroleum Geoscience, Geoscience, Earth Sciences or Geology **OR** an equivalent qualification for MPhil in Petroleum Geoscience or Geoscience.

Graduates in the fields of Geology/Geophysics and Engineering (other than Petroleum Engineering) may be required to do qualifying examinations to become eligible for entry into the programme unless such a graduate possesses adequate and practical experience in industry, in which case only Departmental examinations will be required.

## PhD Programmes

*PhD in Petroleum Engineering*

*PhD in Petroleum Geoscience*

*PhD in Geoscience*

The aims and objectives follow in accordance with the MPhil Programmes.

### REGULATIONS AND ENTRY REQUIREMENTS

- The appropriate University and Faculty of Engineering Regulations for the degree of Doctor of Philosophy shall apply.
- Candidates applying should normally have either:
  - a Master's degree in Petroleum Engineering of The University of the West Indies or an approved University, **OR** an equivalent qualification for PhD in Petroleum Engineering
  - a Master's degree in Petroleum Geoscience, Geoscience, Earth Sciences, Geology or Geophysics of The University of the West Indies or an approved University **OR** an equivalent qualification for PhD in Petroleum Geoscience or Geoscience.

A candidate may be required to do qualifying examinations to become eligible for entry into the programme unless such a candidate possesses adequate and practical experience in industry, in which case only Departmental examinations will be required.

# DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

## **Research**

Civil Engineering is intimately concerned with what is called the 'Built Environment'. In this regard, it is directed at the provision of facilities that can be used beneficially by the community. Clearly, such facilities condition the process of social and economic development and to a large extent, mirror them. The civil engineering industry is therefore of strategic national and regional importance in the Caribbean. An important aspect of research in the Department is the role of the construction sector in the local national economies.

Because civil engineering works are essentially 'resource hungry' they consume large quantities of materials in their creation, there is a considerable potential for cost savings in the use of materials for construction. One way of achieving this is through more imaginative use of traditional materials. Another is to develop entirely new materials from indigenous sources. Materials research is therefore an area accorded high priority by the Department.

Other areas of priority take account of the special conditions under which civil engineering works are carried out in the Caribbean. This is true of the organisation and management of labour, the techniques of construction, operation, and maintenance of facilities, no less than of the design of systems and the specification of materials. Additional focus is also placed on Hazard Resistant Construction and Coastal Engineering.

The research interests of the Department are thus related directly to the critical needs and interests of the wider community. Towards this end, it seeks to cultivate links with organisations and interest groups outside the University. Research funded by the National Institute of Higher Education Research, Science and Technology (NIHERST), TANTEAK, IDRC and the EU are typical examples. Funds are also obtained from international sources such as the British Council. The facilities provided are good and constantly being improved. There are eight laboratories: Structures, Concrete, Fluid Mechanics, Environmental Engineering, Soil Mechanics, Highway Materials, Geology and Transportation, to which has recently been added a new computing facility.

The main areas of research can be listed as follows:

- Civil Engineering Economics
- Civil Engineering Project Management
- Coastal Engineering and Management
- Computer-aided Engineering & Design
- Disaster Mitigation & Management
- Environmental Engineering
- Materials Engineering
- The Analysis & Design of Foundations
- The Analysis & Design of Hydraulic Systems
- The Analysis & Design of Structures
- Transport Engineering
- Other areas of research related to the Construction programme is indicated in Section 3.5.4.

The Department offers programmes of study by research leading to the MPhil and PhD degrees in Civil Engineering in all its areas of speciality.

## Programmes in Construction Management

### OVERVIEW

The practice of civil engineering involves a series of decisions having to be made on choices from a diverse and complex set of alternatives. Such choices are often interrelated and are usually urgent. These decisions have to be made throughout the life of a project from the basis of the initial conception through the design phase, and material and procedure selection to the construction and commissioning of the completed structure. At any stage, the effectiveness of the whole process can be compromised by poor decision-making.

As a result, a heavy demand is placed upon both the managerial and technical skills of the engineers involved. There has been a continuing tendency for civil engineering projects to become both increasingly large and increasingly complex. This has naturally resulted in the technical and managerial functions not only becoming more difficult but also becoming more important. As a result, there is a continuing need to provide training programmes that upgrade the skills and capabilities of engineers and other construction professionals in modern engineering and managerial techniques. An important secondary objective of the MSc/Diploma programme is to provide this service.

By allowing a wider perspective of engineering technology and economy to be taken, it is anticipated that the quality of engineering management should thereby improve. Emphasis is placed upon the publication and presentation of the results of this research to the widest possible national and international audience. Clearly the spin-off benefits of this programme include enhancing the initiative, creativity and purposeful thinking that are generated in those who participate.

### THE AIMS AND OBJECTIVES

To provide instruction in a range of engineering, economic and managerial subjects that should enable engineers and construction professionals to be better able to deal with the problems that can occur on a construction project.

To improve the decision-making capabilities of engineers and other construction professionals in the region, with a view to improving the efficiency and effectiveness of the whole construction process.

To equip engineers and construction professionals to apply modern knowledge effectively in the real, competitive world of industry, and hence to assist the nations of the regions in their bid for modernisation and development.

To foster the advancement of knowledge through the promotion of research into the problems and opportunities that face the construction sector.

## *Postgraduate Diploma in Construction Management*

### REGULATIONS AND ENTRY REQUIREMENTS

Before registration as a student of the University proceeding to the Postgraduate Diploma in Construction Management, a candidate must have a minimum of one year's appropriate practical experience or equivalent as well as the following:

- i. A first degree or equivalent qualification in Civil, Structural, Construction, Building or Architectural Engineering;
- OR**
- ii. A first degree or equivalent qualification in Architecture or Quantity Surveying or Surveying & Land Information;
- OR**
- iii. An equivalent qualification acceptable to the Faculty of Engineering.

Any candidate for the Diploma may be required to sit an entrance examination and/or complete an introductory/qualifying course before being granted permission to read for the Diploma. In addition, candidates seeking admission under (ii) or (iii) may be restricted to certain subject areas in the Course of Study.

### STRUCTURE OF PROGRAMMES

This programme is offered both as part-time and full-time.

### DURATION OF STUDY

Full-time: Not less than one (1) academic year

Part-time: Not less than two (2) academic years

**NUMBER OF CREDITS REQUIRED**

The Postgraduate Diploma requires 29 credits. The candidate must pass six (6) core courses and one (1) elective course listed below.

**COURSE LISTING****CONSTRUCTION MANAGEMENT****CORE COURSES****SEMESTER 1**

Course Code	Course Title	Credits
COEM 6003	Organization & Management of Construction	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6013	Materials Technology	E4
<b>OR</b>		
COEM 6016	Natural Hazards Management	E4

**SEMESTER 2**

COEM 6025	Practical Team Project	E5
COEM 6005	Construction Project Management	E4

**ELECTIVES****SEMESTER 2**

Course Code	Course Title	Credits
COEM 6015	Maintenance & Facilities Management	E4

***MSc in Construction Management*****MSC (NON-TECHNICAL)**

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng (Hons) undergraduate first degree.

See [www.jbm.org.uk](http://www.jbm.org.uk) for further information.

**REGULATIONS AND ENTRY REQUIREMENTS**

Candidates applying for registration should normally have a minimum of one year's appropriate practical experience or equivalent as well as either:

- iv. A first degree or equivalent qualification in Civil, Structural, Construction, Building or Architectural Engineering;

**OR**

- v. A first degree or equivalent qualification in Architecture or Quantity Surveying or Surveying and Land Information;

**OR**

- vi. An equivalent qualification acceptable to the Faculty of Engineering.

**STRUCTURE OF PROGRAMME**

This programme is offered both as part-time and full-time.

**DURATION OF STUDY**

Full-Time:	Not less than one (1) academic year
Part-Time:	Not less than two (2) academic years

**NUMBER OF CREDITS REQUIRED**

The MSc in construction management requires 41 credits. The candidate must pass seven (7) core courses and one (1) elective course. In addition, they have to successfully complete an Independent Research Project (COEM 6018) of nine (9) credit values. The courses, codes, titles, and the corresponding number of credits are listed below.



**COURSE LISTING****MSC IN CONSTRUCTION MANAGEMENT****CORE COURSES****SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
COEM 6003	Organization & Management of Construction	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6013	Materials Technology	E4
<b>OR</b>		
COEM 6016	Natural Hazards Management	E4

**SEMESTER 2**

COEM 6005	Construction Project Management	E4
COEM 6020	Research Methods	C3
COEM 6025	Practical Team Project	E5

**ELECTIVES****SEMESTER 2**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
COEM 6015	Maintenance & Facilities Management	E4

**OTHER INFORMATION**

1. For the MSc, after completing all taught components of the courses students are required to complete the Independent Research Project (COEM 6018) that has a nine (9) credit value.
2. Students will normally be expected to complete their Independent Research Projects within 12 months of finishing the examinations.
3. *Full-time* students will normally be required to complete all required core and elective courses within two (2) consecutive semesters.
4. *Part-time* students will normally be required to complete all required core and elective courses within four (4) semesters.
5. Students having completed the requirements for the Postgraduate Diploma in Construction Management within the specified period have obtained 29 or more credits and completed the Practical Team Project (COEM 6025) may be granted a Postgraduate Diploma upon request.
6. Candidates pursuing the Postgraduate Diploma can request to use the credits they earned to transfer to the MSc programme in Construction Management, if they wish to do so. Upon the approval of the transfer, these students need to complete all the requirements of the MSc programme as stated above in order to obtain the MSc Construction Management degree.

**SHORT COURSES AND SEMINARS**

1. The Programme in Construction Management may also include Short Courses and/or Seminars on topics of interest to the sector. These are on subjects of topical interest and are organised at various times in response to identified needs and problems.
2. Details of Short Courses and Seminars will be advertised widely and notified to appropriate individuals as and when details are finalised.
3. For further details of the courses and the programme syllabus, or general advice on the programme, please contact the Head, Department of Civil & Environmental Engineering, or the Leader of the Programme.

## ***MPhil, PhD in Construction Engineering & Management and Construction Management***

The Construction Engineering & Management programme also offers programmes of study by research leading to the MPhil and PhD Degrees in Construction Engineering & Management and Construction Management.

### **REGULATIONS AND ENTRY REQUIREMENTS**

*(Please see the latest version of Regulations for Graduate Certificates, Diplomas and Degrees” by Board for Graduate Studies and Research, UWI)*

The regulations for the MPhil in Construction Engineering & Management or Construction Management would require:

1. A minimum GPA of 3.0 or honours degree (Upper Second Class) or its equivalent (unless the Campus Committee in any particular case otherwise decides) in one of the construction-related professions, e.g., Civil Engineering, Building Engineering, Architecture, Quantity Surveying, Planning, Land Surveying, etc.;
2. At least one (1) year of relevant industrial experience;
3. Before completion must have passed a course in Research Methods or equivalent

For the PhD in Construction Management or Construction Engineering & Management programme, the applicant must possess:

1. Approved graduate degrees awarded primarily for research;
2. Taught Master’s degree from the UWI or another approved University, provided that the Masters programme included a research component of at least 25% of the total credit rating and the applicant achieved at least a B+ average or its equivalent;
3. Approval of upgrade application;
4. Such other qualifications and experience as the Board for Graduate Studies and Research may approve;
5. At least one (1) year of relevant industrial experience.

A candidate may be required to sit an entrance examination and/or complete introductory/qualifying courses before being allowed to read for the MPhil or PhD degree.

### **THE PRINCIPAL AREAS OF RESEARCH**

The Principal areas of research are as follows (but not limited to):

- Advanced Construction Materials
- Building Information (BIM) in the Architecture, Engineering, and Construction Industry
- Caribbean Construction Firms and/or Finance
- Construction Management and Administration
- Green Technology Application in Construction
- Information and Communication Technology (ICT) in Construction Engineering and Management
- Infrastructure Technology in Construction Management
- Management of Quality in Construction
- Marine and Offshore Structure Construction
- Project and/or Resource Management
- Rehabilitation, Retrofitting, and Repairing of Existing Construction
- Service-Life Prediction Modeling and Life-Cycle Costing
- Sustainable Construction

## Programmes in Coastal Engineering & Management

Integrated coastal zone management in the wider Caribbean is recognised as the approach for ensuring the survival and sustainable development of the coastal resources of the region. The Coastal Zone Manager needs to have a pool of knowledge and skills that support reliable decision-making for the preservation, enhancement and sustainable development of the coastal zone.

The Graduate Programme in Coastal Engineering and Management in the Department of Civil & Environmental Engineering has two (2) degree offerings:

- i. **Postgraduate Diploma in Coastal Engineering and Management, and**
- ii. **MSc in Coastal Engineering and Management**

### AIMS OF THE PROGRAMME

To provide advanced and specialised knowledge in the field of coastal engineering and management associated with the natural and man-made coastal zone infrastructure.

To equip the graduate with the knowledge of coastal processes and coastal engineering techniques required for the assessment of coastal defence systems and the design of coastal engineering schemes, with particular emphasis on Caribbean conditions.

To produce a graduate capable of developing coastal management plans and management systems.

To produce a graduate capable of implementing and managing new research initiatives.

### COURSE DELIVERY

The course is designed to be delivered weekly face-to-face sessions, group activities, field trips and group design exercises. All course notes are available on the My-eLearning platform, which facilitates ease of delivery.

### REGULATIONS AND ENTRY REQUIREMENTS

A first degree (lower second-class honours minimum) from an approved University in the Natural Sciences, Planning, Civil Engineering, Environmental Engineering, Surveying, Land Information, or

An accredited BTech or HND/Associate Degree in Civil Engineering plus five (5) years related postgraduate experience.

## *Postgraduate Diploma in Coastal Engineering and Management*

### STRUCTURE OF PROGRAMME

Offered both Part-time and Full-time

### DURATION OF STUDY (FOR TAUGHT COMPONENT):

Minimum of two (2) semesters or a maximum of four (4) semesters

### NUMBER OF CREDITS REQUIRED: 28

### Course Listing

#### SEMESTER 1

Course Code	Course Title	Credits
CZEM 6100	Coastal Processes & Hazards	E4
CZEM 6101	Coastal Geomorphology	E4
CZEM 6130	Principles of Coastal Defence, Management and Environmental Assessment	E4
COEM 6016	Natural Hazards Management	E4

#### SEMESTER 2

CZEM 6102	Coastal Zone Metrics	C4
COEM6106	Design of Coastal Structures	C4
CZEM 6112	Coastal Zone Modelling	C4

**MSc in Coastal Engineering & Management****STRUCTURE OF PROGRAMME**

Offered Part-time and Full-time

**DURATION OF STUDY (FOR TAUGHT COMPONENT):**

Minimum of two (2) semesters or a maximum of four (4) semesters

**NUMBER OF CREDITS REQUIRED: 40****Course Listing****SEMESTER 1**

Course Code	Course Title	Credits
CZEM 6100	Coastal Processes & Hazards	E4
CZEM 6101	Coastal Geomorphology	E4
CZEM 6130	Principles of Coastal Defence, Management and Environmental Assessment	E4
COEM 6016	Natural Hazards Management	E4

**SEMESTER 2**

CZEM 6102	Coastal Zone Metrics	C4
CZEM 6106	Design of Coastal Structures	C4
CZEM 6112	Coastal Zone Modelling	C4
COEM 6020	Research Methods	C3

**SEMESTER 3**

CZEM 6108	Research Project	C9
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**SEMESTER 1**

MODULE		PART-TIME	FULL-TIME
CZEM 6100	Coastal Processes and Hazards	Year 1	Year 1
CZEM 6130	Principles of Coastal Defence, Management and Environmental Assessment	Year 2	Year 1
CZEM 6101	Coastal Geomorphology	Year 1	Year 1
COEM 6016	Natural Hazards Management	Year 2	Year 1

**SEMESTER 2**

CZEM 6102	Coastal Zone Metrics	Year 1	Year 1
CZEM6106	Design of Coastal Structures	Year 2	Year 1
CZEM 6112	Coastal Zone Modelling	Year 1	Year 1
COEM 6020	Research methods ( <i>MSc Students only</i> )	Year 2	Year 1

**SEMESTER 3**

CZEM 6180	Research Project ( <i>MSc Students only</i> )	Year 2	Year 1
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## Programmes in Civil and Environmental Engineering

### *Postgraduate Diploma in Civil Engineering*

#### STRUCTURE OF PROGRAMME

Offered both Part-time and Full-time

#### DURATION OF STUDY (FOR TAUGHT COMPONENT):

Minimum of two (2) semesters or a maximum of four (4) semesters

#### NUMBER OF CREDITS REQUIRED: 31

#### CORE SUBJECTS

##### SEMESTER 1

Course Code	Course Title	Credits
CIEN 6001	Advanced Structural Engineering	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6012	Geotechnics in Construction	E4

##### SEMESTER 2

CIEN 6005	Civil Engineering Design Project	C9
COEM 6020	Research Methods	E3

#### OPTIONAL SUBJECTS

Course Code	Course Title	Credits
CIEN 6002	Road Network Conservation	C3
CZEM 6106	Design of Coastal Structures	C4
CIEN 6012	Advanced Transportation Engineering	C4
COEM 6005	Construction Project Management	E4
COEM 6013	Materials Technology	E4
COEM 6015	Maintenance and Facilities Management	E4
COEM 6016	Natural Hazards Management	E4
CIEN 6030	Performance Based Seismic Design	E4

In addition to the listed courses, the Department may approve any other course as an optional subject.

## ***Postgraduate Diploma in Civil with Environmental Engineering***

### **STRUCTURE OF PROGRAMME**

Offered both Part-time and Full-time

### **DURATION OF STUDY (FOR TAUGHT COMPONENT):**

Minimum of two (2) semesters or a maximum of four (4) semesters

**NUMBER OF CREDITS REQUIRED: 31**

### **CORE COURSES**

#### **SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
CIEN 6000	Advanced Environmental Engineering	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6012	Geotechnics in Construction	E4

#### **SEMESTER 2**

CIEN 6005	Civil Engineering Design Project	C9
COEM 6020	Research Methods	E3

### **OPTIONAL SUBJECTS**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
CIEN 6002	Road Network Conservation	C3
CZEM 6106	Design of Coastal Structures	C4
CIEN 6012	Advanced Transportation Engineering	C4
COEM 6005	Construction Project Management	E4
COEM 6013	Materials Technology	E4
COEM 6015	Maintenance and Facilities	E4
COEM 6016	Natural Hazards Management	E4

In addition to the listed courses, the Department can approve any other course as an optional subject.

## MSc Programmes

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng (Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree.

See [www.ibm.org.uk](http://www.ibm.org.uk) for further information.

There are two (2) degrees offered in this programme:

- (i) **MSc in Civil Engineering**
- (ii) **MSc in Civil with Environmental Engineering**

### THE AIMS AND OBJECTIVES

- a) To extend existing engineering and science knowledge beyond the level covered at the BSc Honours Degree level and to move to a professional, Master's output.
- b) To widen existing engineering and science knowledge and to include areas not covered in the BSc Honours Degree level.
- c) To develop the skills required for team-working (and, for CEng, leadership), social and business awareness, through further studies, such as law, finance, management, risk assessment and environmental issues.
- d) To gain experience of team-working, ideally with cross-disciplinary elements, integrating topics covered in the BSc level and centered on real professional and business issues.

### REGULATIONS AND ENTRY REQUIREMENTS

There are four routes offered for admission to the programmes:

1. **Route 1** provides for 4 continuous years of study leading to the award of the BSc Honours and the MSc Degrees. Applicants must have successfully completed the 3-year BSc Honours Degree programme in three (3) years, attaining a minimum of 55 % weighted average across the three (3) years (GPA of 2.5).
2. **Route 2** provides for successful completion of the BSc Honours Degree and pursuit of the MSc Degree after one (1) year of Initial Professional Development in civil engineering practice. This would give the student an opportunity to better understand the learning outcomes of BSc Honours Degree before proceeding to the MSc.
3. **Route 3** provides for successful completion of an unaccredited BEng or BSc in Civil Engineering or related engineering degree and pursuit of the MSc Degree after one (1) year of Initial Professional Development in civil engineering practice. Acceptance is subject to a successful Academic Assessment with the Institution of Civil Engineers (ICE) at the Incorporated Engineer (IEng) level [<https://www.ice.org.uk/my-ice/my-membership/aqp>].
4. **Route 4** provides for successful completion of a BAsC in Civil Engineering and pursuit of the MSc Degree after successful completion of final year BSc courses (CVNG 3005 - Foundation Engineering and CVNG 3002 - Structural Analysis with a B+). Additionally, the candidate must have two (2) year of Initial Professional Development in civil engineering practice.

An MSc candidate in Civil Engineering must normally have a BSc Civil Engineering Honours Degree and those for the MSc Civil with Environmental Engineering Degree must normally have a BSc Civil with Environmental Engineering Honours Degree, or an equivalent qualification.

A candidate for any MSc degree must normally pass a course in Research Methodology.

### STRUCTURE OF PROGRAMMES - OFFERED PART-TIME

It is an evening programme with lectures and tutorials being delivered face-to-face between 4:00 pm and 8:00 pm on weekdays.

#### Duration of Study

Minimum of three (3) semesters or a maximum of six (6) semesters.

Students failing to complete all course requirements for the MSc programme within the specified period but have obtained 28 or more credits may be granted a Post Graduate Diploma in Civil Engineering or Civil with Environmental Engineering upon request. Students who are awarded the post graduate diploma shall not be able to apply any of these credits for earning the MSc in Civil Engineering and /or MSc in Civil with Environmental Engineering.

**CREDITS**

**Credits for the postgraduate diploma shall comprise the following:**

1. Twenty-eight (28) credits from the core courses; AND
2. At least three (3) or four (4) other credits from the list of optional courses (or any other course approved by the Head of Department)

**No. of Credits required: 40 or 41**

The credits required to complete the programme are dependent on the electives chosen. The Semester 1 workload is 16 credits, Semester 2 has 15 or 16 credits and Semester 3 (May to July) has 9 credits.

***MSc in Civil Engineering – Course Listing***

Candidates are required to select one (1) optional subject in Semester 2.

**CORE COURSES****SEMESTER 1**

Course Code	Course Title	Credits
CIEN 6001	Advanced Structural Engineering	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6012	Geotechnics in Construction	E4

**SEMESTER 2**

CIEN 6005	Civil Engineering Design Project	C9
COEM 6020	Research Methods	E3

**OPTIONAL SUBJECTS**

Course Code	Course Title	Credits
CIEN 6002	Road Network Conservation	C3
CZEM 6106	Design of Coastal Structures	C4
CIEN 6012	Advanced Transportation Engineering	C4
COEM 6005	Construction Project Management	E4
COEM 6013	Materials Technology	E4
COEM 6015	Maintenance and Facilities Management	E4
COEM 6016	Natural Hazards Management	E4
CIEN 6030	Performance Based Seismic Design	E4

In addition to the listed courses, the Department may approve any other course as an optional subject.

**SEMESTER 3 (May-July)**

Course Code	Course Title	Credits
COEM 6018	Research Project	C9

***MSc in Civil with Environmental Engineering - Course Listing***

Candidates are required to select one (1) optional subject in Semester 2.

**CORE COURSES****SEMESTER 1**

Course Code	Course Title	Credits
CIEN 6000	Advanced Environmental Engineering	E4
COEM 6006	Construction Accounting & Finance	E4
COEM 6009	Contracts Management & Construction Law	E4
COEM 6012	Geotechnics in Construction	E4

**SEMESTER 2**

Course Code	Course Title	Credits
CIEN 6005	Civil Engineering Design Project	C9
COEM 6020	Research Methods	E3



**OPTIONAL SUBJECTS**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
CIEN 6002	Road Network Conservation	C3
CZEM 6106	Design of Coastal Structures	C4
CIEN 6012	Advanced Transportation Engineering	C4
COEM 6005	Construction Project Management	E4
COEM 6013	Materials Technology	E4
COEM 6015	Maintenance and Facilities	E4
COEM 6016	Natural Hazards Management	E4

In addition to the listed courses, the Department can approve any other course as an optional subject.

**SEMESTER 3 (May-July)**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
COEM 6018	Research Project	C9

# DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

## **General**

The Department of Electrical and Computer Engineering (<http://sta.uwi.edu/eng/electrical>) offers taught postgraduate programmes leading to the award of a Master of Applied Science (MAsc) and a Postgraduate Diploma in Electrical & Computer Engineering. These programmes are conducted in four (4) major subject areas: Communication Systems, Control Systems, Energy Systems and Integrated Systems.

The Department also offers programmes of study and research leading to MPhil and PhD degrees in Electrical & Computer Engineering. Departmental research activities are conducted in the extended areas: Communication Systems, Computer Systems Engineering, Control Systems, Electronic Systems and Energy Systems.

## **Subject Areas for Study and Research**

### **COMMUNICATION SYSTEMS (MASC, PG DIPLOMA, MPHIL AND PHD)**

Research in the Communication Systems Group is primarily focused around three application spaces: biomedical engineering, emergency communications and inclusive connectivity. Keen focus areas in biomedical engineering include the application of artificial intelligence and communications to body-centric communication networks (BCC), stochastic fading bioimpedance and channel estimation for organic communications in health, wellness, and agriculture; biomedical sensors using microwave and mmWave systems; internet of bio-things and nano-communication technologies, and related simulations on multiple platforms. Research in generative AI focusses on applications and policy in medical agriculture, cybersecurity, digital twins, and engineering education areas. Research activity in emergency communications is focused on the efficacy of the communications function in disaster management (preparation, response, mitigation) and investigation of approaches to improve such in different context; alongside a range of analytical studies including models for communication links in emergency management simulation. Action research in inclusive connectivity is interdisciplinary, covering the intersection of technology, policy, regulation and development studies, with an emphasis on appropriate technologies and the enabling environment for affordable and accessible telecommunications for all. Other research in the Communication Systems Group addresses the performance evaluation of multiservice traffic over heterogeneous access networks, queue management, infinitesimal perturbation analysis in stochastic flow models and of fluid queues under various conditions, network and application performance studies of wired and wireless high-speed, multiservice networks, as well as cognitive, semantic related technologies for productivity enhancement. The Communication Systems group is regularly represented in consultations, working groups and other forms of advisory capacities on the national, regional and international levels in communications.

### **COMPUTER SYSTEMS (MPHIL AND PHD)**

Research in Computer Systems Engineering is carried out in the areas of computer architecture and organisation, advanced computer architecture, microprocessor and microcontroller-based hardware and software design, design of application specific parallel architectures, embedded systems, supercomputer technologies, image processing and artificial intelligence and robotics.

### **CONTROL SYSTEMS (MASC, PG DIPLOMA, MPHIL AND PHD)**

Automation, control, and instrumentation theory is necessary to measurement and product quality control. Control Systems plays a vital role in regulating machines and processes to close tolerances. The Control Systems Group conducts research in artificial intelligent and multi-agent systems, focusing on their decision making, reasoning capability, the feedback loop's controllability and stability. Their work involves developing algorithms and methodologies to enhance the robustness and adaptability of any autonomous system. This research contributes to advancements in various industries, from manufacturing to robotics, ensuring that complex systems operate reliably and meet stringent performance standards.

### **ELECTRONIC SYSTEMS (MPHIL AND PHD)**

Research in this area involves the design and testing of new analogue circuit configurations using operational amplifiers and linear integrated circuits. Other areas under investigation include the design and application of a new form of transconductance amplifier, the use of current feedback techniques in small and large signal design and the evaluation of current conveyors and their comparison with operational amplifiers in the design of voltage amplifiers, filters, multiphase oscillators and gyrators.

**ENERGY SYSTEMS (MASC, PG DIPLOMA, MPHIL AND PHD)**

Research in Energy Systems is related to real operating and planning problems encountered in the industry. Emphasis is placed on special problems related to peculiarities of small, isolated systems as obtained in all the Caribbean countries. The Energy Systems Group conducts research in electricity generation, with renewable and conventional sources, and its transmission and distribution. Current research activities include consideration of the effects of large loads, such as arc furnaces, on the system operation and the life span of equipment; simulation of various electromechanical and electromagnetic transient phenomena; introduction of wind energy systems to a grid; linear and non-linear optimisation problems as applied to power systems and design and simulation of power electronic drives. The Group additionally conducts research in the application of power electronics to electrical drive systems.

Research is being conducted in the electronic control of machines and drives where induction motors are being controlled using rotor field-oriented control and digital signal processing methods. Electro-magnetic interference and radio frequency interference problems are being studied as well as power factor correction in the presence of harmonics.

**INTEGRATED SYSTEMS (MASC, PG DIPLOMA)**

The Electronic Systems and Computer Engineering Systems groups conduct research in the development and application of Integrated Systems involving the complex interaction of electronic and computer sub-systems in real-world applications. This combination is becoming increasingly important and has encouraged the Department to introduce a major in Integrated Systems. Research in this area involves the design and testing of new analogue circuit configurations using operational amplifiers and linear integrated circuits. Other areas under investigation include the design and application of a new form of transconductance amplifier, the use of current feedback techniques in small and large signal design and the evaluation of current conveyors and their comparison with operational amplifiers in the design of voltage amplifiers, filters, multiphase oscillators and gyrators.

These areas of research are combined in areas of computer architecture & organisation, advanced computer architecture, microprocessor/microcontroller-based hardware & software design, design of application specific parallel architectures, embedded systems, supercomputer technologies, image processing, artificial intelligence and robotics.

## Programmes in Electrical and Computer Engineering

Accredited by the Institution of Engineering and Technology (IET) of the UK to the level of Partial CEng (Further Learning).

The Department offers two (2) Master's level programmes: **Master of Applied Science (MASC) in Electrical Computer Engineering**; and the **Postgraduate Diploma in Electrical and Computer Engineering**.

The MASC and Diploma in Electrical and Computer Engineering are offered with Majors in four (4) subject areas: Communication Systems, Control Systems, Energy Systems and Integrated Systems.

### **Entry Requirements**

The minimum requirements for entry into the MASC and Postgraduate Diploma Programmes are:

1. BSc (Hons) in Electrical and/or Computer Engineering
2. BSc (Hons) in Mechanical Engineering
3. BSc (Hons) in Applied Physics majoring in Electronics
4. Other such qualifications deemed equivalent to any of the above (1, 2, 3) by the Faculty.

Only candidates with qualifications under categories 1 or 2 above or equivalent are eligible for entry into the MASC Energy Systems option.

Candidates with a BSc Third Class (Hons) Degree in Electrical and Computer Engineering may be considered eligible for entry into the taught postgraduate programmes, subject to an evaluation of the BSc degree and relevant post-degree industrial experience.

All students who seek entry under categories 2, 3 and 4 may be required to pursue qualifying courses as determined by the Head of Department and undertake examinations in these courses. Normally, the qualifying courses will not exceed twelve (12) credits. For further information all students should consult [the Board for Graduate Studies and Research Regulations for Graduate Diplomas and Degrees](http://sta.uwi.edu/admissions/postgrad/downloads.asp) at: <http://sta.uwi.edu/admissions/postgrad/downloads.asp>

### **Credit Requirements**

#### **Postgraduate Diploma in Electrical and Computer Engineering**

The Diploma will be awarded to students who pass twenty-one (21) credits of courses approved by the Department. Students will be required to select a major subject area and must register for five (5) courses listed as core for that major and the compulsory course ECNG 6709 - Business Management. The remaining credits may be obtained from any of the other postgraduate courses offered by the Department or from other Departments within the Faculty and approved by the Head of Department.

Candidates pursuing the Postgraduate Diploma may transfer to the MASc programme in Electrical and Computer Engineering by seeking approval from the Head of Department. Students are only allowed to transfer a maximum of eighteen (18) credits from the Postgraduate Diploma to the MASc in Electrical and Computer Engineering programme.

### **Master of Applied Science in Electrical and Computer Engineering**

#### **AIMS AND OBJECTIVES**

The overall aim of the primary taught postgraduate award, the Master of Applied Science (MASc), is to provide advanced exposure to the breadth and depth of Electrical and Computer Systems and technologies, as well as pertinent Engineering Practice, thereby enabling graduates to demonstrate technical and commercial leadership. This is accomplished by improving business management and general research skills and facilitating the development of subject-specific skills and knowledge levels using existing and emerging technologies. Through this Programme, the Department also aims to make a significant contribution to the pool of professional and technological resources available locally and regionally to support associated industry, teaching and research in locally and regionally-relevant Electrical & Computer Engineering-based areas.

The Learning Objectives of the Master of Applied Science (MASc) in Electrical & Computer Engineering programme are to:

1. Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology.
2. Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.
3. Provide technical and commercial leadership.
4. Demonstrate effective interpersonal skills.

Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.

The MASc in Electrical and Computer Engineering will be awarded to students who obtain a minimum of 36 credits as follows:

Taught Courses	24 credits
Progress Report	4 credits
MASc Project	8 credits

Twenty-four (24) credits must comprise five courses from any of the majors, two compulsory courses (ECNG 6709 and ECNG 6710) and an elective.

Candidates must pass both the written examination and the course work component with at least a 50% mark to be credited with a Pass

#### **DURATION OF STUDY**

Both the Diploma and MASc programmes are offered in full-time and part-time modes. Part-time students are normally expected to complete the requirements of taught courses in four (4) semesters. Full-time students are normally expected to complete the requirements of taught courses in two (2) semesters. Students must successfully complete taught courses (24 credits) before they proceed to the project stage.

MASc students having satisfied the requirements for the Postgraduate Diploma in Electrical and Computer Engineering within the specified period may be granted the Postgraduate Diploma upon request.

**MASC PROJECT**

The MASC Project must be conducted in the area of the selected major.

- a) Students who have completed the taught course requirements and are approved to proceed to the project phase **MUST** register for the following courses:  
 ECNG 6021 MASC Research I – 4 credits, **MUST PASS** to continue to  
 ECNG 6022 MASC Research II – 0 credits, followed by  
 ECNG 6023 MASC Project – 8 credits

Students can register for these courses in any semester. ECNG 6022 registration is only required if the student requires more than one semester to complete the research project [refer to (c) below]. **Students are not allowed to register for ECNG 6021, ECNG 6022 and ECNG 6023 simultaneously.**

- b) Project Selection  
 Prior to registration in ECNG 6021, proposals for MASC projects must be submitted to the Department via the Postgraduate Portal for approval. Students should consult the MASC Project Guide or the Department website for further details.

Students, who have made substantial progress in their work in ECNG 6021, can take up an accelerated path **with approval from their supervisor** and hence can register for ECNG 6022 and ECNG 6023 in the second semester of the project phase.

- c) Examination of Project Components  
 First and second examiners for each student project will be appointed by the Head of Department upon recommendation from the Postgraduate Coordinator immediately following the submission and approval of the project proposal.

ECNG 6021 will be examined by way of an interim report submitted by the student and examined by the first and second examiners. ECNG 6023 will be examined by way of a final report submitted by the student and examined by the first and second examiners. Evaluation of ECNG 6023 may include a demonstration, report presentation and oral examination led by a panel comprising the first examiner, second examiner and a moderator if deemed necessary by supervisor(s).

Students who fail ECNG 6021 on the first attempt will be deemed to have failed the programme and will be asked to withdraw. As recognition of the work completed in the MASC Programme, these students may request a Postgraduate Diploma Degree. Students who fail ECNG 6023 will be allowed one final opportunity to pass the course.

- d) Students who wish to pursue their ECNG 6023 – MASC Project during Semester III (summer period), must seek approval from their supervisor before registering for their project.
- e) Students who wish to pursue their ECNG 6023 – MASC Project during Semester III (summer period), must seek approval from their supervisor before registering for their project.

**COURSE LISTING FOR THE MASC AND DIPLOMA PROGRAMMES****PREREQUISITE COURSES**

Each major has a list of prerequisite BSc level courses. Prerequisites may be waived based on qualification and experience. Otherwise, candidates will be required to complete the relevant prerequisites as qualifying or departmental courses, as determined by the Head of Department. Students may opt to register for electives other than those listed for the selected major.

**COMPULSORY COURSES (FOR ALL MAJORS)**

Course Code	Course Title
ECNG 6710	Research Methods
ECNG 6709	Business Management

**COMPULSORY COURSE (FOR ALL DIPLOMAS)**

Course Code	Course Title
ECNG 6709	Business Management

**PREREQUISITE COURSES:**

ECNG 3021 or equivalent undergraduate course of study.

**MAJOR IN COMMUNICATION SYSTEMS**

**CORE COURSES:**

Course Code	Course Title
ECNG 6700	Stochastic Processes
ECNG 6701	Data Communication Networks
ECNG 6703	Principles of Communication
ECNG 6704	Performance Engineering of Computer Communication Systems
ECNG 6708	Transmission Systems

**PREREQUISITE COURSES:**

Course Code	Course Title
ECNG 3001	Communication Systems II
ECNG 3002	Data Communication Systems
ECNG 3003	Telecommunication Networks

**MAJOR IN CONTROL SYSTEMS**

**CORE COURSES:**

Course Code	Course Title
ECNG 6600	Real Time Systems
ECNG 6603	Modern Control Strategies
ECNG 6604	Linear Control Systems
ECNG 6605	Distributed Computer Control
ECNG 6711	Adaptive Control

**PREREQUISITE COURSES:**

Course Code	Course Title
ECNG 3004	Control and Instrumentation II
ECNG 3032	Control and Instrumentation I

***Major in Energy Systems***

**CORE COURSES:**

Course Code	Course Title
ECNG 6500	Computer Aided Power Systems Analysis
ECNG 6503	Advanced Power System Protection
ECNG 6504	Electrical Drives & Industrial Power Systems
ECNG 6505	Surge Phenomena & Insulation Coordination
ECNG 6509	Switchgear & Transformer Technology

**PREREQUISITE COURSES:**

Course Code	Course Title
ECNG 3008	Power Electronic Circuits
ECNG 3010	Electrical Machines & Drive Systems
ECNG 3012	Power Systems Analysis
ECNG 3015	Industrial & Commercial Electrical Systems

***Major in Integrated Systems***

**CORE COURSES:**

Course Code	Course Title
ECNG 6600	Real Time Systems
ECNG 6601	Digital Electronic Systems
ECNG 6605	Distributed Computer Control
ECNG 6613	Database Systems Principles and Design
ECNG 6614	Multiprocessor Systems

**PREREQUISITE COURSES:**

Course Code	Course Title
ECNG 3006	Microprocessor Systems: Design and Applications

### ***MPhil and PhD Degrees in Electrical and Computer Engineering***

The Department also offers programmes of study and research leading to the MPhil and PhD degrees in Electrical and Computer Engineering. Departmental research activities are conducted in the extended areas: Communication Systems, Computer Systems Engineering, Control Systems, Electronic Systems and Energy Systems. A Research Methods course approved by the Department must be completed for MPhil and PhD Research Degrees.

#### **TIME LIMITS FOR REGISTRATION**

##### **MPhil**

The minimum period of registration for an MPhil candidate is two years full-time and maximum three years. For a part-time candidate, the minimum registration period is four years and the maximum five years.

Students enrolled for the MPhil degree must satisfactorily complete at least two research seminars prior to submission of the MPhil thesis.

##### **PhD**

The minimum period of registration for a PhD candidate is three years full-time and maximum five years. For a part-time candidate, the minimum registration period is five years and the maximum seven years.

Students enrolled for the PhD degree must satisfactorily complete at least three research seminars prior to submission of the PhD thesis.

For further information, please refer to the [Regulations for Graduate Diplomas and Degrees](#).

# DEPARTMENT OF GEOMATICS ENGINEERING & LAND MANAGEMENT

## Research

The Department has **ten (10)** academic staff members involved with three taught postgraduate programmes in addition to MPhil and PhD research degrees. The taught programmes are MSc Geoinformatics, MSc Urban and Regional Planning, and Post Graduate Diploma in Land Administration.

The Department's research expertise is established in the ability to understand, capture, and visualise spatio-temporal phenomena and processes to provide reliable management options for decision-makers to achieve sustainable development.

These objectives are achieved by using surveying, mapping, monitoring, modelling and spatial analysis tools and techniques. Cutting edge technology is being utilised in the research such as global positioning systems, satellite remote sensing and GIS. The other side of the approach is in the field of physical planning and development associated with policy planning, strategic and development planning, coastal zone planning and development control.

Priority areas and new themes of research have been identified with focus on geomatics engineering, geodesy, land administration, spatial analysis, geoinformatics, spatial and settlements planning, the environment, and ecosystems. The following are some topics of immediate concern:

- Mapping and modelling of land cover/use dynamics for the sustainable management of the environment and natural resources.
- Extraction of spatial information from aerial and satellite Imagery and LIDAR.
- Coastal zone management and modelling coastal changes for sustainable development.
- Comparative analysis of planning statutes and administrative structures in the Caribbean.
- Design for sustainable development of urban and other settlement areas, environmental planning and policy planning.
- Urban structure and urban form in the Caribbean.
- Climate change adaptation for coastal cities in the Caribbean.
- Community and participatory planning.
- Non-structural measures for hazard mitigation.
- Formulation and definition of national datums.
- Geohazards; flooding and landslides, developing plans for areas exposed to natural and human-made hazards.
- Global climate change, climate change and food security, sea level change.
- Land tenure rights and practices including family land in specific jurisdictions.
- Quality assurance of geospatial data and the development of standards for spatial data dissemination.
- Relevant theory and methodology for Caribbean Planning and Resource Management.

Resources for research include automated field and GPS data recording and computation systems, photogrammetric and satellite image processing and analysis tools, GIS and mapping hardware and software, in addition to state-of-the-art computing and digital services facilities.

## MPhil in Surveying & Land Information

## MPhil in Geoinformatics

## MPhil in Urban and Regional Planning

### REGULATIONS

The Regulations for the MPhil in Surveying and Land Information, MPhil in Urban and Regional Planning, and MPhil in Geoinformatics are the same as the General Regulations for the MPhil, except that candidates applying for registration should normally have either:

- (a) A Bachelor's degree with Second Class Honours in Surveying & Land Information/Geomatics;  
**OR**
- (b) An equivalent qualification suited to the fields of Urban & Regional Planning or Geoinformatics.



## PhD in Surveying & Land Information

## PhD in Geoinformatics

## PhD in Urban and Regional Planning

### REGULATIONS

The Regulations for the PhD in Surveying and Land Information, Geoinformatics and in Urban and Regional Planning are the same as the University and Faculty of Engineering regulations for the Degree of Doctor of Philosophy except that candidates applying should normally have either:

- (a) An MPhil Degree in Surveying and Land Information/Geomatics, Geoinformatics or Urban and Regional Planning of The University of the West Indies;

**OR**

- (b) A Master's Degree by Research in Geomatics, Urban & Regional Planning or Geoinformatics of an approved University.

### *MPhil/PhD Degree in Geoinformatics*

The aim of the MPhil and PhD in Geoinformatics programme is to meet the growing needs of the Caribbean region for high-level critical thinkers who will be able to undertake research and development necessary to support sustainable development efforts of the region. The study programme for MPhil/PhD in Geoinformatics provides students with the knowledge and understanding for:

- Critical assessment and understanding of the manipulation and analysis of spatial information.
- A systematic approach to analysing and solving spatial problems using a range of appropriate strategies and specific techniques.
- Understanding of the main issues surrounding data requirements, quality, analysis, and management of spatial data embedded economic, political, social and legal structures create social barriers affecting their wider use.
- Understanding of design, management, and logistical Issues in Enterprise GIS development.

### *MPhil/PhD Degree in Urban and Regional Planning*

Urban and regional planning is the profession that deals with the understanding and management of land use in the hierarchy of urban and regional settlements and the spatial relations of human activities. It is an interdisciplinary science that deals with the physical, environment, social, economic, and cultural aspects of human settlements in both urban and rural areas. The study programme for MPhil/PhD in Urban and Regional Planning provides students with the knowledge and understanding of:

- Comparative international theory and practice of urban and regional planning.
- Caribbean urban history and settlements structures.
- The Caribbean's natural resource base as islands and implications for economic development in sectors such as industry, tourism, agriculture, forestry, and sustainable development.
- The legal and administrative structure governing Caribbean urban and regional planning and management including development planning and the regulation of land use and built development.
- The manipulation and analysis of spatial data and information as part of research and policy formulation.

### *Postgraduate Diploma/MSc in Urban and Regional Planning*

#### INTRODUCTION

The MSc Urban and Regional Planning Programme is driven by the need to produce a cadre of planning professionals with a tailored education and training in Caribbean planning issues, which are distinct from other regions of the world by virtue of population dynamics, economic evolution, social problems, and unique physical environment. The programme focuses on the evolution of theoretical perspectives on physical planning, especially with a developing country planning epistemology, it aims to equip the graduate with knowledge associated with policy planning, strategic and development planning, physical planning and design, as well as development control in areas of development relevant to the Caribbean region.

#### AIMS AND OBJECTIVES

##### Aims

- a. To provide general and specialised knowledge in the field of physical planning with respect to theory, methodology, analysis, and applications.
- b. To equip the graduate with the knowledge for a profession in the field of urban and regional planning, associated with policy planning, strategic and development planning, physical planning and urban design, coastal zone planning, environmental planning, as well as development control.
- c. To produce a graduate capable of developing appropriate plans for communities and settlements, open areas, coastal zones, protected areas, areas exposed to natural and man-made hazards, and other areas where development occurs, or areas which are subjected to protection, conservation, or any other special treatment.

- d. To produce a graduate capable of managing the implementation and monitoring of policies and plans.

#### **Objectives**

- (i) The core courses are intended to fulfil the following objectives:
- To provide students with full understanding of planning as a discipline, the philosophical basis of planning, and the major theoretical and analytic developments in the field.
  - To cover the methods and procedures for making plans for physical development, be it for the public or private sector, at the national, regional, local or site level.
  - To equip students with a reflective and insightful understanding of the social and environmental conditions of human settlements and spatial development and change.
  - To equip students with an understanding and knowledge of implementing policies, strategic and development plans, physical and urban design plans, as well as development control measures.
- (ii) To understand and evaluate the impact of development.
- The electives provide the basis for students to acquire a measure of skills mix, as well as the background for further work, research and development.

#### **Learning Outcomes**

As a result of the course content and instruction graduates should be able to:

- Demonstrate the ability to respond effectively to unfamiliar problems in unfamiliar contexts.
- Formulate and propose incisive and innovative policies, strategies, and courses of action as responses to a variety of planning problems, transforming existing systems and not simply function within an ineffective one.
- Synthesise and Integrate data from various sources and to identify the contexts in which the various data types are appropriate.
- Describe the genesis and function of planning in society.
- Apply the history and theory of planning in relation to social and economic structures, including, but not limited to, such characteristics as income, race, ethnicity, and gender.
- Understand the ethics of professional practice and behaviour, including the relationship to clients and the public, and the role of citizens in a democratic society.
- Interpret case laws relevant to the field of urban and regional planning and application of these laws to realistic hypothetical situations.
- Conceptualise problems from complex, real-world situations so that the problems are meaningful to clients and are research worthy.
- Apply statistical and other analytic techniques, as well as computer methods, to define planning problems, generate alternatives, and evaluate their consequences. Use census data to inform policy formulation.
- Effectively and fluently communicate a wide variety of planning information, ideas, principles, arguments and proposals through well-prepared written, graphic, oral and electronic means, and demonstrate effectively and fluently written, numeric, oral, IT and information literacy skills.
- Work effectively as members and leaders of planning teams, and to apply an understanding of interpersonal and group dynamics to assure effective group action.
- Interpret case laws relevant to the field of urban and regional planning and application of these laws to realistic hypothetical situations.
- Exhibit an excellent level of understanding of the complexities of planning issues and problems especially the complexities of planning within the Caribbean context, with regards to space, ecology, resources and susceptibility to natural disasters.
- Demonstrate originality and flair in the treatment and exposition of the subject matter, making excellent connections between the different areas of the curriculum
- Work very well individually and in groups, demonstrating high levels of initiative, autonomy and leadership
- Exhibit a sensibility in formulating interventions that reflect an understanding of place-specific socioeconomic, political, and cultural circumstances.

The programme offers a wide range of courses that allows the student to pursue individual specialisations, progress to employment within the field and to embark on advanced study within planning, including MPhil/PhD research.

**ENTRY REQUIREMENTS**

Applicants for the MSc Urban and Regional Planning should have:

- (i) at least a Second-Class Bachelor's Degree in a related area from a recognised institution, or
- (ii) a combination of maturity, training and professional experience acceptable to the Faculty. A typical applicant would have a previous degree gained in Urban and/or Regional Planning, Surveying/Geomatics, Natural Sciences, Engineering, Geography, Architecture, Sociology, Economics, Political Science, Management and Law.

**QUALIFYING STUDENT**

An applicant not considered suitable for direct admission may be admitted as a qualifying student, up to one year. The structure of study will be designed to suit the needs of the individual student.

**TRANSFER OF CREDITS**

Up to six (6) credit hours of coursework taken prior to enrolment in the Master's programme, whether at this university or another, may be counted towards the Master's degree, if the Head of Department formally approves acceptance of these courses. Prior to the approval, the advice from the Programme Coordinator should be sought.

**STRUCTURE OF PROGRAMME**

Offered part-time and full-time

- (a) Part-time students: - Normally required to complete the coursework and written examinations within six (6) semesters of registration. Project should be started at the commencement of the semester following the completion of the written examinations and completed within nine (9) months.
- (b) Full-time students: - Normally required to complete the coursework and written examinations within three (3) semesters of registration. Project should be started at the commencement of the semester following the completion of the written examinations and completed within six (6) months.

**NB The normal load for a part-time student is half that of a full-time student.**

**DURATION OF STUDY**

Part-time students: Must normally complete the programme within ten (10) semesters.

Full-time students: Must normally complete the programme within eight (8) semesters.

**NO. OF CREDITS REQUIRED: 39**

Core courses	18 credits
Elective courses	9 credits
Research Project	12 credits

**EXAMINATION**

- (a) Evaluation may take one of the following modes: (1) coursework only, normally applied for studio work, (2) combination of coursework and final examination, and (3) final examination. In the case of combination, candidates will be required to pass both the coursework and examination.
- (b) In MSc Research Project evaluation will be on the report. Candidates may also be orally examined. They will in addition be required to present at least one acceptable seminar.
- (c) A full-time candidate who fails not more than two courses, or a part-time candidate who fails not more than one course in a semester may be allowed to repeat such courses if the Board of Higher Degrees so decides.
- (d) A full-time candidate who fails more than two courses, or a part-time candidate who fails more than one course in a semester, will normally be required to withdraw from the programme.

**AWARD OF DEGREE**

The MSc in Urban & Regional Planning will be awarded on successful completion of all courses and the Research Project.

**COURSE LISTING - MSC URBAN & REGIONAL PLANNING****CORE COURSES**

Course Code	Course Title	Credits
PLAN 6000	Philosophy & Principles of Planning	3
PLAN 6001	Planning Practice Law and Ethics in the Caribbean	3
PLAN 6002	Graphic and Design Studio	3
PLAN 6003	Design for Development	3
PLAN 6004	Planning Analysis and Evaluation	3
PLAN 6024	Research Methods	3
PLAN 6030	Research Project (MSc Urban and Regional Planning Only)	12

**ELECTIVE COURSES:**

Course Code	Course Title	Credits
PLAN 6005	Urban Design	3
PLAN 6006	Sustainable Housing and Settlements Planning	3
PLAN 6007	Community and Participatory Planning	3
PLAN 6008	Tourism Planning	3
PLAN 6009	Transportation Planning	3
PLAN 6011	Planning in the Coastal Zone	3
PLAN 6012	Professional Planning Internship	3
PLAN 6014	SIDS Resource Management	3
PLAN 6025	Independent Study in Urban and Regional Planning	3
TOUR 6040	Sustainable Tourism Management	3
TOUR 6002	Tourism Destination Management	3
TOUR 6003	Tourism Policy and Strategy	3
GINF 6100	Principle of Geoinformatics	3

***Postgraduate Diploma in Land Administration***

This programme was developed to address the reform of the policies, procedures, statutes, and institutions involved in Land Administration and Management throughout the Caribbean. This programme is a response to the need to maintain and strengthen the human resources employed in land administration and land management in key institutions of the state, and private quasi-state sectors.

**AIMS AND OBJECTIVES**

- Provide specialised training in Land Administration Management to key public, quasi-state and private sector professionals.
- To enhance the existing process of reform in Land Administration in the public sector.
- To enhance the Department's capability in offering training in the broader area of Land Studies and Land Management in keeping with the Department's strategic plan.

**LEARNING OUTCOMES**

The graduate of the programme will be able to:

- Synthesise the form and function of optimum land administration systems.
- Evaluate existing components of a land administration system and recommend reform.
- Research innovative concepts in land administration and apply them to specific environments with specific needs.

**ENTRY REQUIREMENTS**

The main condition for entry would be a relevant first degree and relevant industrial experience or maturity and professional experience acceptable to the Faculty. Present entry requirements for either MSc Planning and Development or MSc Geoinformatics would also be acceptable. The target groups are:

- Public officials nominated by sponsoring institution.
- Professionals: Surveyors, engineers, planners, geographers, agriculturalists, natural and social scientists interested in the area of Land Administration and Management.
- Individuals interested in upgrading their skills on a course-by-course basis.

**STRUCTURE OF PROGRAMME**

The programme will be delivered in six (6) short intensive instructional periods each approximately one week of whole day lectures, tutorial demonstrations and lab/field exercises. There will be a full-time, three-week period when students will work on their special projects towards the end of the cycle.

**DURATION OF STUDY**

Twelve (12) months.

**COURSE LISTING**

Students are required to complete the following courses:

Course Code	Course Title	Credits
LAND 5000	Introduction to Land Administration	E3
LAND 5002	Land Economy & Property Management	E3
LAND 5003	Land Law	E3
LAND 5004	Land Information Management	E3
LAND 5006	Special Project	C6
LAND 5007	Cadastral Systems	E3
PLAN 6014	Small Island Developing States (SIDS) Resource Management	E3

**ASSESSMENT AND AWARD OF DIPLOMA**

With the exception of LAND 5006 Special Project, which shall be assessed as a 100% coursework, all other courses shall be assessed as follows:

- Final examination: 60%
- Assessed assignments: 40%

Students are required to complete 18 credits of core taught courses and 6 credits of project for a total of 24 credits.

Diplomas shall be awarded upon completion of all courses and the final project.

***Postgraduate Diploma/MSc in Geoinformatics*****Introduction**

Geoinformatics is a nascent multidisciplinary field in which graduates must be prepared to apply knowledge in new contexts, work cooperatively and communicate effectively.

**THE AIMS AND OBJECTIVES****Aims**

The goal of the MSc/PGDip Geoinformatics programmes is to provide high-quality professional graduate instructions in Geoinformatics that leads to productive careers and long-life learning.

**Objectives**

**The graduate with an MSc/PGDip in Geoinformatics will be able to:**

- Explain the principles, theories, tools and techniques of Geoinformatics.
- Apply specialised knowledge of Geoinformatics to a wide range of disciplines.
- Use the skills required to work individually or as a member of a team.
- Apply creative and critical thinking in solving applications in multidisciplinary areas using Geoinformatics.
- Formulate and effectively communicate professional opinions on topical issues.

In addition to the above, the graduate with an MSc in Geoinformatics will be able to develop research capabilities to contribute to the further academic and professional development of Geoinformatics.

**ENTRY REQUIREMENTS**

Applicants for the MSc or the PGDip in Geoinformatics programmes should have one of the following:

- (a) A Second-Class Honours BSc degree in Surveying and Land Information /Geomatics, or a degree in a related area from a recognised institution.
- (b) A Second-Class Honours BSc degree in Engineering, Natural Science, Agriculture or Geography, which includes Mathematics and Computer Science at levels equivalent to the respective courses in (a).
- (c) An equivalent qualification acceptable to the Faculty of Engineering.
- (d) A PGDip in Geoinformatics (for MSc Geoinformatics only). (Note: Additional requirements for admission may be placed by the Graduate School).

A graduate student in these programmes is also expected to have a strong mathematical/analytical background and ability to use specialised software applications within this context.

**Duration of Study and Award of Degree**

The programme is geared towards full-time study. It is expected that full-time students will complete the PGDip in 9 months and the MSc programme in 18 months. Part-time is expected to take two (2) calendar years for the PGDip programme and two and a half (2 1/2) calendar years for the MSc programme. Upon completion of all course requirements, a candidate will be awarded a PGDip in Geoinformatics. With the additional completion of the research thesis, a candidate will be awarded the Master's degree in Geoinformatics.

**STRUCTURE OF PROGRAMME**

Offered both part-time and full-time

**COURSE OF STUDY**

Students registered for the Postgraduate Diploma in Geoinformatics are expected to complete 26 credits of core courses and six credits of elective courses, while students registered for the MSc in Geoinformatics are expected to complete 38 credits of core courses and six credits of elective courses.

**COURSE LISTING****CORE COURSES**

The core courses for the PGDip/MSc Geoinformatics programmes are as follows:

Course Code	Course Title	Credits
GINF 6100	Principles of Geoinformatics	3
GINF 6015	Extraction and Management of Information from Geo-images	4
GINF 6020	Spatial Databases	4
GINF 6021	GIS and Society	4
GINF 6022	Spatial Analysis and Modelling	4
GINF 6023	Enterprise GIS Design and Development	4
GINF 6024	Research Methodology	3
GINF 6006	Research Project (MSc Geoinformatics only)	12

**ELECTIVE COURSES**

There are several courses available in the Department of Surveying and Land Information and other departments that may be selected to cover the elective courses that students are allowed to take. Elective courses may be taken in consultation with the Programme Coordinator or the Head of Department.

Course Code	Course Title	Credits
GINF 6009	Applications of GIS in Natural Resource Management	4
GINF 6010	Applications of GIS in Urban Development	4
GINF 6007	Issues and Application of Remote Sensing	4
GINF 6030	Independent Study in Geoinformatics	3
GINF 6025	Professional Internship	3
PLAN 6011	Planning in the Coastal Zone	3
PLAN 6014	SIDS Resource Management	3
PLAN 6006	Sustainable Housing and Settlements Planning	3
PLAN 6007	Community and Participatory Planning	3
PLAN 6008	Tourism Planning	3
PLAN 6009	Transportation Planning	3
COMP 6100	Computer Communications Network	3
COMP 6150	Distributed Computing	3
ECNG 6613	Database Systems, Principles & Design	3

# DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING

## Research

The Department offers the facilities to carry out research leading to the MPhil and PhD Degrees in a wide range of important areas: Mechanical, Industrial, Manufacturing and Agricultural Engineering (Biosystems), Production Engineering & Management.

Research students register for the MPhil degree in the first instance and then, subject to the Faculty and University's Regulations, may upgrade to the PhD degree. Students who already have a Master's degree obtained through a substantial research project, may register directly for the PhD. A research student works in his chosen field of research under the guidance of a supervisor who has substantial expertise and experience in the field.

Persons interested in pursuing research leading to the MPhil or PhD degrees in Agricultural, Industrial, Mechanical or Production / Manufacturing Engineering & Management are invited to contact the Head of Department to discuss their research interests and for further information on research opportunities within the Department. The Department may be able to provide some financial support for specific research projects.

A sample of recent Research Theses and Projects are listed as follows:

- i. Modelling of RF Propagation in Rectangular Confined Spaces
- ii. Determinants of the Open Innovation Model for Trinidad and Tobago: A Case Study of the Food and Beverage Cluster
- iii. Multi-criteria maintenance optimization for improving the performance of Offshore Production Systems
- iv. A study of Fused Deposition Modeling (FDM) Process for part quality improvement" Multi-Objective Optimization Approach
- v. Development of an innovation management framework for the Caribbean manufacturing sector
- vi. The Characterisation of Tensile Fracture and Crack Propagation Forces in Trinidad Soils of varying Peat Content during Tillage Operations
- vii. A Quasi-Analytical Approach to the Statistical Moments Associated with Large Ocean Waves
- viii. An investigation into the Feasibility of Applying Cognitive Function Synthesis to Robot Navigation
- ix. An Exergy Analysis of a Hydrocarbon Processing Unit.
- x. Heat Transfer Mechanism in Biological Fibrous Materials.
- xi. Osmotic and Air-drying Behaviour of Fruit and Fish.
- xii. A Reliability Centred Maintenance Programme.
- xiii. Strategic Remodelling of the Quality Systems of the Laboratories at the Caribbean Epidemiology Centre (CEC).

## Master's and Doctoral Programmes in Agricultural Engineering (Biosystems Engineering)

### THE AIMS AND OBJECTIVES

The main objective of these programmes is to offer sound, attractive graduate degrees through both teaching and research in the three main areas of Agricultural Engineering viz:

- i. Engineering Design
- ii. Crop Processing, Food Engineering & Post-harvest Technology
- iii. Soil & Water Engineering

These guidelines apply to Master's and Doctoral Degree candidates and the number and nature of courses taken will be determined by both the background of the candidate and the Degree of interest.

All of the current rules, regulations and examination requirements for Postgraduate Degrees by Research in the University will apply, i.e., regulations for the MPhil and the PhD degrees.

**Agricultural Engineering Design**

The Research Degree in Agricultural Engineering Design is aimed at training students to carry out research and development in the area of Tool and Equipment Design for agriculture and related industry. This will cover field equipment from hand tools and special accessories for local crops and products, to handling and pre-processing equipment for the food industry. Farm machinery design and development for small farm usage and for tropical crops will be encouraged.

**Crop Processing & Post-harvest Technology**

The Research Degree in Crop Processing & Post-harvest Technology is aimed at training graduate students in post-harvest technology, crop processing and agribusiness development. The emphasis will be on primary crop processing and post-harvest technology of perishables (high moisture content, biological products, e.g., cereal grains, vegetables, fish and meat) and durables (lower moisture content, e.g., cereal grains, oilseeds). Product and process development will be encouraged all within a framework of agribusiness development for the Caribbean. Developing improved systems to process and store tropical crops/foods and by-products can lead to increased agribusiness activities in the Caribbean. These include packing-houses for fruits, vegetables, root crops and cut flowers both for domestic and export markets and food processing industries which utilise tropical fruits, vegetables, fish meat, amongst others.

**Soil & Water Engineering**

The Research Degree in Soil & Water Engineering is aimed at training graduate students in Irrigation and Drainage Engineering, Soil Erosion and Conservation Engineering, Theory and Practices of Soil Cultivation and General Water Resources Planning and Development related to agriculture. Emphasis will be placed on modern methods of irrigation design and planning as well as on techniques of modifying the mechanical properties of soil in order to improve soil workability by farm machinery and to minimise soil erosion. The research work in Soil & Water Engineering will also assess the effectiveness of new and existing techniques to reduce the related problems of soil erosion and degradation, poor drainage status and soil compaction under the impact of mechanical forces.

**Degree Structure for MPhil and PhD**

These being Research Degrees, students will be expected to produce a satisfactory Thesis (MPhil or PhD) as stipulated in the University's regulations.

Additionally, students depending upon their academic background, will be required to take three (MPhil) or four (PhD) Departmental courses. These courses will be used to direct the student's approach towards the research topic: in particular, strengthening their knowledge base in their area of interest and to research methodology in general.

Students are also mandated to deliver two (MPhil) or three (PhD) research seminars during their research programme.

The Degree structure therefore comprises the following:

- i. An MPhil or PhD Thesis
- ii. Relevant Courses (three (3) for MPhil, four (4) for PhD)
- iii. Two (MPhil) or three (PhD) Research Seminars

**Course Listing**

For all three Degrees, both at the MPhil and PhD levels, the available courses are: -

Course Code	Course Title
AENG 6000	Research Methodology (Agriculture Economics)
AENG 6001	Processing & Storage of Perishable Crops
AENG 6002	Processing & Storage of Durable Crops
AENG 6003	Physical Properties of Agricultural Products
AENG 6004	Special Topics in Design
AENG 6005	Reading Course in Agricultural Engineering
AENG 6006	Hydrology & Water Resources
AENG 6007	Irrigation & Drainage Engineering
AENG 6008	Soil Mechanics & Cultivation
AENG 6009	Soil & Water Conservation Engineering
AGBU 3000	Farm Business Management
AGBU 3006	Agricultural Project Appraisal & Implementation
MENG 6501	Statistical Methods in Engineering

Other suitable courses from the Faculties of Engineering, Science & Technology and Food & Agriculture may also be taken, subject to Departmental approval.



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Course Code	Course Title
AENG 6010	Research Seminar
AENG 7000	MPhil Thesis
AENG 8000	PhD Thesis

**Duration of Study**

The time limits for completion of postgraduate research degrees (MPhil and PhD) are those as normally specified by the University.

**Regulations and Entry Requirements**

The normal University Regulations will apply for entry into the MPhil programme specifically at least an Upper Seconds Honours Degree in any of the following disciplines viz.:

- Engineering
- Natural Sciences
- Earth Sciences
- Food Science
- Agriculture
- Agricultural Economics

as well as any other suitable degree. The suitability of the applicant's undergraduate training as generally specified above will be matched to the specific degree of interest. Students with Lower Second Honours or Pass Degrees will be accepted only under special circumstances principally related to postgraduate experience.

**MPhil/PhD in Mechanical Engineering****MPhil/PhD in Manufacturing Engineering****MPhil/PhD in Industrial Engineering****MPhil/PhD in Engineering Management****MPhil/PhD in Production Engineering and Management****BACKGROUND**

Research degree programmes that lead to the award of a Master of Philosophy (MPhil) or a Doctor of Philosophy (PhD) in Mechanical Engineering, Manufacturing, Engineering Management or Industrial Engineering are offered by the Department.

**THE AIMS AND OBJECTIVES**

The objectives of the MPhil/PhD programmes in Mechanical/Manufacturing/Industrial Engineering by research are:

- a. To provide training at the postgraduate level in specialised Mechanical/Manufacturing/Industrial Engineering subject areas through teaching which equips our graduates to solve engineering problems through research.
- b. To assist in the transfer of new, emerging, and advanced technologies to the businesses of the Region through the mechanism of research projects.
- c. To develop and augment the region's pool of expertise in Mechanical/Manufacturing/Industrial Engineering.

**ENTRY REQUIREMENTS**

- a. At least a BSc Upper Second Class Honours Degree in Industrial, Mechanical, Manufacturing or Electrical Engineering or equivalent. Only in exceptional circumstances will candidates with Lower Second-Class Honours or Pass degrees be considered.

**DEGREE STRUCTURE FOR MPIL AND PHD**

The Degree structure comprises the following:

- i. An MPhil or PhD Thesis
- ii. Relevant Courses (three (3) for MPhil, four (4) for PhD)
- iii. Research Seminar (two (2) for MPhil and three (3) for PhD)

**RESEARCH THESIS**

These being Research Degrees, students will be expected to produce a satisfactory Thesis (MPhil or PhD) as stipulated in the University's regulations.

**DURATION OF STUDY**

Students are expected to complete the MPhil programme in accordance with the relevant University Regulations.

**DEPARTMENTAL COURSES**

Depending upon their academic background, students will be required to take three (MPhil) or four (PhD) courses. These courses will be used to direct the students' approach towards the research topic; strengthening their knowledge base in their area of interest and to research methodology in general.

**A. Compulsory Course**

Course Code	Course Title
MENG 6508	Research Methods

**B. Elective Courses in Production Engineering and Management/Industrial Engineering**

Course Code	Course Title
IENG 6000	Total Quality Management
IENG 6001	Expert Systems (COMP 2800 OR IENG 3004) *
IENG 6002	Distributed Information Systems & Databases (IENG 3013) *
IENG 6003	Computer Integrated Manufacturing Systems
IENG 6004	Occupational Biomechanics
IENG 6005	Industrial Ergonomics
IENG 6006	Occupational Safety & Health
IENG 6007	Industrial Automation
IENG 6009	Robotic Technology & Applications
IENG 6010	Operations Research in Manufacturing I (IENG 3007) *
IENG 6011	Operations Research in Manufacturing II (IENG 3007) *
IENG 6012	Operations Research in Services (IENG 3007) *
IENG 6013	Directed Readings
MATH 3530	Mathematics III (MATH 2240) *
MENG 6506	Project Management

**C. Mechanical/Manufacturing/Production Engineering and Management Engineering Courses:**

Course Code	Course Title
MENG 6200	Production Technology (MENG 2008) *
MENG 6201	Machine Tool Technology
MENG 6202	Applied Materials Technology
MENG 6203	Robotic Technology & Applications
MENG 6300	Applied Ergonomics
MENG 6301	Computer Applications in Manufacturing
MENG 6302	Design of Plant & Services
MENG 6303	Computer Control Systems
MENG 6400	Production Planning & Control
MENG 6401	Advanced Production Management
MENG 6402	Human Resource Management I
MENG 6403	Human Management II
MENG 6404	Maintenance Engineering & Management
MENG 6405	Total Quality Management
MENG 6500	Industrial Marketing
MENG 6501	Statistical Methods in Engineering
MENG 6502	Financial Management
MENG 6503	Applied Operations Research
MENG 6504	Technology & Product Development
MENG 6505	Health, Safety & The Environment
MENG 6506	Project Management for Mechanical Engineers
MENG 6508	Research Methods
MENG 6509	Introduction to Operations Research

The above courses build upon the foundations laid at the undergraduate level and are thus vertically integrated with the undergraduate programme.

## MSc in Engineering Management

All taught MSc programmes in the Department of Mechanical and Manufacturing Engineering are accredited to CEng (Chartered Engineer) level by the Institution of the Mechanical Engineers (UK). Therefore, these programmes satisfy fully the engineering education requirements for Chartered Engineer at (CEng) level.

### THE AIMS AND OBJECTIVES

To provide advanced education and training for graduates in Engineering, Science and related areas to meet current and future needs of manufacturing and allied industries.

### MSc in Engineering Management (EM)

The overall objective of the Engineering Management (EM) programme is to provide advanced education and training in management for graduates in Engineering, and related areas to meet current and future needs of manufacturing and allied industries. The specific objective of this programme of study is to allow graduates in Engineering and Science to strengthen and enhance their capabilities in managing engineering functions.

On completion, the graduates of the EM programme will be able to:

- Contribute to organisational efforts to achieve customer satisfaction
- Create effective work environments using Human Resource Concepts
- Develop and implement work design practices to enhance human performance
- Ensure compliance with health, safety, and environmental regulations
- Implement work methods to ensure quality of products and services
- Use Operations Research models for making optimal decisions
- Formulate and implement projects for change management and enhancement of organizational performance
- Ensure proper use of funds in compliance with financial policies
- Formulate and implement maintenance policies and programs for optimal use of physical assets

*EM Output:*

A competent engineering manager capable of effective management of the engineering functions in the organization.

### REGULATIONS

1. The General Regulations of the University and Faculty of Engineering Regulations for MSc Degrees shall apply.
2. Candidates are required to pass both coursework and written examinations in each course offered.

### ENTRY REQUIREMENTS

The requirements for admission to the MSc in Engineering Management Programme are as follows:

- i. BSc in Engineering or an equivalent. Candidates with other qualifications will be considered if they have at least ten (10) years industrial experience in the area of Engineering Management. Qualifying examinations may also be prescribed for such candidates.
- ii. Normally, at least one (1) year of industrial experience is desirable.

### STRUCTURE OF PROGRAMME

#### Duration of Study

Part-time students: Normally expected to complete the examination requirements within four (4) semesters and complete the Project in accordance with the relevant University Regulations.

Full-time students: Normally expected to complete the examination requirements within two (2) semesters and complete the Project in accordance with the relevant University Regulations.

The Programme consists of a set of courses grouped under four (4) major Subject Groups and a Final Project. Each course is taught over one (1) semester and carries three (3) credits, and the Final Project carries nine (9) credits. MENG 6508 Research Methods is a compulsory course for all MSc programmes in the Department.

**Course Listing****A. Production Technology and Materials**

Course Code	Course Title
MENG 6200	Production Technology (MENG 2008*)
MENG 6201	Machine Tool Technology
MENG 6202	Applied Materials Technology (MENG 3015)
MENG 6203	Robotic Technology & Applications

**B. Production Systems Design**

Course Code	Course Title
MENG 6300	Applied Ergonomics
MENG 6301	Computer Applications in Manufacturing
MENG 6302	Design of Plant & Services
MENG 6303	Computer Control Systems

**C. Production Management & Control**

Course Code	Course Title
MENG 6400	Production Planning & Control
MENG 6402	Human Resource Management I
MENG 6403	Human Resource Management II
MENG 6404	Maintenance Engineering & Management
MENG 6405	Total Quality Management

**D. Engineering Management & Optimisation**

Course Code	Course Title
MENG 6500	Industrial Marketing
MENG 6501	Statistical Methods in Engineering
MENG 6502	Financial Management
MENG 6503	Applied Operations Research
MENG 6504	Technology & Product Development (MENG 3013)
MENG 6505	Health, Safety & The Environment
MENG 6506	Project Management
MENG 6508	Research Methods
MENG 6509	Introductions to Operations Research
MENG 6600	Final Project

**OTHER INFORMATION****Requirements for Award of MSc**

Candidates are required to obtain a total of 36 credits, as given below, in coursework and complete an industry-oriented project, MENG 6600, equivalent to nine (9) credits.

**i. MSc in Engineering Management:**

12 credits from Subject Groups A and B, and 24 credits from Subject Groups C and D.

There are mandatory courses for each of the programmes that must be taken by students. Selection of elective courses is subject to the approval of the Department.

**Who Should Enrol?**

The programmes would be most useful to Engineers and Managers holding responsibilities for Planning, Design and Development, Production/Operations, Plant Maintenance, and Projects in Manufacturing and Service Industries.

Graduates in Engineering or a related field wishing to pursue careers in Production/Operations Management may also apply.

## MSc in Engineering Asset Management

The purpose of the EAM programme is to provide the industry with competent Engineers capable of the acquisition, installation, reliable operation, maintenance, and disposal of the physical assets in these industries. This programme is designed to meet the University's Strategic Plan to provide the industry with trained personnel in the area of Asset Management to support their growth and competitiveness.

The MSc programme in EAM stresses University/Industry linkages. The students are professionals from industry and the lectures are supplemented with real life case studies and short courses presented by experienced industry SME's. Student projects will normally be provided and sponsored by companies in which joint advisory committees of Faculty members and corporate managers provide guidance. Students are required to perform all aspects of the project work, from project formulation to final presentation of results to both the company and university.

The programme content includes both a strong theoretical base and a range of practical skills relevant to asset management. Students are made more familiar with the industry systems on completion of the course.

The programme is delivered on a part-time basis, over four semesters covering 12, 3-credit courses and on a full-time basis. The delivery of the courses will be over two semesters. A Final Project equivalent to 9 credits is mandatory on completion of all taught courses.

**Output:** A competent asset manager capable of managing the acquisition, reliable operation, maintenance and disposal of physical assets to meet organisational objectives and strategies. The graduates would be provided with in depth theoretical and practical knowledge and skills required to:

- Develop, deploy, and evaluate strategic plans for physical assets in creating and sustaining a competitive edge;
- Formulate reliable maintenance objectives to support corporate / operations objectives and strategies;
- Develop and implement maintenance plans and programs to achieve maintenance objectives;
- Prepare, implement and audit annual budgetary control systems;
- Select and implement effective Reliability and Maintenance technologies such as RCM, TPM, FMECA, Ishikawa diagram, RCA etc.;
- Design and deploy organisational structures, processes, and procedures for managing physical assets;
- Develop and implement work Planning and Scheduling systems to optimise the use of Human and all other resources ;
- Develop measurement and reporting systems including KPI's for assessment of performance of assets and operations;
- Formulate and execute strategic, long and medium-term plans for improvement in asset performance;
- Apply analytical and optimisation systems and models such as Weibull analysis to support decision making processes;
- Plan and control major plant Overhauls and Turnarounds;
- Select and use Computerised Maintenance Management Systems effectively; and
- Improve Asset Reliability and Maintainability with optimal Management Accounting on a continuous basis to ensure that Industries maintain or improve their competitive edge.

### REGULATIONS

1. The General Regulations of the University and Faculty of Engineering Regulations for MSc Degrees shall apply.
2. Candidates are required to pass both coursework and written examinations in each course offered.

### ENTRY REQUIREMENTS

The requirements for admission to the Programme are as follows:

- a. BSc in Engineering or a related degree. Candidates with other qualifications will be considered if they have at least ten (10) years industrial experience in the area of Engineering Asset Management. Qualifying examinations may also be prescribed for such candidates.
- b. Normally, at least one (1) year of relevant industrial experience is desirable.

### STRUCTURE OF PROGRAMME

#### OFFERED PART-TIME AND FULL-TIME

##### Duration of Study

Part-time students: Normally expected to complete the examination requirements within four (4) semesters and complete the Project in accordance with the relevant University Regulations.

Full-time students: Normally expected to complete the examination requirements within two (2) semesters and complete the Project in accordance with the relevant University Regulations.

The programme consists of twelve (12) courses and a Final Project. Each course is taught over one (1) semester and carries three (3) credits, and the Final Project carries nine (9) credits.

MENG 6508 Research Methods is a compulsory course for all MSc programmes in the department.

### **Course Listing**

The structure and the courses for each type will consist of the following courses:

#### **A. Full-Time Programme Structure:**

##### **CORE COURSES**

###### **SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>
MENG 6700	Strategic Asset Management
MENG 6701	Asset Maintenance Technologies
MENG 6705	Maintainability Engineering & Management
MENG 6402	Human Resource Management I

###### **SEMESTER 2**

MENG 6702	Work Planning and Scheduling
MENG 6703	Condition Monitoring and Diagnostics
MENG 6704	Maintenance Analysis and Optimisation
MENG 6706	Asset Reliability Management
MENG 6508	Research Methods

##### **OPTIONAL COURSES**

###### **SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>
MENG 6505	Health, Safety and the Environment
MENG 6708	Reliability Centered Maintenance
MENG 6506	Project Management

###### **SEMESTER 2**

MENG 6707	Asset Performance Management
MENG 6405	Total Quality Management
MENG 6600	Final Project

(On successful completion of 12 courses)

#### **B. Part-Time Programme Structure:**

##### **CORE COURSES**

###### **YEAR 1**

###### **SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>
MENG 6700	Strategic Asset Management
MENG 6701	Asset Maintenance Technologies
MENG 6402	Human Resource Management I

###### **SEMESTER 2**

MENG 6702	Work Planning and Scheduling
MENG 6703	Condition Monitoring and Diagnostics
MENG 6706	Asset Reliability Management

###### **YEAR 2**

###### **SEMESTER 1**

<b>Course Code</b>	<b>Course Title</b>
MENG 6705	Maintainability Engineering and Management

###### **SEMESTER 2**

MENG 6704	Maintenance Analysis and Optimisation
MENG 6508	Research Methods

**OPTIONAL COURSES****YEAR 2****SEMESTER 1**

Course Code	Course Title
MENG 6505	Health, Safety and the Environment
MENG 6506	Project Management
MENG 6708	Reliability Centered Maintenance

**SEMESTER 2**

MENG 6707	Asset Performance Management
MENG 6405	Total Quality Management
MENG 6600	Final Project

**(On successful completion of 12 courses)****OTHER INFORMATION****Requirements for Award of MSc**

Candidates are required to obtain a total of 36 credits, as given in the part-time and full-time programme structure and courses above, in coursework and complete an industry-oriented project, MENG 6600, equivalent to nine (9) credits.

**Who Should Enrol?**

The Programmes would be most useful to Engineers and Managers holding responsibilities for Asset Management, Plant and Project maintenance, Reliability and Operational Efficiency and Projects in Engineering, Manufacturing and Service Industries.

Graduates in Engineering or Science wishing to pursue careers in Engineering Asset Management may also apply.

## MSc in Manufacturing Engineering & Management (MEM)

**1.2 PURPOSE & OBJECTIVES OF THE UWI MEM PROGRAMME**

The overall objective of the programme is to provide advanced education and training for graduates in Mechanical Engineering and similar graduates of CEng/IEng accredited degrees, to meet current and future needs of manufacturing and allied industries. Furthermore, the purpose of this programme is to allow graduates in Mechanical Engineering and equivalent domains to strengthen and enhance their technical, professional and managerial skills and capabilities in the areas of manufacturing engineering and manufacturing management.

It also seeks to provide Mechanical Engineering Graduates and equivalent Graduates with a deeper understanding of the knowledge required for designing products and manufacturing systems with the intention to improve effectiveness, promote innovativeness and enhance competitiveness of the Caribbean manufacturing sector. In this regard the specific objectives of the program are:

- To provide graduate students with the advanced and specialised knowledge in the areas of Manufacturing Engineering and Management with a focus on the conventional and computer integrated manufacturing (CIM) fields.
- To prepare graduates with the knowledge of product design processes and rapid product development approaches required to support the local and regional economy with a particular emphasis on integration of computer aided design (CAD), computer aided engineering (CAE) and computer aided manufacturing (CAM) tools and techniques.
- To produce graduates capable of developing lean management plans and material control policies that minimise overall costs of setup, ordering and inventories.
- To produce graduates capable of implementing and managing contemporary quality tools in the local and regional manufacturing industry.
  - i. To use incremental-iterative methods to solve nonlinear manufacturing problems arising from large deformations and/or nonlinear material properties.
  - ii. To choose shape and/or sizing parameters appropriately in product design.

**MEM Output:** A competent Manufacturing Engineer capable of combining technical, professional and managerial skills and capabilities.

**THE LEARNING OUTCOMES**

On completion of the programme, the graduates will be able to:

- i. Apply systematic approach for appropriate design and evaluation of manufacturing planning and control (MPC) systems, in the context of local and regional manufacturing.
- ii. Identify various elements of CIM and evaluation of their interactions for introduction of automated systems in the context of Caribbean industry.
- iii. Apply an integrated modelling approach to design innovative product models by deploying total quality tools/techniques and project management skills to arrive at an innovative product design that fulfils the Caribbean industry requirements.
- iv. Use the principles of rapid prototyping (RP) and CNC programming skills for effective operation and utilisation of the manufacturing resources in the local industry.
- v. Formulate and analyse a range of manufacturing systems and present the same through industry-based design projects and validation through simulation experiments.
- vi. Formulate and analyse a range of manufacturing problems using appropriate finite element models with due consideration being placed on validation.
- vii. Develop the ability to prepare a project proposal from its conception to implementation, closeout, and ex- post evaluation.
- viii. Understand how to monitor, control, and improve the quality of products and processes in industries, using the statistical methods and other quality improvement tools and techniques.
- ix. Successfully manage the Health and Safety aspect of an Industrial Enterprise as well as manage the Environmental activities in an Industrial Facility to make the facility competitive and sustainable.
- x. Outline the Environmental Aspects and logistics of locating a Plant and analyse the manufacturing processes of a manufacturing Facility.
- xi. Present data appropriately and deal with errors in a systematic manner

**REGULATIONS AND ENTRY REQUIREMENTS**

- A. The General Regulations of the University, the Faculty of Engineering and the Department of Mechanical and Manufacturing Engineering for MSc Degrees shall apply.
- B. The requirements for admission to the programme are as follows:
  - a BSc Degree in Mechanical, Manufacturing, Production, Industrial Engineering, or an equivalent with at least a Lower Second-Class degree.
  - at least one (1) year of industrial experience is desirable. This may be waived for Recent Graduates with a First or Upper Second-Class Honours degree, who wish to complete the programme on a Full-Time basis.
  - applicants with Third Class or Pass degrees require at least three (3) years industrial experience.

A graduate student in this Programme is also expected to have a strong mathematical and analytical background and ability to use specialised software applications within this context.

**STRUCTURE OF PROGRAMME**

Offered part-time and full-time.

**DURATION OF STUDY**

**Part-time students:** Normally expected to complete the examination requirements within four (4) semesters and complete the Project in accordance with the relevant University Regulations.

**Full-time students:** Normally expected to complete the examination requirements within two (2) semesters and complete the Project in accordance with the relevant University Regulations.

**NO. OF CREDITS REQUIRED: 45**

Six (6) Compulsory Courses	18 credits
Four (4) Optional Courses	12 credits
Final Project	9 credits

**OTHER INFORMATION**

The programme consists of a set of six (6) compulsory courses and four (4) optional courses, two (2) courses from each Subject Groups A & B (12 credits) and complete an industry-oriented project, MENG 6600 (9 credits). All courses are three (3) credits unless otherwise specified.



The programme stresses university-industry linkages. Student projects will normally be provided and sponsored by companies in which a joint advisory committee of Faculty members and corporate personnel will provide guidance.

### ***Course Listing***

#### **COMPULSORY COURSES:**

<b>Course Code</b>	<b>Course Title</b>
MENG 6200	Production Technology
MENG 6207	Computer Integrated Manufacturing
MENG 6306	Advanced CAD/CAM for Product Realization
MENG 6400	Production Planning & Control
MENG 6504	Technology and Product Development
MENG 6508	Research Methods
MENG 6600	Final Project

#### **OPTIONAL COURSES:**

##### **Group A: Manufacturing Engineering**

Two (2) courses to be chosen from the following:

<b>Course Code</b>	<b>Course Title</b>
MENG 6203	Robotic Technology & Applications
MENG 6302	Design of Plant & Services
MENG 6305	Finite Elements Analysis in Manufacturing
MENG 6307	Design & Simulation of manufacturing Systems
MENG 6701	Asset Maintenance Technologies

##### **Group B: Manufacturing Management**

Two (2) courses to be chosen from the following:

<b>Course Code</b>	<b>Course Title</b>
MENG 6505	Health, Safety & The Environment
MENG 6405	Total Quality Management
MENG 6506	Project Management
MENG 6700	Strategic Asset Management

#### **REQUIREMENTS FOR AWARD OF MSC**

Candidates are required to obtain a total of thirty (30) credits from six (6) Compulsory courses (18 credits) and four (4) Optional courses, two courses from each Subject Groups A & B (12 credits) and complete an industry-oriented project, MENG 6600 (9 credits).

#### **REGULATIONS**

The General Regulations of the University and Faculty of Engineering for MSc Degrees shall apply.

# OFFICE OF THE DEAN

## MSc in Project Management

This is a Campus programme involving the Faculty of Engineering, Faculty of Social Sciences (Department of Management Studies) and the Institute of Business and is taught through the Department of Civil & Environmental Engineering. It is academically managed by a Campus-based team led by the Dean of the Faculty. This MSc is a two-year evening programme. The Degree will be awarded following the normal University requirements for taught Master's Programmes.

The MSc is designed to specifically meet the growing industry demands and graduates will develop methodological approaches to the management of financial aspects of projects and programmes as well as learn about the strategic management of people in the organisation.

### THE AIMS AND OBJECTIVES

To train and produce Graduates who will be able to:

- Solve real-world management problems associated with the project cycle and to exercise sound management judgment through practical application of Project Management concepts and skills;
- Apply management principles to business situations;
- Develop and communicate project financial and performance objectives;
- Accurately develop Master Plans for projects and programmes, including tasks, budget and resource requirements;
- Effectively monitor, control and report project costs, the scheduled and quality /performance levels needed to meet agreed milestones and required levels of earned value; and
- Provide effective leadership and promote a true environment that will help motivate team members and resolve conflicts.

### ENTRY REQUIREMENTS

A first degree from an approved University in Project Management, Information Technology, Planning, Agriculture, Accounting, Engineering, Management Sciences, Economics, Architecture, Quantity Surveying, Land Surveying, Construction Management. Applicants must possess sufficient related work experience that would assist the candidate in becoming eligible for registration in related professional associations and institutions. Candidates with a good first degree in other areas will be entertained on a case-by-case basis.

### STRUCTURE OF PROGRAMME

#### Offered Part-time only

The programme will be an evening programme with lectures and tutorials being delivered between 4.00 pm and 8.00 pm on weekdays and will involve an interactive approach to learning embracing real life problems and experiences. Group discussions and pursuit of topics and assignments will be an essential feature of the delivery format.

### PROGRAMME DELIVERY AND ACADEMIC SUPERVISION

The Programme Coordinator is responsible for Delivery of the programme.

### DURATION OF STUDY:

A minimum of four (4) semesters or a maximum of six (6) semesters.

### NO. OF CREDITS REQUIRED: 45

Eight (8) core courses to be done over the first two semesters	24 credits
Four (4) electives over the third and fourth semesters	12 credits
Project to be done over the third and fourth semesters	9 credits

### Compulsory Courses

#### SEMESTER 1

Course Code	Course Title	Credits
PRMG 6001	Project Leadership & Organisational Behaviour	3
PRMG 6003	Project & Programme Management	3
PRMG 6004	Project Accounting & Finance	3
PRMG 6015	Contract Management & Contract Law for Project Managers	3

**SEMESTER 2**

PRMG 6002	Project Management Information Systems	3
PRMG 6007	Procurement Management, Logistics & Contracting	3
PRMG 6010	Risk Management for Project Managers	3
PRMG 6019	Research Methods for Project Managers	3

**PROJECT**

PRMG 6014	Project Management Research Project/Internship Project	9
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Candidates will be required to deliver seminar presentations for three (3) of the eight (8) core courses.

**Electives**

The following is a list of the Elective Courses from which the student is required to complete four (4) by the end of the fourth semester. Other courses may be selected from graduate programmes. When registering for other graduate programme courses (i.e. courses not listed below), students may need to request an override. This can be done electronically when registering for the course. However, if the electronic request is not permitted, students must then seek approval from the Programme Coordinator.

Course Code	Course Title	Credits
COEM 6016	Natural Hazards Management	3
IENG 6006	Occupational Safety & Health	3
MENG 6405	Total Quality Management	3
MENG 6505	Health, Safety & The Environment	3
PRMG 6005	Marketing Management & Business Communication	3
PRMG 6008	Project Estimating & Cost Management	3
PRMG 6009	Managing Information Technology Projects (PRMG 6002)	3
PRMG6011	Advanced Project Management	3
PRMG 6012	Value Engineering & Management	3
PRMG 6013	International Project Management	3
GINF 6100	Principles in Geoinformatics	3
PRMG 6017	Project Management for Small & Medium Size Organisations	3
PRMG 6018	Financial Risk Management & Regulatory Compliance (Banks and Financial Institution)	3

Designated courses are already delivered within the Campus Units involved.

**Project Management Research Project**

This project-based course carries nine (9) credits and provides the student with the opportunity to integrate knowledge and skills learned throughout the programme, and should normally be taken as the last course in the delivery of the programme. Conceptual work on the Project will begin at the end of the first semester, and the project should be completed by the end of the fourth semester. Students develop, design and present a project; plan and justify the project; work to satisfy performance, schedule and budget requirements; adjust for unplanned occurrences; and provide status reports.

As an alternative, the student may opt to pursue an internship project, within the mainstream of their area of specialisation, that is approved by the Academic Unit involved.

## MPhil/PhD Degrees in Project Management

### ***Regulations:***

#### **MPHIL IN PROJECT MANAGEMENT**

The Regulations for the MPhil in Project Management are the same as the General Regulations for the MPhil, except that the candidates applying for registration should normally have either:

- a. A Bachelor's degree with Second Class Honours in Project Management, Civil Engineering, Construction Engineering and Management
- OR**
- b. An equivalent qualification in the field of Management Studies

#### **PHD IN PROJECT MANAGEMENT**

The Regulations for the PhD in Project Management are the same as the University and Faculty of Engineering regulations for the Degree of Doctor of Philosophy except that Candidates applying should normally have either:

- a. An MPhil Degree in Project Management
- OR**
- b. An MSc in Project Management awarded at the level of Distinction

#### **THE AIM AND OBJECTIVES**

Technical deepening and broadening beyond the level covered by the taught MSc degree in Project and Programme Management by research into the specific problem that arise in a wide range of industries and sectors in the economy:

- i. To immerse the student in firsthand contact with the many challenges in project and programme management.
- ii. To expose the student to advanced theoretical and applied analysis in the field of project and programme management.
- iii. To provide the student with the intellectual environment to be able to conceptualise real challenges into a problem format, then apply rigorous analysis within the context of the project management discipline to be able to produce a theoretical formulation to problem solutions.
- iv. To provide the context within which the student can generate new innovative and novel solutions to real problems encountered by project management practitioners.

#### **FOR FURTHER INFORMATION, CONTACT**

The Project Management Office

Email: [STA-Project.Management@sta.uwi.edu](mailto:STA-Project.Management@sta.uwi.edu)

Tel: 1 (868) 662-2002; Ext. 83838/84006

## SECTION 2 – REGULATIONS

### Regulations for Postgraduate Diplomas and Degrees

Please see the [Board of Graduate Studies and Research, Regulations Policy for Degrees and Diplomas](#):

### Regulations for Research Degrees

#### GENERAL REGULATIONS

A candidate for the MPhil degree is required to read courses totaling a minimum of six (6) credits. A candidate for the PhD degree is required to read courses totaling a minimum of nine (9) credits. Candidates are required to pass both the coursework and the written examinations before submitting the thesis.

Where graduate students write undergraduate examinations for graduate credit, or where they are writing qualifying or departmental examinations, they must pass both components of the course (i.e. coursework and written examination) in accordance with the University's marking scheme before proceeding to graduate work.

For all theses at least three Examiners shall be appointed including one Internal Examiner and two External Examiners. The Supervisor shall not be an Examiner of a thesis. One of the External Examiners shall be appointed as an Additional External Examiner who shall be engaged: (a) when the External Examiner indicates that he/she is unavailable or unwilling to serve as an Examiner of the thesis; or (b) different recommendations are made by the Internal Examiner and the External Examiner as to whether the thesis should Pass or Fail.

#### Master of Philosophy

The MPhil Degree shall be awarded on the basis of an examination by thesis and the appropriate University Regulations for the Master's Degree shall apply.

Candidates applying for registration should normally be holders of a Bachelor's Degree in Engineering or other appropriate field of at least the standard of at least an Upper Second Class Honours Degree of The University of the West Indies. Holders of lower class Degrees or a General Bachelor's Degree must normally pass qualifying examinations.

#### Doctor of Philosophy

The appropriate University and Faculty of Engineering Regulations for the Degree of Doctor of Philosophy shall apply.

Attendance at the oral examination for the PhD Degree in the Faculty of Engineering shall be open to the academic and professional community. A minimum of seven days' notice shall be given before the examination.

### Regulations for MPhil Qualifying Examinations

#### GENERAL REGULATIONS

Any person wishing to proceed to MPhil in the Faculty of Engineering must take a qualifying examination unless:

- a. He/she possesses at least an Upper Second Class Honours Degree or equivalent in the area in which he/she is working or in a related area;
- OR**
- b. He/she has been appointed to the post of Assistant Lecturer or higher in the Faculty;
- OR**
- c. The Board for Graduate Studies and Research exempts him/her on the recommendation of the Faculty Sub-committee of the Board for Graduate Studies and Research.

The qualifying examination shall consist of at least two (2) papers lasting three (3) hours each.

Normally, one of the papers shall be taken from the BSc (Eng) Degree Examination or be of equivalent standard and one will be specific paper in the specialist area of interest.

There shall be a Moderator appointed by the Dean on the recommendation of the Head of Department from among persons not working in the Department(s) involved in the research.

The Head of the Department will assign the responsibility for the preparation of the question papers and the marking of the scripts.

The Moderator mentioned in the Regulations above shall be required to examine the question papers before the examination and to examine the scripts after they have been marked. He may, if he wishes, require an oral examination. In order for the candidate to pass, the Examiners must certify to the Board for Graduate Studies and Research that the candidate has reached at least a standard equivalent to Second Class Honours in the papers examined and the Moderator must give his approval of the examination.

All part-time postgraduate students may be required to attend such postgraduate seminars as may be arranged by the department in the Faculty of Engineering during the academic year.

Not less than five (5) calendar years (unless the Faculty relaxes this requirement if it can be shown that the candidate's employment is such that his normal work is the same as the research work for his degree) after passing the qualifying examination a part-time student for the MPhil will present a dissertation and may also be orally examined on the general field of study or on the dissertation.

A part-time student for the PhD will submit a thesis and be orally examined in the general field of study and on the thesis not less than seven (7) calendar years (unless the Faculty relaxes this requirement if it can be shown that the candidate's employment is such that his normal work is the same as the research work for his degree) after registration for the degree.

The award to a part-time student of the postgraduate degree, be it Master's or PhD Degree, will be subject to the conditions of award to full-time postgraduate students.

For part-time students, an MPhil thesis must be submitted normally not later than five (5) years after the date of registration. Similarly, a PhD thesis must be submitted not later than seven (7) years after the date of registration.

## Guidelines for Postgraduate Programmes

### MSc/MASc/Diploma

The following are the approved guidelines for the conduct of Graduate Programme in the Faculty of Engineering.

#### Registration

A full-time candidate will not normally be permitted to register for more than 18 credits per semester, and a part-time candidate for not more than 9 credits. A full-time student should complete all the course requirements (including project) within two (2) years, a part-time student within four (4) years.

#### Total Number of Credits in Master's Programme

The total number of credits should normally be set at 45 in accordance with the recommendations of the Board for Graduate Studies.

#### Value of a Course Credit

A course credit is defined as one (1) contact hour per week OR one (1) 2-hour lab per week OR one (1) hour supervised research per week.

#### Performance of Students:

Qualifying candidates may normally be allowed one (1) attempt at the original examination for any one course.

Master's/Diploma candidates may normally not have more than two (2) attempts at an examination for any one course.

To maintain registration, candidates should normally pass a minimum of 50% of the course load in each semester.

University Regulations state that candidates may not have more than two (2) attempts at an examination.

**Oral Examination**

Students may be orally examined at the discretion of the Department, subject to the approval of The Office of Graduate Studies and Research.

**MARKING SYSTEM****Examination of Project Report**

Examiners must observe the University guidelines for report marking. Marks awarded for each section should be indicated in the report together with brief comments. Where this is not done, the report will be sent back to the examiner for re-examination.

**Procedure for Examination Reports**

The Faculty will continue to submit all project reports to External Examiners in cases where the projects constitute more than 25% of the programme credit ratings. Project Reports are to be submitted simultaneously to all examiners. For a student to pass (i.e. average project mark is  $\geq 50\%$ ) all examiners should normally concur. Where there is no-agreement among examiners, the Board of Examiners will decide on the appropriate action to be taken. For programmes with less than 25% project credit rating, the use of an external examiner could be avoided.

**Withdrawal**

A candidate required to withdraw will not be considered for readmission within two (2) years of their withdrawal, but within five (5) years after withdrawal. The candidate will retain credits for courses already successfully completed. Candidates who voluntarily withdraw may be allowed to re-enter at the next available opportunity. In this case, all credits previously accumulated will be retained by the candidate (normally for up to five (5) years thereafter, at the discretion of the department). No extensions will be granted to students beyond three (3) years full-time and six (6) years of part-time.

**NOTE:** For additional information on postgraduate regulations please see the [Regulations for Graduate Diplomas and Degrees](#).

# STUDENT LIFE AND DEVELOPMENT DEPARTMENT (SLDD)

## *DIVISION OF STUDENT SERVICES AND DEVELOPMENT (DSSD)*

The SLDD is the first and most important **STOP** for high quality academic support and personal development.

### **WHO CAN ACCESS THE SERVICES OF SLDD?**

**ANY** student can access the services through self-referral or referrals by Faculties, Departments, friends, family, etc. SLDD caters to the needs of students who are Full-Time, Part-Time, Postgraduate, Undergraduate, Mature, International, Regional, Student Athlete and Students with Disabilities and Medical Conditions. We provide support to **ALL** students in the following areas:

#### *GENERAL SUPPORT – ALL STUDENTS*

- Peer-Pairing
- Referral to Counselling
- Access to a Safe Space for relaxing and restoration

#### *ACADEMIC SUPPORT - ALL STUDENTS*

- Time Management
- Examination Strategies
- Workload Management
- Study Skills - one on one sessions
- Educational Assessment/Screening – Lucid Adult Dyslexia Screening (LADS) & Learning and Study Strategies Inventory (LASSI)
- Peer Tutoring – one on one sessions

#### *INTERNATIONAL AND REGIONAL STUDENT SUPPORT*

- Assistance with Immigration matters – renewal of landing stamps
- Liaising with faculties and departments in The UWI and the Immigration Division regarding immigration matters

#### *POSTGRADUATE AND MATURE STUDENT SUPPORT*

- Opportunities for student employment such as peer tutoring, and special examination invigilation
- Liaising with faculties and departments on any postgraduate and mature students matters

#### *DISABILITY SUPPORT/STUDENTS WITH MEDICAL CONDITIONS SUPPORT (TEMPORARY AND PERMANENT)*

- Loans of aids and devices such as laptops, digital voice recorders, wheelchairs, walking canes and crutches
- Special accommodations in the classroom and for examination
- Liaison with faculties, departments, deans, heads of departments, and lecturers
- Special parking accommodations - Accessible Parking Permits
- Student Support Group
- Assistive Technology Lab at the Alma Jordan Library- special software (JAWS)

**No student of The UWI will be discriminated against based on having special needs.** Every effort is made to facilitate requests related to mobility, general academic support and examinations accommodation. Sharing needs early will enable us to better serve a student as a member of the Campus Community.

### **HOW DO I REGISTER AT SLDD?**

- All students accessing the services must complete the registration form
- Collect a registration form from the SLDD office or download from <https://sta.uwi.edu/dssd/student-life-and-development> (SLDD website)
- Complete the registration form and submit to the office or via email to [sta-sldd@sta.uwi.edu](mailto:sta-sldd@sta.uwi.edu)
- Schedule an appointment to meet with the Manager or a Student Support staff member
- An assessment of the student's needs will be conducted to determine the required service
- Students with disabilities and medical conditions must submit a medical report from a qualified medical professional to the Health Services Unit to be verified
- The verified document must be submitted to SLDD to be sent for approval by the Chair, Examination



**FOR MORE INFORMATION OR ASSISTANCE, CONTACT:**

***Dr Jacqueline Huggins, Manager, Student Life and Development Department,***

Email – [sta-sldd@sta.uwi.edu](mailto:sta-sldd@sta.uwi.edu) or [jacqueline.huggins@sta.uwi.edu](mailto:jacqueline.huggins@sta.uwi.edu)

Address: Heart Ease Building, Wooding Drive, St. Augustine Campus

Tel: 662-2002 Ext. 83866, 83921, 83923, 84254, 84103 OR Direct line 645-7526

Hours: Monday to Friday | 8:30 am - 4:30 pm

***SLDD Website:*** [sta.uwi.edu/dssd/student-life-and-development](http://sta.uwi.edu/dssd/student-life-and-development)

***Facebook:*** [www.facebook.com/UWI-Student-Life-Development-Department-SLDD-948337438614375](https://www.facebook.com/UWI-Student-Life-Development-Department-SLDD-948337438614375)

***Never hesitate to contact the SLDD at any time!***

# STUDENT EXCHANGE & STUDY ABROAD

## INTERNATIONAL OFFICE - OFFICE OF INSTITUTIONAL ADVANCEMENT AND INTERNATIONALISATION (OIAI)

The St. Augustine Campus has a range of partnership agreements managed through the International Office, OIAI that facilitates exchanges by UWI students as well as students from our international partners to spend time at each other's campuses. The Office also enables student mobility with institutions where we do not have such formal partnerships.

The UWI Student Exchange programme will allow you to study at one of our many international partners around the world, including in North America, Europe, South America, Africa, Asia and the Caribbean in addition to other UWI Campuses.

This type of international immersion has many educational and personal benefits. Students who have participated in the past have all spoken about the tremendous experiences and learnings not only in the classroom, but also from the people and places that they were able to interact with. They have become more independent in their thinking, self-sufficient and confident. They have also been able to make new friends, learn new languages and experience the world first-hand as true global citizens. A number of options for student mobilities are available to undergraduate and postgraduate students, including:

1. Incoming and Outgoing Student Exchange – from one semester to one year duration.
2. Incoming and Outgoing Study Abroad (fee paying) – from one semester to one year duration.
3. Visiting Students – for postgraduate students doing research on invitation by overseas institution.
4. Incoming and Outgoing Study Tours
5. Students on internships/practicums

Funding is available to assist students with some of these exchange opportunities.

For further information on funding as well as Student Exchange and Student Mobility, please visit our website: [sta.uwi.edu/internationaloffice/](http://sta.uwi.edu/internationaloffice/) or visit our Facebook Page for the latest news on mobility opportunities at: [www.facebook.com/UWIInternationalOffice/](https://www.facebook.com/UWIInternationalOffice/), or contact:

### ***Alviann Thompson (Outbound Mobility Coordinator & Academic Agreements)***

International Office  
The University of the West Indies, St. Augustine Campus  
Trinidad and Tobago, West Indies  
Email: [outgoing.mobility@sta.uwi.edu](mailto:outgoing.mobility@sta.uwi.edu)  
Phone: +1(868) 662-2002 ext. 85010 Direct: +1(868) 224-3708

### ***Chawntel Mc Call (Inbound Mobility Coordinator)***

International Office  
The University of the West Indies, St. Augustine Campus  
Trinidad & Tobago, West Indies  
Email: [incoming.mobility@sta.uwi.edu](mailto:incoming.mobility@sta.uwi.edu)  
Phone: +1(868) 662-2002 ext. 84206/Direct: +1(868) 224-3708

### ***Study Tours***

International Office  
The University of the West Indies, St. Augustine Campus  
Trinidad & Tobago, West Indies  
Email: [internationaloffice@sta.uwi.edu](mailto:internationaloffice@sta.uwi.edu)  
Phone: +1(868) 662-2002 ext. 84280/Direct: +1(868) 224-3707

### ***Carol Ayoung (Director (Ag.), International Office)***

Email: [Carol.Ayoung@sta.uwi.edu](mailto:Carol.Ayoung@sta.uwi.edu) or [internationaloffice@sta.uwi.edu](mailto:internationaloffice@sta.uwi.edu)  
Direct: +1(868) 868 224-3739

# THE CAMPUS LIBRARIES

## THE UNIVERSITY OF THE WEST INDIES ST. AUGUSTINE CAMPUS

The Campus Libraries support the teaching, learning and research activities of The University of the West Indies (UWI), St. Augustine Campus (STA) community. These libraries include:

- The Alma Jordan Library
- The Medical Sciences Library
- The Norman Girvan Library of The Institute of International Relations
- The Republic Bank Library and Information Resource Centre of the Arthur Lok Jack Global School of Business
- The School of Education Library
- The Patience-Theunissen Memorial Library of the Seminary of St. John Vianney & the Uganda Martyrs Theological Institute at Mt St Benedict
- The Seismic Research Centre Library, and
- The UWI-ROYTEC Allan McKenzie Library

### **Resources for Students**

Each Library's website ([libraries.sta.uwi.edu/](http://libraries.sta.uwi.edu/)) is the gateway to its comprehensive electronic, print, and multimedia information resources. From there, students can access state-of-the-art, scholarly, full-text databases on and off campus. The specialised and constantly updated collections contain information relevant to all faculties, research centres, and institutes on Campus. They currently provide access to approximately:

- electronic resources: 258 databases, 104,337 e-journal titles, and 68,158 e-books
- print resources: 439,343 books/monographs

Moreover, a sizeable body of Caribbean research may be accessed from maps, microforms, newspapers, theses, photographs, oral history interviews, and over 150 special collections in the West Indiana and Special Collections Division (WISC).

### **Library Services**

- traditional loans
- device loans
- inter-library loan/document delivery
- information literacy sessions
  - Finding Information; Research Skills; Avoiding Plagiarism; Citing and Referencing; Endnote; Managing Information and more
- reference assistance
- research consultations
- dissertation/thesis checking
- web-based research guides
- orientation tours

### **Library Facilities**

- audio-visual rooms
- computer laboratories
- photocopiers and printers
- reading rooms
- study rooms

### **Research Support**

An online chat service which provides users with immediate responses to questions in real-time with library staff, is available from The Alma Jordan Library, The Medical Sciences Library, The School of Education Library, The Republic Bank Library & Information Resource Centre, and The Norman Girvan Library websites. Users can also submit queries when staff is not online. Users can find answers in the Frequently Asked Questions (<https://uwi-sta.libanswers.com/>) at The Alma Jordan Library and The Medical Sciences Library.

The Institutional Repository, **UWISpace**, facilitates the collection, preservation, and distribution of the scholarly/research output of the University. Researchers can also archive and preserve datasets generated by their research activities.

**UWIScholar** ([uwischolar.sta.uwi.edu](http://uwischolar.sta.uwi.edu)) is The University's research information management system designed to aggregate and manage researcher (faculty and students) profiles and facilitate global networking and expertise discovery. UWISpace dataset links can be added to the research list in UWIScholar.

The libraries also provide services and software that enable UWI faculty, staff, and students to publish their subscription and open-access online journals ([journals.sta.uwi.edu/](http://journals.sta.uwi.edu/)). These journals are published using the Open Journals System (OJS), an open-source editorial management and publishing system, which can manage some or all of the stages of the journal publishing process, including submissions, peer review, editing, online publishing, and indexing.

The Alma Jordan Library, in collaboration with the St. Augustine Centre for Innovation and Entrepreneurship (STACIE) and the Intellectual Property Office of the Ministry of the Attorney General and Legal Affairs, provides an **Intellectual Property Help Desk Service** ([libraries.sta.uwi.edu/ajl/index.php/services/ip-help-desk](http://libraries.sta.uwi.edu/ajl/index.php/services/ip-help-desk)) to help support researchers.

For further information on these resources and services, please refer to your Library's website or contact your Faculty Liaison Librarian:

***Mr. Randy Siew***

Faculty Liaison Librarian  
Engineering Division, Floor 1  
The Alma Jordan Library  
The University of the West Indies  
St. Augustine Campus  
Tel.: (868) 662-2002 Exts. 83594, 82244  
Fax: (868) 662-9238  
E-mail: [Randy.Siew@sta.uwi.edu](mailto:Randy.Siew@sta.uwi.edu)  
Web: [libraries.sta.uwi.edu/ajl](http://libraries.sta.uwi.edu/ajl)

# UNIVERSITY REGULATIONS FOR STAFF AND STUDENTS ON PLAGIARISM

Plagiarism is frowned upon in the University and as such penalties will be applied to any person found guilty of plagiarism. The [University Regulations on Plagiarism Graduate Diplomas and Degrees](#) approved by the Board for Graduate Studies and Research in May 2013 defines plagiarism as follows:

## Definition of Plagiarism

- 2 In these Regulations,
  - “plagiarism” means the unacknowledged and unjustified use of the words, ideas or creations of another, including unjustified unacknowledged quotation and unjustified unattributed borrowing;
  - “Level 1 plagiarism” means plagiarism which does not meet the definition of Level 2 plagiarism;
  - “Level 2 plagiarism” means plagiarism undertaken with the intention of passing off as original work by the plagiariser work done by another person or persons.
- 3 What may otherwise meet the definition of plagiarism may be justified for the purposes of Regulation 2 where the particular unacknowledged use of the words, ideas and creations of another is, by the standards of the relevant academic discipline, a function of part or all of the object of the work for evaluation whether or not for credit, including without limitation:
  - a. The unacknowledged use is required for conformity with presentation standards;
  - b. The task set or undertaken requires producing a result by teamwork for joint credit regardless of the level of individual contribution;
  - c. The task set or undertaken requires the use of an artificial language, such as is the case with computer programming, where the use of unoriginal verbal formulae is essential.
- 4 The fact that a user enjoys the right of use of certain words, ideas and creations as a matter of intellectual property, does not justify their unacknowledged use under Regulations 2 and 3.

Both staff and students are advised to read and comply with the [University Regulations on Plagiarism Graduate Diplomas and Degrees](#) which also cover, among other things:

- Evidence of Plagiarism
- Student Certification
- Electronic Vetting for Plagiarism by the University
- Level 1 Plagiarism in Work which does not Constitute a Thesis or Major Project Report
- Level 1 Plagiarism in Theses and Major Project Reports
- Level1 Plagiarism: Appeals
- Level 2 Plagiarism
- Clearance on a Charge of Level 2 Plagiarism
- Level 2 Plagiarism: Appeal to the Senate
- Delegation by Dean or Head of Department
- Supervisor’s Conflict of Interest

## SECTION 3 - COURSE DESCRIPTIONS

### Chemical Engineering

**SEMESTER: 1**

**COURSE CODE: CHNG 6001**

**COURSE TITLE: ADVANCED PROCESS DYNAMICS & CONTROLS**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Analysis and design of advanced control systems, control systems with multiple loops, feed forward and cascade control, design of control systems for multivariable processes, synthesis of alternative control configurations for multiple-input, multiple-output (MIMO) processes, interaction of control loops, plant-wide control, application of artificial intelligence in process control, fuzzy logic and neural networks, modeling and simulation using HYSYS and MATLAB.

**SEMESTER: 1**

**COURSE CODE: CHNG 6002**

**COURSE TITLE: NUMERICAL METHODS & COMPUTING**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Solution of linear and non-linear equations, solving sets of equations, interpolating polynomials, numerical differentiation and numerical integration, numerical solution of ordinary differential equations, boundary-value problems, numerical solution of elliptic, parabolic and hyperbolic differential equations, applications in heat transfer, fluid mechanics and reactor design.

**SEMESTER: 1**

**COURSE CODE: CHNG 6003**

**COURSE TITLE: PROCESS SYNTHESIS, ANALYSIS & OPTIMISATION**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Process design principles: heuristics, shortcut methods. Synthesis of process flow diagrams: reactors, separators, recycle, process control. Process optimisation: basic concepts, standard techniques, advanced techniques (topological optimisation, parametric optimisation). Pinch technology: basic concepts, heat exchanger network design, mass exchange networks. Analysis of process performance: input/output models, reliability.

**SEMESTER: 1**

**COURSE CODE: MENG 6506**

**COURSE TITLE: PROJECT MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** Project identification in context of investment programme at national and sectorial level, pre-investment studies, detailed project preparation, development and evaluational project organisation, project analysis and evaluation (technical, economic, financial, social and environmental). Project implementation (procurement/contracts programming and control); ex-post evaluation.

**SEMESTER: 1**

**COURSE CODE: CHNG6206**

**COURSE TITLE: RESEARCH METHODS FOR CHEMICAL ENGINEERS**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** The disciplines of engineering are all described as the application of science to realistic systems which benefit human being. Engineering research is therefore based on the principles of scientific research which, in turn, are based on the scientific method, in which observations (experiments), theories, calculations and models are derived from the existing body of scientific knowledge and verified independently by others who are experts in the field. In order to emphasise this concept, this course is addressed to Novice researchers in a number of different methods of approach for each research question.

**SEMESTER: 2****COURSE CODE: ENGR 6018****COURSE TITLE: ENERGY & THE ENVIRONMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Energy conservation, principles and definitions of renewable energy and sustainable energy practice, reducing the impact of energy use through renewable energy, solar thermal conversion: principles and practice, solar photovoltaic: introduction, principles and practice, wind turbines: characterising the wind, wind turbine principles, hydro-power principles, biomass characterisation and direct use of biomass, hydrogen, and fuel cells. Global case studies: discussion and application in the Caribbean area.

**SEMESTER: 2****COURSE CODE: CHNG 6101****COURSE TITLE: ADVANCED CHEMICAL ENGINEERING THERMODYNAMICS****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Review of classical thermodynamics. Applications to phase equilibrium: equation of state approach and mixed equation of state/activity coefficient model approach. Applications to reaction equilibrium. Application to process problems: equilibrium flash calculations, distillation problems, multiphase reaction equilibrium, reactive distillation.

**SEMESTER: 2****COURSE CODE: CHNG 6102****COURSE TITLE: ADVANCED CHEMICAL REACTION ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Flow models and reactor performance. Heterogeneous catalysis: kinetics of solid catalysed gaseous reactions. Catalyst types, characterisation, manufacture, and industrial applications. Biochemical kinetics and applications. Polymerisation kinetics and reactors. Gas/solid non-catalytic reactions, kinetics, and applications. Gas/liquid reactions and industrial applications. Reactor modelling. Fixed-bed catalytic reactors, tower, and bubble (tank) reactors, fluidised bed reactors. Survey/analysis of existing reactors.

**SEMESTER: 2****COURSE CODE: CHNG 6201****COURSE TITLE: BIOCHEMICAL ENGINEERING II****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Application and analysis of advanced biological systems, biochemical engineering for graduate level students, selected bioprocesses - bioremediation, introduction to bio-process control - use of biosensors, design and implementation of bioprocesses, advances in biochemical engineering, bioprocess laboratory project/research paper, management of bio-processes.

**SEMESTER: 2****COURSE CODE: CHNG 6203****COURSE TITLE: PETROLEUM PROCESSING TECHNOLOGY****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Structure of the international petroleum industry. Analysis and test methods for crude petroleum including condensate and natural gas. Processing structure of petroleum refineries for the manufacture of fuel products. Lubricants and petrochemical precursors. Processing of petrochemical feedstocks - oxidation, hydrogenation, chlorination, nitration, polymerisation, sulphonation and esterification, alkylation, synthesis of CO-H<sub>2</sub> mixtures. Refinery fuel products and lubricants specifications and test methods. Crude topping, distillate fractionation and vacuum distillation - heaters, heat exchange equipment and distillation towers. Conversion processes - cracking and reforming. Treatment processes - desulphurisation, dewaxing, etc. Factors affecting investment decisions in petroleum processing, scheduling. Process economics.

**SEMESTER: 2****COURSE CODE: CHNG 6204****COURSE TITLE: UTILITY ENGINEERING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to plant operation, plant start up prime movers, steam engines, steam turbines, internal combustion engines, gas turbines, air compression C.S.A.B. - 52 lubrication. Heating and air-conditioning systems and accessories, refrigeration systems. ASME Code Section 1, calculations of cylindrical components, tubing, piping, stayed and unstayed surfaces, openings and compensation, safety valves. Water treatment impurities, internal and external treatment, analytical methods, industrial waste treatment, gas turbines, types, components, applications. Fuels, furnaces, design, ash handling, fluid gas treatment, draft, fan types, fan control, draft calculations, steam turbines, principles of operation, construction, control, maintenance, commissioning, condensing equipment, alternators, pressure vessels and components inspection, safety, hazards. Operation and maintenance, piping, support, expansion, methods of connecting. Pumps, types, construction compressors, types, accessories, operation, maintenance, applications.

**SEMESTER: 2****COURSE CODE: ENGR 6005****COURSE TITLE: POLLUTION PREVENTION, CLEANER PRODUCTION & INDUSTRIAL WASTE ABATEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Preventative environmental strategies vs. end-of-pipe treatment, environmentally friendly product design, low-waste production technologies, efficient use of energy and raw materials, optimisation of existing technologies, operational safety, integrated approach to waste minimisation. In plant survey. Waste minimisation through volume and strength reduction process modification, separation, and segregation, recycle and reuse technology. Characterisation of liquid, solid and gaseous wastes from important industries of the country or region. Treatment of wastes from different industries - case studies. Combined treatment plant for small-scale industries.

**SEMESTER: 2****COURSE CODE: ENGR 6006****COURSE TITLE: WATER & WASTEWATER ENGINEERING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Water quality and beneficial uses. Water quality criteria and drinking water guidelines and standards. Water quality indices. Physicochemical processes for water and wastewater treatment, sedimentation, flotation, chemical coagulation and flocculation, filtration, ion exchange, adsorption, precipitation, disinfection, aeration, membrane processes, water demand and distribution. Wastewater quantities, wastewater collection system and characteristics of municipal wastewater. Preliminary, primary, secondary, and tertiary treatment of wastewater. Reactor kinetics, reactor types and their analyses. Aerobic and anaerobic process design. Activated sludge and its modification, trickling filter, rotating biological contractors, suspended, and attached growth anaerobic systems. Stabilisation ponds, aerated lagoons, etc. Sludge treatment and disposal. Treated effluent disposal in inland waters and marine environment. On-site waste treatment.

**SEMESTER: 2****COURSE CODE: ENGR 6007****COURSE TITLE: AIR POLLUTION CONTROL****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Introduction/sources of air pollution, air pollution, effects, air pollution control laws and regulations, air pollution control philosophies, air pollution measurements, emission estimates, meteorology for air pollution control engineers, air pollutant concentration models, general ideas in air pollution control, the nature of particulate pollutants, control of primary particulates, control of volatile organic compounds (VOCs), control of sulphur oxides, control of nitrogen oxides, the motor vehicle problem, air pollution and the global climate. Control devices and strategies.



**SEMESTER: 2****COURSE CODE: CHNG 6303****COURSE TITLE: DESALINATION****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Water source selection, pretreatment consideration: chemical treatment, degasification and deaeration, filtration. Evaporation: Single and multiple effect evaporators; Single and multiple effect evaporation - vapor compression. Membrane techniques: Reverses osmosis, Selection of membranes, Fouling and biofouling, Modelling of systems using ROSA. Post treatment considerations: Remineralisation and aeration, Waste Disposal.

**SEMESTER: 2****COURSE CODE: MENG 6402****COURSE TITLE: HUMAN RESOURCE MANAGEMENT I****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Formal and informal organisation, the bureaucratic model, the organisational environment, modern organisation theory, the individual in the organisation, SKAO, theories of motivation and leadership industrial relations, IRA, RSBA, communication in organisations, performance appraisal systems.

**SEMESTER: 2****COURSE CODE: MENG 6405****COURSE TITLE: TOTAL QUALITY MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Philosophy and principles of total quality management, customer satisfaction, quality systems, quality tools, continuous improvement, employee involvement and empowerment, supplier partnerships, benchmarking, quality function deployment, statistical process control, Taguchi's quality engineering, experimental design.

**SEMESTER: 2****COURSE CODE: MENG 6502****COURSE TITLE: FINANCIAL MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Analysis of financial statements, financial forecasting and planning, risk, return and valuation, capital budgeting, financial structure and leverage, cost of capital, financing mix decisions, current asset management, cash, marketable securities, accounts receivables, inventory and short-term financing, long-term financing, common stock, debt, preferred stock, term loans and leasing, dividend policy.

**SEMESTER: 3****COURSE CODE: ENGR 6701****COURSE TITLE: MANAGEMENT & LEADERSHIP SEMINARS****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Active participation in seminars and discussions on topics including Project management, case studies in human resource management, business processes and marketing, new venture and product development, supply chain management, HSE and other related areas.

# Food Science and Technology

**SEMESTER: 2**

**COURSE CODE: FOST 6000**

**COURSE TITLE: FUNDAMENTALS OF FOOD PROCESS ENGINEERING**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** The basic engineering concepts of fluid flow, heat transfer and mass transfer in food processing operations and quantitative problem-solving in unit operations likely to be encountered in the food industry. Topics include Material and Energy Balances, Fluid flow in pipes and pressure drop, Bernoulli equation, Modes of heat transfer, heat exchangers, Pasteurisation, Canning and Sterilisation, Process time calculations, Psychrometry, Drying kinetics, Refrigeration and freezing systems.

**SEMESTER: 2**

**COURSE CODE: FOST 6001**

**COURSE TITLE: SANITATION IN FOOD PROCESSING**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** Principles and practices of food plant sanitation. The Food Code and Food Standards. Site & location selection for food processing facilities. Cleaning and sanitation. Control and evaluation of microbial, insect and rodent contamination. Pest Control. Hygienic design and construction of buildings and equipment. Ancillary facilities. Organisation of a sanitation control programme. Personal and personnel hygiene. Water and air. Food allergens. Waste & wastewater treatment and disposal. GMPs, SOPs, SSOPs and HACCP public health regulations

**SEMESTER: 1**

**COURSE CODE: FOST 6002**

**COURSE TITLE: FOOD PACKAGING**

**NO. OF CREDITS: 2**

**PREREQUISITES: NONE**

**SYLLABUS:** Formulation of materials. Basic uses of packaging materials. Packaging design. Physical and chemical properties of packaging materials. Advantages and limitations of packaging materials. Test methods. Shipping forms.

**SEMESTER: 1**

**COURSE CODE: FOST 6003**

**COURSE TITLE: FOOD CHEMISTRY**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** Food chemistry is an interdisciplinary subject which deals with the chemical, physical and functional properties of food constituents and the chemical changes these constituents undergo during handling, processing and storage including those that limit food shelf life. Topics include: Chemistry and physics of the major food constituents. Composition and structure of foods. Chemical reactions involved in food processing, storage and handling.

**SEMESTER: 2**

**COURSE CODE: FOST 6004**

**COURSE TITLE: FOOD PROCESSING LABORATORIES**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** Laboratory exercises in the preservation and processing of meat, poultry, seafood, dairy products and fruits, vegetables, root crops and tubers. Processes will include thermal processing (canning), batch and high temperature short time (HTST) pasteurisation of milk, fruit juices and beverages. Production of soya products such as soy milk and tofu. Production of jams, jellies, and marmalades. Oven, spray, drum and freeze drying. Meat curing and smoking. Production of fermented foods, e.g., yoghurt.

**SEMESTER: 1****COURSE CODE: FOST 6005****COURSE TITLE: FOOD MICROBIOLOGY****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Introductory microbiology. Microorganisms important in food microbiology. Principles of contamination, preservation, and food spoilage. Food safety management and associated standards e.g., HACCP. Epidemiological investigations. Microorganisms in the production of foods. Food intoxications and infections. Fermentations and biotechnology. Genetic foods advantages and challenges. Microbiology in food plant sanitation. Methods for detection, enumeration and identification of spoilage and pathogenic microorganisms. Food safety and risk assessment. Laboratory practicals in microbiological procedures, the production of microbially-produced foods, their evaluation and associated reporting procedures.

**SEMESTER: 1****COURSE CODE: FOST 6006****COURSE TITLE: FOOD QUALITY ASSURANCE****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Responsibilities and organisation of the quality assurance department. Quality management, systems and procedures. Quality standards. Quality attributes- colour, flavour, kinesthetics, shape, size and defects. Sensory Evaluation. Statistical methods. Sampling and Inspection. Recording and reporting. Grades and standards. Control charts. Production control. Food analysis - methods and instrumentation. Laboratory practicals in the evaluation of quality attributes and associated reporting procedures.

**SEMESTER: 1****COURSE CODE: FOST 6007****COURSE TITLE: PRESERVATION AND PROCESSING OF MEAT AND POULTRY****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** The study and applications of the principles and techniques involved in processing meat and poultry. The manufacture of further processed products. Structure, physical and chemical composition of muscle and major organs. Meat quality. Pre- and post-slaughter handling practices and their effects on meat quality. Meat packaging.

**SEMESTER: 2****COURSE CODE: FOST 6008****COURSE TITLE: PRESERVATION AND PROCESSING FRUITS AND VEGETABLES****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Effect of post-harvest handling on the processing quality of fruits and vegetables. Unit operations of thermal processing, dehydration, refrigeration and freezing. Juices and beverages- their preparation and preservation. Processing of miscellaneous vegetables. Jams, jellies, and marmalades. Preserves, candied and crystallised products. Pickles and sauces. By-product utilisation.

**SEMESTER: 1 & 2****COURSE CODE: FOST 6019/FOST 6020****COURSE TITLE: FOOD SCIENCE MSC RESEARCH PROJECT****NO. OF CREDITS: 6****PREREQUISITES: NONE**

**SYLLABUS:** To undertake relevant research in the areas of food quality, food safety and risk assessment, food fermentations, food packaging, food dehydration, root crops, cocoa and underutilised fruits and vegetables.

**SEMESTER: 2****COURSE CODE: MENG 6508****COURSE TITLE: RESEARCH METHODS****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to research methods. Research process from conceptualisation to analysis and conclusions. Types of research, defining a research topic, originality and thinking of research, identifying issues and objectives for research, developing research methodology, literature review, finding research material, data collection, referencing and citation, executing the research, hypothesis testing, data analysis, reporting the findings of the research, dealing with supervisors.

# Petroleum Engineering and Reservoir Engineering

**SEMESTER:****COURSE CODE: PENG 6000****COURSE TITLE: PETROLEUM GEOSCIENCE****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to Geology, Earth Structure, Plate Tectonics, Geological Time, and History; Minerals and Rocks; Rock Forming Processes with Environments of Deposition; Sedimentary basins; Structural Geology and Hydrocarbon Traps; Origin, Migration and Accumulation of Petroleum; Composition of Hydrocarbons and Reservoir Characteristics. The petroleum reservoir; Geophysical exploration techniques. Mapping - Surface and Subsurface; Geological Laboratory. Field Trip. Petroleum Engineering vocabulary; Units. Pressures. Routine core analysis, laboratory procedures. Characteristics of reservoir rocks; pore space representation. Porosity; saturation; Volumetric representation of hydrocarbon in place. Permeability, Darcy and non-Darcy Flow; linear and radial flow; datum correction; Saturation effects; capillary pressure, relative permeability essentials.

**SEMESTER:****COURSE CODE: PENG 6001****COURSE TITLE: ADVANCED PETROLEUM GEOLOGY & GEOPHYSICS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Interpretation of geological and geophysical data; Geological history of Trinidad & Tobago; Structural and stratigraphic setting of hydrocarbon occurrences; Hydrocarbon prospects; Evaluation of prospects; Seismic acquisition; Processing and interpretation of 2-D and 3-D data; Case studies.

**SEMESTER:****COURSE CODE: PENG 6002****COURSE TITLE: DRILLING ENGINEERING & COMPLETIONS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Rotary drilling rigs. Rig components, Drilling bits and bottom-hole assemblies; Coring. Drilling fluid systems. Mud engineering; Subsurface control and safety; Blowout prevention and wellhead equipment; Bore hold stability; Pressure losses; Rig hydraulics; Deviated drilling; Directional drilling; Horizontal well drilling; Hole problems and solutions; Fishing and stuck pipe; Drill string and casing string design; Solids removal; Pore pressure prediction and fracture hydraulics; completion techniques; Casing strings and setting depths. Subsea completions; Computer modelling; AFE; Offshore drilling and equipment. Drilling Safety. Drilling practice in Trinidad. Well completion design. Casing, Tubing & Wellhead Equipment; Packers; Downhole Tubulars; Subsurface control and safety; Cementing; Perforating; Completion/Workover fluids; Sand control; wireline operations; Coiled Tubing; Stimulation; Horizontal wells; Workover Programmes; Case studies.

**SEMESTER:****COURSE CODE: PENG 6003****COURSE TITLE: ADVANCED DRILLING ENGINEERING & WELL COMPLETION****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Drilling fluids; Surface chemistry; Non-Newtonian flow and pressure losses in the circulating system; Surge and swab pressures; Solids removal; Pore pressure prediction and fracture hydraulics; Blowout prevention and wellhead equipment; Bore hold stability; Deviated drilling; Hole problems and solutions; Drill string and casing string design; Offshore drilling and equipment; Cementing, completion techniques; Completion/workover fluids; Subsea completions; Rig selection and evaluation; Bid evaluation; Sand control; Stimulation; Computer modelling; Case studies.

**SEMESTER:****COURSE CODE: PENG 6004****COURSE TITLE: ADVANCED PRODUCTION ENGINEERING & TECHNOLOGY****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Concept of nodes in the total production system; Inflow performance relationships; Single and multiphase flow; Nodal analysis; Natural and artificial lift methods and equipment; Production processes at surface; Control and instrumentation; Production logging; Pressure and rate measurement; Subsurface control and safety; Wellhead systems; Production economics.

**SEMESTER:****COURSE CODE: PENG 6005****COURSE TITLE: RESERVOIR EVALUATION****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Well logging: Logging methods and interpretation techniques; Conditions around the wellbore, effects on measurements of mud filtrate invasion, formation contents etc. The terminology of well logging,  $S_w$ ,  $S_{xo}$ ,  $R_t$ ,  $R_{xo}$  etc. Formation and fluid properties; The physical principles involved in geophysical well logging: electrical logs; sonic log; radioactivity logs; dipmeter log. The Archie Equations in clean formations. Discussion of the uncertainties involved. Estimation of porosity in different lithologies. Cross-plots for porosity and lithology, uncertainties. Estimation of water saturation. Gas effects. Differentiation between gas and oil hydrocarbon saturation. Effects of shaliness and modified equations. Shale estimation. Computed logs; Local field examples. Well testing: Principles of Pressure Transient Test Analysis; Diffusivity Equation; Analysis of Buildup and Drawdown Tests; Multi-rate testing; Type-curve Analysis; Determination of skin; wellbore storage, drainage radius and stabilisation time; Gas well-testing; Real gas potential application; Other well tests. Gas well-testing; computer logging packages. Local field examples.

**SEMESTER:****COURSE CODE: PENG 6006****COURSE TITLE: ADVANCED WELL TEST ANALYSIS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Diffusivity equation; Constant rate and constant pressure; Solutions; Effects of total skin and wellbore storage; Type-curve analysis; Varying wellbore storage; Determination of average pressure; Radius of drainage and stabilisation time; Multiphase flow; Real gas potential application; Multi-rate, interference, pulse and vertical permeability testing; Layered systems; Fractured reservoirs; Faults; Channel sands; Use of pressure and its time derivative in type curve matching; Gas well-testing; Real gas potential application; gas flow tests with non-Darcy flow; extended well testing. Computerised methods of analysis. Local field examples.

**SEMESTER:****COURSE CODE: PENG 6007****COURSE TITLE: RESERVOIR ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Hydrocarbon Composition; Properties of reservoir rocks and fluids; Phase behaviour; Vapour-liquid Equilibria; Oil and gas reservoirs; Drive mechanisms; Pore Volume Compressibility; Reservoir mechanics: PVT Analysis, General material balance; Natural water influx.

**SEMESTER:****COURSE CODE: PENG 6008****COURSE TITLE: ADVANCED RESERVOIR ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: PENG 6007**

**SYLLABUS:** Dry gas, gas-condensate and oil reservoirs; Material balance and applications; Tarner's method; Natural water influx; Immiscible flooding; Reservoir simulation - single and multi-phase; Compositional simulators; Computer simulation exercises.

**SEMESTER:****COURSE CODE: PENG 6009****COURSE TITLE: STRATEGIC PETROLEUM MANAGEMENT & ORGANISATIONS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** The nature and role of strategy in petroleum operations; Involvement of strategy in organisations; Structuring change; Leadership styles; Life cycles; Range of strategic planning and organisational behaviour; Learning and Development; Communicating strategy; Corporate cultures; Analysis of the corporate environment; Response to challenges.

**SEMESTER:**

**COURSE CODE: PENG 6010**

**COURSE TITLE: IMPROVED OIL RECOVERY**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Microscopic Displacement; Macroscopic Displacement; Waterflooding; Problems of waterflooding. Models - Buckley Leverett Stiles. Miscible and Immiscible Fluid Displacements; Carbon dioxide flooding; Ternary Diagrams; Minimum Miscible Pressure; Enhanced Oil Recovery Methods; Thermal methods of oil recovery; Steam flood models- Marx Langenheim, Boberg and Lantz; Heavy oil problems relevant to Trinidad. Well completion types for thermal processes; Other IOR processes. Screening Criteria; Reservoir simulation - single and multi-phase; Computer exercises.

**SEMESTER:**

**COURSE CODE: PENG 6011**

**COURSE TITLE: PETROLEUM ECONOMICS, LAW & CONTRACT ADMINISTRATION**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** World energy supply/demand; Oil pricing; Petroleum leasing/contracts; Petroleum taxation; Comparison of petroleum natural gas; Managing petroleum resources; Petroleum act and regulations; Petroleum taxes act; Income tax in aid of industry act; Contractual arrangements; Drilling contracts; Natural gas contracts; Service (rental) contracts; Services contracts; Oil sales/purchase contracts.

**SEMESTER:**

**COURSE CODE: PENG 6012**

**COURSE TITLE: NATURAL GAS ENGINEERING**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Properties of Natural Gas Systems; Gas Volumes; Reserve estimates; Pressure Transient Testing of Gas Wells; Deliverability Testing of Gas Wells; Gas Flow Measurement; Compression of Natural Gas; Gas Conditioning and Processing; Uses of natural gas; LNG; Field Development/Management; Gas Transmission/Pipeline Design Considerations; Offshore Operations; Gas Contracts.

**SEMESTER:**

**COURSE CODE: PENG 6013**

**COURSE TITLE: FINANCIAL MANAGEMENT & ACCOUNTING**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Basic principles of financial management; Financial reporting and the local regulatory framework; Financial ratio analysis; Corporate report analysis; International differences in petroleum finance; Budgeting and budgetary control; Short-term decision analysis; Long-term decision analysis; Introduction to strategic financial management; Balance sheets; Profit and loss accounts; Management of working capital; Preparation of management accounting statements; Investment appraisal techniques.

**SEMESTER:**

**COURSE CODE: PENG 6014**

**COURSE TITLE: OFFSHORE STRUCTURES & SYSTEMS**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Oil and gas production facilities; Dynamics of floating structures; Floating production systems; Offshore loading; Offshore storage facilities; Articulated columns; Submerged production systems.

**SEMESTER:****COURSE CODE: PENG 6015****COURSE TITLE: PRODUCTION ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Productivity Index (PI) and the Inflow Performance Relationships (IPR) for oil and gas wells. Single and multiphase flow; tubing sizing; Nodal analysis; Natural and artificial lift methods and equipment; Typical production profiles (plateau and exponential decline). Control and instrumentation; Pressure and rate measurement; Production logging; Surface operations; Wellhead systems; Surface facilities - onshore, offshore. Design and operation of crude oil separation, Emulsion breaking; liquid recovery. Gas production. Sand control; Wax and asphaltine problems, Hydrate prevention; Stimulation – acidisation and fracturing. HSE in production. Local field examples.

**SEMESTER:****COURSE CODE: PENG 6016****COURSE TITLE: PETROLEUM ECONOMICS & MANAGEMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** World energy supply/demand; Oil pricing; Petroleum taxation systems and comparisons; Cash flow, profit and profitability; Uncertainty and risk; Incremental investments; Contractual arrangements; Economic issues in natural gas; Managing petroleum resources.

**SEMESTER:****COURSE CODE: PENG 6017****COURSE TITLE: SELECTED TOPICS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** A series of lectures on topics of relevance to petroleum engineering but not covered in other courses.  
Assessment: Coursework only.

**SEMESTER:****COURSE CODE: PENG 6018****COURSE TITLE: HUMAN RESOURCE MANAGEMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Social environment of the petroleum industry; Managing change and creating effectiveness; Management structures; Diagnosis of change; Conflict management; Leadership; The strategy; Human resource planning; Organisations and culture; Communication; Labour markets; Trade unions and the collective bargaining process in petroleum industries; Work design and motivation; Management development; Evaluation and reward.

**SEMESTER:****COURSE CODE: PENG 6020****COURSE TITLE: ECONOMIC & QUANTITATIVE AIDS TO DECISION-MAKING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Linear programming; Non-linear programming; Network planning techniques; Simulation in petroleum industry situations; Demand and supply of key commodities in the petroleum industry; Demand analysis; Energy market structures; Pricing practices; The role of the state in the market economy; Decision-making under uncertainty, time value of capital, correlation and regression analysis, analysis of time-series data, stochastic decision-making and Markov Analysis; Other decision-making models.

**SEMESTER:****COURSE CODE: PENG 6021****COURSE TITLE: PETROLEUM PRODUCTION PLANNING & CONTROL****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Decision theory; Forecasting techniques in petroleum production operations; Processing and capacity planning; Inventory management; Material requirement planning; Sequencing and line balancing; Scheduling operations; Resource allocation; Project management techniques.

**SEMESTER:**

**COURSE CODE: PENG 6022**

**COURSE TITLE: MAINTENANCE & SAFETY MANAGEMENT**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** Maintenance activities; Types of maintenance; Troubleshooting; Production equipment; Drilling equipment and maintenance; Scheduling planning activities for maintenance; Repair and programming design and evaluation; Health safety and welfare; Provision and role of the management in safety and awareness; Management of health; Occupational safety; Accidents and their causes; Financial implications of accidents; Protective devices; Legislation for safety and environmental issues.

**SEMESTER:**

**COURSE CODE: PENG 6023**

**COURSE TITLE: RESEARCH METHODS**

**NO. OF CREDITS: 3**

**PREREQUISITES: NONE**

**SYLLABUS:** Introduction to research methods. Research process from conceptualisation to analysis and conclusions. Types of research, defining a research topic, originality and thinking of research, identifying issues and objectives for research, developing research methodology, literature review, finding research material, data collection, referencing and citation, executing the research, hypothesis testing, data analysis, reporting the findings of the research, dealing with supervisors.

**SEMESTER:**

**COURSE CODE: PENG 6024**

**COURSE TITLE: PROJECT**

**NO. OF CREDITS: 9**

**PREREQUISITES: NONE**

**SYLLABUS:** Each candidate will also be required to submit a Project Report of an individual analysis of a problem.

**SEMESTER:**

**COURSE CODE: PENG 6017**

**COURSE TITLE: SELECTED TOPICS**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** A series of lectures on topics of relevance to petroleum engineering but not covered in other courses.

**SEMESTER:**

**COURSE CODE: PENG 6025**

**COURSE TITLE: GROUP FIELD PROJECT**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** The group field design project is a reservoir evaluation/development exercise of part of a licence block and the preparation of recommendations for development of a gas and/or oil field through to abandonment carried out by groups of three/six students. Active participation by all the group members is essential. The initial data are made available at the start of the semester. The group projects will be assessed initially by presentation to section staff, and selected groups may make further presentations to an invited audience from the industry.

**COURSE CODE: PENG 6026**

**COURSE TITLE: DIRECTED READING**

**NO. OF CREDITS: 4**

**PREREQUISITES: NONE**

**SYLLABUS:** An in-depth critical review by the student of the current literature in a special topic of importance to Petroleum Engineering. The student will prepare a report and present the findings at a seminar.



**COURSE CODE: PENG 6028****COURSE TITLE: FORMATION EVALUATION****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**Syllabus:** Well logging: Logging methods and interpretation techniques; Conditions around the wellbore, effects on measurements of mud filtrate invasion, formation contents etc. The terminology of well logging, Sw, Sxo, Rt, Rxo etc. Formation and fluid properties; The physical principles involved in geophysical well logging: electrical logs; sonic log; radioactivity logs; dipmeter log. The Archie Equations in clean formations. Discussion of the uncertainties involved. Estimation of porosity in different lithologies. Cross-plots for porosity and lithology, uncertainties. Estimation of water saturation. Gas effects. Differentiation between gas and oil hydrocarbon saturation. Effects of shaliness and modified equations. Shale estimation. Computed logs; Local field examples. Integration of wireline logging data with basic core data to assess formation lithology, porosity and permeability. Core analysis and laboratory measurements of saturation and rock properties such as porosity, permeability, relative permeability, wettability, capillary pressure, and their application to reservoir studies, six lab sessions using the latest well logging software and one lab session on experimental measurement of reservoir rock properties.

## Construction Management

**SEMESTER: 2+****COURSE CODE: COEM 6018****COURSE TITLE: THE INDEPENDENT RESEARCH PROJECT****NO. OF CREDITS: 9****PREREQUISITES: SUCCESSFUL COMPLETION OF ALL REQUIRED CORE AND OPTIONAL COURSES**

**SYLLABUS:** The research project takes the form of an investigation into a topic of significance to the construction sector and is intended to ensure the capacity of the student to apply skills acquired within the prescribed courses. It is executed under the direction of one or more supervisors approved by the Department and is examined by the submission of a written report, which is required to conform to the general standards for MSc projects within the Faculty of Engineering. The project shall be formally assigned as soon as practicable after the results of the written examinations are available, and in any case not normally later than July 1 in any year. The project shall normally be completed within three (3) months of being assigned, i.e., by the end of September of the year in question. Any project not completed at the end of December of the year of assignment shall require formal approval of extension of time.

**SEMESTER: 1****COURSE CODE: COEM 6003****COURSE TITLE: ORGANISATION & MANAGEMENT OF CONSTRUCTION****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** The functions of managers; planning, organising, controlling, and leading. The role of managers; interpersonal, informational, and decision-making. The evolution of management thought, from the Industrial Revolution to now. Professional ethics and the engineer/manager. Problem-solving and decision-making. Initiative and creativity. Information Technology (IT) and management information systems (MIS), and the role of computers in information management. The management of quality; TQM and ISO 9000.

**SEMESTER: 1****COURSE CODE: COEM 6005****COURSE TITLE: CONSTRUCTION PROJECT MANAGEMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** This course addresses the culture, principles and techniques of project and programme management. The following are covered: What is a project? What is project management? The project life cycles for different industries, project context: planning the project (project selection - tools and techniques), scope management defining the project. Project planning, work breakdown structures, Gantt Chart, PERT Chart, CPM, preparing the master plan, project budgeting, responsibility matrix, communication plan, project criterion for success, project control (project baseline, status reporting, control cycle, monitoring and control tools, resource grading, change control, resource leveling, variance reporting tools, project audit). Implementation, project finalization and close-out. Project cost, risk, and quality management. What is programme management, benefits of programme management, programme management organisation/programme planning, benefits management, stakeholder management, programme management processes, effective project, and programme teams. The project support office, audit, applications of project management software, e-business programme management.

**SEMESTER: 1****COURSE CODE: COEM 6006****COURSE TITLE: CONSTRUCTION ACCOUNTING & FINANCE****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to accounting: the nature and purpose of financing accounting, business entity, chart of accounts, recording accounting transactions, the accounting cycle, profit and loss statement, balance sheet, accounting ratios, accounting controls. Introduction to Management Accounting: cost classification, methods of costing, job costing and contract costing, integrated accounts. Introduction to Financial Management: project financing, budgeting, financial planning, and cost control. Construction claims, performance of construction contracts.

**SEMESTER: 1****COURSE CODE: COEM 6009****COURSE TITLE: CONTRACT MANAGEMENT & CONSTRUCTION LAW****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** An introduction to the different legal systems. The impact of law on the delivery of engineering goods and services; Law and the construction sector. The making of law and the courts; litigation. The elements of contract law and relation with the construction sector. Types of contracts; Different procurement systems; Standard form building contracts (specifications codes of practice; Standards, statutes and local government regulations); The elements of the Law of Tort, disputes and conflict resolution methods; Professional associations, codes of ethics, professional liability; Construction claims; Different forms of business organisations; Business law and the company act; Health and safety legislation; Environmental law; Introduction to intellectual property; Confidentiality of information; Warranties and indemnity. Introduction to international law.

**SEMESTER: 1****COURSE CODE: COEM 6013****COURSE TITLE: MATERIALS TECHNOLOGY****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Factors affecting the choice and use of materials in construction. The general properties and behaviour of the major types of construction materials. Factors affecting the production of the construction materials in major use in the Caribbean. Specifications, standards, and testing of materials. Methods of improving the properties and performance of materials. Major-project patterns in the Caribbean (e.g., marine projects) and the resultant demands for materials performance. Materials procurement, handling, storage, and extraction control.

**SEMESTER: 2****COURSE CODE: COEM 6015****COURSE TITLE: MAINTENANCE & FACILITIES MANAGEMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Maintenance awareness. Planned maintenance, maintenance management systems. Maintenance of facilities. Maintenance policy - housing, offices, industries - private and public sector projects. Maintenance surveys, repairs, rehabilitation of structures. Corrosion in construction, building defects, deterioration, repair procedures. Performance audit, reliability, performance evaluation. Maintenance financing, budget. Planning considerations, upgrading, recycling, reuse. Maintenance manuals, checklists, information systems.

**SEMESTER: 1****COURSE CODE: COEM 6016****COURSE TITLE: NATURAL HAZARDS MANAGEMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** The course deals with the genesis and nature of natural hazards, their physical and theoretical basis as well as their operation and propagation. It deals with their economic and social impact; vulnerability of structures; policy and legislation; planning response; engineering and physical response; the development of site-specific disaster plans; international, regional, and local response agencies; evacuation and evacuation drills and simulations; search and rescue; recovery, emergency relief shelter management and risk analysis.

**SEMESTER: 2****COURSE CODE: COEM 6020****COURSE TITLE: RESEARCH METHODS****NUMBER OF CREDITS: 3**

**SYLLABUS:** The topics covered in the unit will include Principles of research, information sources, research design, research methodology, data collection, data analysis, presenting research proposals and writing research reports.

**SEMESTER: 2****COURSE CODE: COEM 6025****COURSE TITLE: PRACTICAL TEAM PROJECT****NUMBER OF CREDITS: 5**

**SYLLABUS:** The projects are based upon real schemes and involve information gathering, planning, organisation, coordination, detailed assessment of ideas, reporting and presentation.

## Coastal Engineering and Management

**SEMESTER: 1****COURSE CODE: CZEM 6100****COURSE TITLE: COASTAL PROCESSES & HAZARDS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Description and calculation procedures for tides; currents (Caribbean), storm surges; global wind systems, hurricanes, linear wave theory, wave transformation and attenuation processes, random waves, short- and long-term wave statistics, design wave specification, wave prediction from wind records, wave-induced longshore currents; coastal sediment transport, sediment budgets, assessing site functionality and vulnerability to coastal disasters.

**SEMESTER: 1****COURSE CODE: CZEM 6101****COURSE TITLE: COASTAL GEOMORPHOLOGY****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Coastal classification and morphology, volcanic coasts, reefs, corals, estuaries and wetlands, continental shelf; coastal morphodynamics, coastal inlets, morphodynamics and shoreface processes; geotechnical investigations; slope and embankment stability; soil liquefaction, stabilisation, compaction, bearing capacity and settlement.

**SEMESTER: 1****COURSE CODE: CZEM 6130****COURSE TITLE: PRINCIPLES OF COASTAL DEFENCE MANAGEMENT AND ENVIRONMENTAL ASSESSMENT****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** The functional performance of coastal defence techniques including artificial headlands, offshore breakwaters, groynes, beach nourishment, sea walls and revetments, managed retreat. Identification of their environmental impacts and opportunities. Introduction to shoreline management plans and coastal zone plan development. Objectives of EIA, legal context, scope of impacts of coastal developments, watershed impacts; mitigation and remedial measures, control measures, consequences of infringement, monitoring and management.

**SEMESTER: 2****COURSE CODE: CZEM 6102****COURSE TITLE: COASTAL ZONE METRICS****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Descriptive statistics; nearshore and upland sampling, measurements and monitoring techniques for storms, beach profiling, tidal, wind and wave measurements, currents, and sediments; aqueous sampling techniques; coastal resources, hazards, classification and configuration, coastal hazard vulnerability tools; database development; spatial techniques and web-based solutions

**SEMESTER: 2****COURSE CODE: CZEM 6106****COURSE TITLE: DESIGN OF COASTAL STRUCTURES****NO. OF CREDITS: 4****PREREQUISITES: NONE****SYLLABUS:** Deterministic and probabilistic design methods for coastal applications.

The structural performance of coastal structures: Design wave loading; design methods for jetties, breakwaters, sea walls, revetments, and beach renourishment. Design for enhancement of capacity in response to climate change and sea level rise.

**SEMESTER: 2****COURSE CODE: COEM 6020****COURSE TITLE: RESEARCH METHODS****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Principles of research, information sources, research design, research methodology, data collection, data analysis, presenting research proposals, writing research reports.

**SEMESTER: 2****COURSE CODE: CZEM 6112****COURSE TITLE: COASTAL ZONE MODELLING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to modelling concepts, types and time scales including process-based numerical models and scaled physical models, behaviour-based numerical models, Geomorphological analysis and parametric equilibrium models. Concepts of computational fluid dynamics; Navier Stokes equations, numerical solution techniques, practical application of models. Wave model types and applicability. Coastal morphodynamic model types and applications. Circulation models. Physical models. Case studies; wave and current models and morphodynamic models.

**SEMESTER: 3****COURSE CODE: CZEM 6180****COURSE TITLE: RESEARCH PROJECT****NO. OF CREDITS: 9****PREREQUISITES: NONE****SYLLABUS: INDICATIVE SYLLABUS**

The material covered will reflect the student's own requirements. In general, all projects will demand: - problem identification and definition of objectives; - planning and execution within time and cost constraints; - information search and its interpretation; - evaluation resulting in the making of conclusions.

The project may be suggested by a member of staff, by the individual student or an industrial concern. Industry generated projects must be approved by academic staff as being suitable before being accepted.

Project allocation procedures provide each student to: - select a preferred area, based upon a taught programme or upon previous experience; - discuss projects with prospective supervisors; - agree on a particular project, supervisor, and outline project terms of reference.

Each project will be supervised by a member of academic staff who will monitor progress, offer guidance, and encourage the student to take the active lead role in researching and the development of the project. The need to plan the objective and outcomes against a time scale will be stressed.

## Civil & Environmental Engineering

(TO BE READ IN CONJUNCTION WITH SYLLABUSES FROM OTHER DEPARTMENTS AND PROGRAMMES WHERE APPLICABLE)

**SEMESTER: 1****COURSE CODE: CIEN 6000****COURSE TITLE: ADVANCED ENVIRONMENTAL ENGINEERING  
SYSTEMS DESIGN****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Water supply and treatment systems; Wastewater collection and treatment; Solid waste management; urban drainage systems; Air and noise pollution prevention and mitigation in built environment.

**SEMESTER: 1****COURSE CODE: CIEN 6001****COURSE TITLE: ADVANCED STRUCTURAL ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Flexibility and stiffness methods; numerical methods in Structural Engineering, non-linear analysis; computer aided analysis and design.

**SEMESTER: 2****COURSE CODE: CIEN 6002****COURSE TITLE: ROAD NETWORK CONSERVATION****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Road networks, classes, function, and configuration; Pavement Maintenance Management Systems; Roadway characteristics, vehicle fleet costs and performance; Maintenance and rehabilitation strategies and policies; Pavement design and performance prediction models; Road pricing, sustainable maintenance budgeting and financing, optimisation and programme development.

**SEMESTER: 2****COURSE CODE: CIEN 6005****COURSE TITLE: PROJECT: CIVIL ENGINEERING DESIGN IV****NO. OF CREDITS: 9****PREREQUISITES: COMPLETION OF ALL REQUIRED CORE AND OPTIONAL COURSES**

**SYLLABUS:** This course is a capstone project designed to generate a learning atmosphere that is close as possible to the experience of working on the design of a real engineering project. The project work engenders a sense of leadership in the student and draws on the first three years of learning in the programme. The emphasis is on self-learning, creativity, design, understanding, project team-working and communication skills, as well as engineering judgment and problem solving. The projects are interdisciplinary, with the involvement of students from other departments, experienced practicing professional engineers in addition to the UWI supervisors and tutors, as well as other Engineering Departments in the Faculty. Students may also pursue internship/industry projects that are approved by the Department. This course applies to the Civil Engineering programme.

**SEMESTER: 2****COURSE CODE: CIEN 6030****COURSE TITLE: PERFORMANCE BASED SEISMIC DESIGN****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Introduction to the principles of Performance Based Earthquake Engineering and Consequence-Based Earthquake Engineering; The Seismic Rehabilitation Design Process and Objectives; Capacity Spectrum NSP Analysis; Coefficient Method NSP Analysis; Acceptance Criteria for Systems analysed by Linear Methods and Nonlinear Methods; Retrofit and Management Strategies and Systems; SAC-FEMA Reliability Analysis Method; Vulnerability Analysis Methods; Software for Pushover Analysis and NDP Analysis; Regional Seismic Risk Assessment; Introduction to HAZUS.

**SEMESTER: 2****COURSE CODE: CIEN 6012****COURSE TITLE: ADVANCED TRANSPORTATION ENGINEERING****NO. OF CREDITS: 4****PREREQUISITES: NONE**

**SYLLABUS:** Transport policy development & evaluation; transportation systems operations and management; application of mathematical programming methods to transportation networks; advanced traffic engineering & traffic studies; application and use of traffic simulation software; design, implementation, and evaluation of traffic management plans; travel demand modelling and forecasting; advances in intelligent transportation systems.

# MASc. Electrical and Computer Engineering

**SEMESTER: 1 & 2**

**COURSE CODE: ECNG 6021**

**COURSE TITLE: MASc RESEARCH I**

**NO. OF CREDITS: 4**

**COURSE DESCRIPTION:** This course represents the first phase of the MASc. Project. Students are expected to identify their project area and proceed to fully engage their research. A 4-credit weighting has been applied to underscore the effort expected in the timely and effective management of the research project. Grading and assessment will be based on the submission of a report.

**SEMESTER: 1 & 2**

**COURSE CODE: ECNG 6022**

**COURSE TITLE: MASc RESEARCH II**

**NO. OF CREDITS: 0**

**COURSE DESCRIPTION:** This course is offered on a PASS/FAIL basis only. During the semester of registration in ECNG 6022 MASc. Research II, it is expected that students would complete their MASc research activity but not yet completed their final report. Assessment will be based on the submission of a report.

**SEMESTER: 1 & 2**

**COURSE CODE: ECNG 6023**

**COURSE TITLE: MASc PROJECT**

**NO. OF CREDITS: 8**

**COURSE DESCRIPTION:** Students registered for the ECNG 6023 MASc. Project are expected to complete their final report for submission no later than three (3) weeks prior to the start of the relevant end-of-semester examinations. ECNG 6023 will be examined by way of a final report submitted by the student and examined by the first and second examiners. Evaluation of ECNG 6023 may include a demonstration, report presentation and oral examination led by a panel comprising the first examiner, second examiner and a moderator.

**SEMESTER: 1**

**COURSE CODE: ECNG 6500**

**COURSE TITLE: COMPUTER-AIDED POWER SYSTEM ANALYSIS**

**NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to revisit fundamental concepts and develop understanding of fundamental techniques employed for power systems analysis. At the end of this course, students will be able to: model the components of power systems; statistically assess power systems and their components; apply the per-unit system to evaluate power system analyses; understand the power transfer problem; calculate symmetrical and asymmetrical fault studies; apply numerical techniques to the solution of large networks and apply computer-based applications for power systems analysis.

**SEMESTER:**

**COURSE CODE: ECNG 6501**

**COURSE TITLE: POWER SYSTEM DYNAMICS**

**NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats with the study and analysis of the dynamic behaviour of electric power systems in response to small and large disturbances. The basic aim is to provide students with the knowledge involved in the operation, planning, and design of electric power systems from the point of view of stability. Additionally, students will learn about modelling and simulation of power systems, especially the synchronous machine and its control systems. This course is designed to provide an adequate background for a career in the electric utilities or in the energy-based industries.

**SEMESTER:**

**COURSE CODE: ECNG 6502**

**COURSE TITLE: POWER SYSTEM OPERATION & PLANNING**

**NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to cover a variety of matters that relate to power system operation and planning. It treats with economic and security methods in power systems; control of interconnected systems; reliability analysis of power systems; system planning and expansion.

**SEMESTER: 1****COURSE CODE: ECNG 6503****COURSE TITLE: ADVANCED POWER SYSTEM PROTECTION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to review the fundamental protection equipment used in a power system, introduce students to their applications and the special considerations of the power system. The problem of improper coordination and proper grading of the power system are also analysed. At the end of this course, students will be able to: understand and apply power system protection equipment; analyse mathematically the operation of comparators; apply current transformers and digital transducers; perform coordination studies on the power system; differentiate between distance protection and power swings; compare the application of digital techniques in power system protection.

**SEMESTER: 1****COURSE CODE: ECNG 6504****COURSE TITLE: ELECTRICAL DRIVES & INDUSTRIAL POWER SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course deals with the utilisation of electric power in electric systems. At the end of this course, students will be able to: define the components required for system development; describe and understand the effects of three phase short-circuit faults and unbalanced faults on the choice of circuit breaker and for specifying cables and transformers; understand and apply the basic techniques in the analysis of the performance of induction motors, d.c. motors and synchronous motors; describe and understand the main numerical methods available for the determination of system parameters and their modification in order to achieve optimal efficiency and performance.

**SEMESTER: 2****COURSE CODE: ECNG 6505****COURSE TITLE: SURGE PHENOMENA & INSULATION COORDINATION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course presents the fundamental types of overvoltages that can be encountered in electric networks, their typical scenarios, and methods of analysis. At the end of this course, students will be able to: identify different types of sources of dielectric stress in the power system; understand the concepts of insulation coordination, insulation levels and related concepts; understand and use mathematical techniques to simulate and study the behaviours of electric networks under transient conditions; analyse the response of the electric network to different types of surges; understand the concepts of wave propagation, calculation of line parameters and their frequency; understand and apply the concepts of different techniques for the mitigation of overvoltages.

**SEMESTER:****COURSE CODE: ECNG 6506****COURSE TITLE: OPTIMISATION TECHNIQUES****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to cover a variety of techniques applicable to optimisation. In particular, it treats with linear programming matters including simplex and revised simplex methods, duality, sensitivity analysis as well as dynamic programming, integer programming methods and network planning techniques. It also covers PERT/CPM; dynamic optimisation methods and applications to engineering systems.

**SEMESTER:****COURSE CODE: ECNG 6507****COURSE TITLE: ENERGY ECONOMICS & PLANNING****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to expose students to aspects of finance, economics, system design, economic operation and short term and long-term generation planning in the context of electric energy systems. At the end of this course, students will be able to: define and analyse the problem of load forecasting; describe the different resources needed for system development; understand and apply the basic techniques used in the analysis of long term and short term generation planning; describe and understand the various financial and computer methods available for arriving at an optimal long term, least cost utility development; characterise the basic principles used to model economic load dispatch; understand and describe the rules and basis for cost allocation and classification in arriving at rates and tariffs.

**SEMESTER:****COURSE CODE: ECNG 6508****COURSE TITLE: POWER SYSTEM INSTRUMENTATION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course covers a variety of topics that relate to power systems instrumentation. In particular, it treats with signal processing and conditioning; transducers; metering technology (volts, amperes, watts, vars, frequency, etc.); application of P techniques in instrumentation; thermal measurements (flow pressure, temperature, etc.); networking of instruments; application of computers to measurement and display; transient data recorders and maintenance of power system instruments.

**SEMESTER: 2****COURSE CODE: ECNG 6509****COURSE TITLE: SWITCHGEAR & TRANSFORMER TECHNOLOGY****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course reviews the physics of the electric AC arc and its application to circuit breaking. At the end of this course, students will be able to: understand and apply circuit breakers and power transformers; analyse mathematically the operation of circuit breakers and transformers; apply engineering analysis in the selection of circuit breakers and transformers; recognise the importance of the circuit breaker and the transformer in the efficient operation of the power system; understand the difference between the various types of arc media; understand the maintenance requirements of the circuit breaker and transformer.

**SEMESTER:****COURSE CODE: ECNG 6510****COURSE TITLE: POWER SYSTEMS MONITORING & CONTROL****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is designed to cover a variety of systems and techniques applicable to power systems monitoring and control. In particular, it treats with SCADA systems, networking applied to power systems; on-line load flow and security analysis; state estimation techniques and automatic load frequency control. The course contextualises these themes in explorations of modern trends in power system monitoring and control.

**SEMESTER: 2****COURSE CODE: ECNG 6600****COURSE TITLE: REAL TIME SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course provides students with an understanding of Real Time Systems (RTS) theory and the practical issues involved when applying RTS principles to digital control systems. At the end of this course, students will be able to: identify and discuss the real-time characteristics of an application; utilise available techniques to (a) translate application-based specifications into periodic/deadline specifications, (b) map ideal priority levels onto available OS priorities and (c) alleviate constraints due to hardware and interprocess communications; produce schedules for cyclic executive, ideal DM, RM or EDF systems and demonstrate their validity by applying utilisation and response-time based criteria; identify the real-time specific features of a real time OS and contrast it with ideal/open real-time OS; produce a graphical representation of a RTS using UML and related techniques; analyse a RTS in terms of its reliability and fault tolerance; propose a solution for a real-time scenario involving hardware control and implement the solution using a real-time OS kernel.

**SEMESTER: 2****COURSE CODE: ECNG 6601****COURSE TITLE: DIGITAL ELECTRONIC SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course presents the methods and design considerations for the implementation of digital systems on FPGAs. At the end of this course, students will be able to: discuss the timing issues in digital systems; explain the rationale for the techniques employed in implementing digital systems on FPGAs; use VHDL in designing Intellectual Property (IP) Core Modules; design a digital system; understand Functional Verification of Digital Systems; use effectively Xilinx ISE, Modelsim and a Functional Verification Tool in FPGA-based design projects.



**SEMESTER:****COURSE CODE: ECNG 6602****COURSE TITLE: DIGITAL ELECTRONIC DESIGN****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This digital design course focuses on digital electronic design using regionally accessible technology, most particularly, Field Programmable Gate Arrays (FPGA) and Programmable Array Logic (PAL) devices. The course covers logic design tools, design considerations and applications of IP cores in signal/image processing and digital communications. It also treats with the use of formal specification, formal hardware verification and reconfigurable computing. Students will develop a variety of relevant skills through supervised lab sessions, classroom discussions, audio-visual presentations, unsupervised lab activities, research, project execution, report preparations and presentations.

**SEMESTER: 2****COURSE CODE: ECNG 6603****COURSE TITLE: MODERN CONTROL STRATEGIES****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course aims to provide hands-on immersion in advanced control systems design. Topics that will be covered include State Space methods; Optimal Control; Linear Quadratic Regulation (LQR); Linear Quadratic Gaussian (LQG) methods; State Estimation; Optimal State Estimators and Kalman filters; Stochastic Control; Model Reference Adaptive Control (MRAC); Self Tuning Regulators; Intelligent Control Systems and Neuro-Fuzzy Control.

**SEMESTER: 1****COURSE CODE: ECNG 6604****COURSE TITLE: LINEAR CONTROL SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats with the design of advanced control systems that utilise advanced analog or discrete multivariable controllers. Topics that will be covered include mathematical representation of dynamic systems; matrix theory review: eigenvalues and eigenvectors, generalised eigenvectors, Jordan form, functions of a square matrix; concept of state-space description of dynamic systems; controllability and observability; feedback control and state estimation; canonical decomposition of state-space systems; system stability; non-linear systems and their state-space representation; stability analysis; optimal control.

**SEMESTER: 1****COURSE CODE: ECNG 6605****COURSE TITLE: DISTRIBUTED COMPUTER CONTROL****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course introduces the fundamental concepts and theoretical issues in modern distributed computer-controlled systems. At the end of this course, students will be able to: define terms and concepts used in distributed computer controlled systems, distributed operating systems and distributed database systems; distinguish between the different hardware/software architectural models used in the design of distributed systems; recognise the constraints placed on distributed system designs by ancillary issues and propose appropriate strategies/counter-measures; relate industrial practice and standards to the theory of distributed systems; appraise the choice of physical architecture/software infrastructure components for a distributed system application.

**SEMESTER:****COURSE CODE: ECNG 6606****COURSE TITLE: OPTICAL COMPONENTS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course identifies key components used in optical systems: fiber, sources, detectors, amplifiers, modulators, etc. It presents the theoretical foundation for the physical phenomena utilised in the operation of the optical devices and then investigates the performance limitations imposed by these physical processes. Ideal and real characteristics of the optical devices are related to performance specifications represented in commercial data sheets. Case studies treat cost analysis for system design.

**SEMESTER:****COURSE CODE: ECNG 6607****COURSE TITLE: OPTICAL APPLICATIONS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats the design and performance analysis of systems derived from a range of optical applications. Optical applications are drawn from Communications and Instrumentation. At the end of this course, students will have an appreciation for the description of light in terms of its degrees of freedom (amplitude, phase, frequency, polarisation and propagation direction) and the physical processes used to manipulate these parameters for communications, sensing and beam-positioning. Students should be able to evaluate the performance of a range of systems and offer reasonable component selection criteria for the design of such systems. Cost analysis is treated.

**SEMESTER:****COURSE CODE: ECNG 6608****COURSE TITLE: DIGITAL INTEGRATED CIRCUITS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course on digital integrated circuits presents an introduction to Integrated Circuit (IC) fabrication techniques and provides a comparative study of logic families. It reviews the structure of memory elements and focuses heavily on VLSI design using stick diagram, and other relevant techniques.

**SEMESTER:****COURSE CODE: ECNG 6609****COURSE TITLE: ANALOGUE ELECTRONIC SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This graduate course offers an advanced treatment of the analysis and design of discrete analog electronic building blocks. In particular, the course treats with these aspects as they relate to current sources as well as voltage sources and references. It analyses amplifier characteristics and implementations such as the differential amplifier and op-amp circuits. It also treats special function circuits, both integrated and discrete; high power audio amplifier techniques; switch mode power supply design and high frequency amplifier design.

**SEMESTER:****COURSE CODE: ECNG 6610****COURSE TITLE: DIGITAL SYSTEM HARDWARE ORGANISATION & DESIGN****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This graduate course focuses on the architecture of representative processors. It includes coverage of hardware programming languages; machine organisation; hardware realisation; micro-programming; intersystem communication; interrupt and memory mapped I/O; communication and error control; large memory systems and high-speed computer arithmetic realisations.

**SEMESTER:****COURSE CODE: ECNG 6611****COURSE TITLE: SOFTWARE ENGINEERING II****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course opens with a review of design methodologies, modularity and decomposition. It then treats with programme design; design quality; programme implementation and testing; system testing; performance testing and documentation and maintenance. The course covers parallel programming and treats with practical aspects such as phased development; changing schedules and requirements; productivity and updating documentation.

**SEMESTER:****COURSE CODE: ECNG 6612****COURSE TITLE: OPERATING SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats with a variety of topics that relate to operating systems. In particular, it includes coverage of Communicating Sequential Process (CSP): symbolic description of processors, traces, communication channels, pipes, etc. with analysis of properties such as synchronisation, parallelism, deadlock and livelock and data flow, etc. It distinguishes between centralised and distributed systems and compares the behaviour of centralised operating systems vs. distributed operating systems. It treats with synchronisation as well as deadlock and livelock analysis using CS; layered protocol and the client server model; ISO OSI model, layers, interfaces, and protocols; Remote Procedure calls and Distributed File Systems, message transport over network, RPC GEN tools and programming for operating system development. The course recognises UNIX as an industrialised standard platform.

**SEMESTER: 2****COURSE CODE: ECNG 6613****COURSE TITLE: DATABASE SYSTEMS PRINCIPLES & DESIGN****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course introduces the principles and application associated with database systems. These principles will be used to design and develop software to meet specific requirements and quality standards within the framework of time and cost. At the end of this course, students will be able to: design a DBMS for information processing of a given system; understand the concepts, tools and technologies related to information systems; design and develop PL/SQL programs for existing databases for information extraction and decision making.

**SEMESTER: 1****COURSE CODE: ECNG 6614****COURSE TITLE: MULTIPROCESSOR SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course is an introduction to parallel processing techniques. It covers parallel processing languages and algorithms as well as introduction topics relating to synchronous multiprocessing.

**SEMESTER:****COURSE CODE: ECNG 6616****COURSE TITLE: COMPUTER GRAPHICS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course introduces theory and practice techniques, which will enable the student to create, manipulate, display and analyse digital data, using either a compiled (C/C++) or an interpreted (MATLAB, Tcl) language and appropriate software packages/libraries. At the end of this course, students should be capable of implementing display/processing algorithms for digital data, by using appropriate theory/techniques drawn from the fields of Information Visualisation, Computer Graphics, Digital Image Processing, Machine and Computer Vision.

**SEMESTER:****COURSE CODE: ECNG 6617****COURSE TITLE: ARTIFICIAL INTELLIGENCE SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course covers fuzzy computing; basic definitions and terminology, fuzzy set operations, membership functions, fuzzy relations, fuzzy if-then-else rules, fuzzy reasoning; adaptive networks; architecture, back propagation learning methods, associative memory learning methods, supervised and unsupervised learning neural networks, neuro-fuzzy modeling, system identification; least squares methods; derivative-based and derivative free optimisation methods, genetic algorithms; neuro-fuzzy computing applications.

**SEMESTER: 1****COURSE CODE: ECNG 6619****COURSE TITLE: VISUAL MEDIA PROCESSING I****NUMBER OF CREDITS: 3**

**COURSE DESCRIPTION:** This optional post-graduate/final-year course targets students who wish to understand the scope and limitations of digital visual media. It introduces common standards and explains the tradeoffs inherent in utilising these standards in different application domains, such as cinema post-production, machine vision, and visual consumer electronics. At the end of this course, students will be able to identify, analyse, recommend, and justify use of image processing tools in applications. Topics include image filtering, image content analysis, image compression, and motion estimation in image sequences.

**SEMESTER:****COURSE CODE: ECNG 6620****COURSE TITLE: VISUAL MEDIA PROCESSING II****NUMBER OF CREDITS: 3****PRE-REQUISITE: ECNG 6619 VISUAL MEDIA PROCESSING I**

**COURSE DESCRIPTION:** This optional post-graduate/final-year course targets students who wish to investigate and/or manipulate digital visual media in their capstone project. Students will explore the tradeoffs inherent in utilising industrial standards in image and video communication (e.g., JPEG, MPEG-2, MPEG4) in different application domains, such as cinema post-production, machine vision, and visual consumer electronics. At the end of this course students will be able to use, design and exploit image processing tools for creation/ manipulation of visual media.

**SEMESTER: 1****COURSE CODE: ECNG 6700****COURSE TITLE: STOCHASTIC PROCESSES, DETECTION AND ESTIMATION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** In ECNG 6700 the theory and application of statistical signal processing is explored, providing the foundation for analysis and design within numerous domains including engineering, education, finance, economics, and pure sciences. Both analytical and computer-aided tools are leveraged for implementing statistical signal processing algorithms enabling learner experimentation with statistical signal processing for real-world non-deterministic problems. The course also provides experiential development to model the behaviour of and to describe the performance of non-deterministic systems. By extension, the course provides students with opportunities to expand and adapt contemporary techniques for use in application spaces of interest, including techniques for the analysis of more complex real-life systems and sub-systems. The course is assessed through 60% final exam and 40% coursework.

**SEMESTER: 2****COURSE CODE: ECNG 6701****COURSE TITLE: DATA COMMUNICATION NETWORKS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** ECNG 6701 covers the design and evaluation of networks which support multi-service traffic. ECNG 6701 presents a structured process accounting for user requirements, system design, and validation, taking account of user-defined service metrics, as well as other contextual factors such as mobility, security, and availability objectives. For proposed designs, issues such as logical addressing, routing, security, and network management will also be considered. Students are exposed to contemporary and emerging networking protocols and technologies as well as computer-aided techniques employing protocol analysers and simulation tools as the basis to synthesise and evaluate logical network designs. These will serve as the basis for further analysis and optimisation of communications networks and protocols. The course is assessed through 100% coursework.

**SEMESTER:****COURSE CODE: ECNG 6702****COURSE TITLE: PRINCIPLES OF SWITCHING****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats switched networks for telecommunications applications. It includes coverage of teletraffic analysis; digital circuit switching; integrated digital networks; packet switching and signaling and control in digital telephone networks. The course contextualises these topics in explorations of new developments in digital telephone networks.

**SEMESTER: 1****COURSE CODE: ECNG 6703****COURSE TITLE: PRINCIPLES OF COMMUNICATION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** ECNG 6703 is a foundation MAsc Communication Systems course. It explores digital communication techniques employed at the physical layer for the reliable and efficient transfer of information over a communications channel subject to Additive White Gaussian Noise (AWGN). The course steps through the functional elements that comprise a digital communications link: source encoding, channel encoding and modulation, as the context in which the requirements for optimal performance are examined. Computer-aided analysis is used to reinforce the theoretical treatment of system behaviour and performance. The course is assessed through a mix of formative and summative exercises. The formative exercises comprise a 20% simulation-based student portfolio, a 15% research project, and a 15% analysis project. A 50% final examination provides summative assessment.

**SEMESTER: 2****COURSE CODE: ECNG 6704****COURSE TITLE: PERFORMANCE ENGINEERING OF COMPUTER COMMUNICATION SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** In this course, the performance of multi-service communication networks will be investigated using analytic and simulation-based methods. The requirements of various classes of applications will be mapped to performance metrics such as throughput, delay, jitter, and packet loss rate. Passive and active techniques for quantifying these metrics will be explored. From an empirical standpoint, input analysis performed on the real-world traffic will be used to drive simulation models which in turn will be used to predict the performance for a wider range of scenarios. However, prediction will also be performed using analytic means by assuming input distributions and using tools such as discrete-time and continuous-time Markov chains, queuing models, and models for networks of queues. Performance predictions and knowledge of quality-of-service (QoS) architectures will be used to inform strategies for the improvement of network performance.

**SEMESTER:****COURSE CODE: ECNG 6705****COURSE TITLE: APPLIED PROBABILITY****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course treats a variety of topics relating to applied probability. In particular, it treats with modeling, quantification and analysis of uncertainty; formulation and solution in sample space; random variables, transform techniques, simple random processes and their probability distributions; Markov processes; Limit theorems; Elements of statistical interference, and decision-making under uncertainty; and Interpretations. The course includes a rich portfolio of applications and lecture demonstrations.

**SEMESTER: 1****COURSE CODE: ECNG 6706****COURSE TITLE: ANTENNAS & RADIATION****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** ECNG 6706 is an elective MSc Communications Systems course. Performance analysis and design of wireless communications systems are investigated, with focus upon the transceiver front-end, waveguides, propagation channels and antennas. Analytical and simulation techniques, and consideration of practical issues such as spectrum management, EMC, and RF safety feature strongly in the course. Contemporary and emerging standards and technologies are investigated through examination of the role of transceiver and antenna systems and supporting signal processing techniques. Students are exposed to software-defined radio which serves as the basis to implement advanced communications techniques such as dynamic spectrum access and MIMO systems. The course is assessed through 100% coursework, comprising of various individual and group-based problem-based analysis and design.

**SEMESTER:****COURSE CODE: ECNG 6707****COURSE TITLE: MULTIMEDIA COMMUNICATION SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course recognises that multimedia communication technologies have propelled the development and the popularity of the World Wide Web as a means of communication, and as a source of information and entertainment. Image, audio and video compression and coding techniques facilitate the proper functioning of multimedia applications by reducing load requirements on networks while network protocols play a complementary role by ensuring that data is transmitted efficiently with little compromise in quality. With these technologies industries across the region can be assisted in becoming more integrated as they are able to increase interaction and make their services more easily accessible to each other and to citizens. The resulting boost in productivity will stimulate growth, as well as help increase the international competitiveness in these sectors. This course will examine fundamental concepts and technologies necessary to multimedia communications.

**SEMESTER: 2****COURSE CODE: ECNG 6708****COURSE TITLE: TRANSMISSION SYSTEMS****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** In this course, the design of transmission systems employed in communication networks for the delivery of data, voice and video traffic will be performed. To drive this design process, requirements specifications for the physical layer, which include coverage, capacity, and error-performance objectives will be developed, taking into account a logical network design and pertinent geographical information. In both the wired and wireless domains, contemporary transmission, and access technologies, as well as their governing standards, will be considered. Suitable simulation tools will be used to validate the design.

**SEMESTER: 1****COURSE CODE: ECNG 6709****COURSE TITLE: BUSINESS MANAGEMENT****NO. OF CREDITS: 3**

**COURSE DESCRIPTION:** This course introduces students to the rudiments and the operations of managing business organisations in a real-world scenario. The course provides students with a working knowledge of the foundation elements of successful planning, operation and control of industries and businesses as they relate to the functioning in today's business and operational environment. The areas of study will cover leadership and management of organisations; the legal and regulatory framework of business; ethics and professional practice; managerial finance and accounting; and sustainable economic development.

**SEMESTER: 2****COURSE CODE: ECNG 6710****COURSE TITLE: RESEARCH METHODS****NO. OF CREDITS: 3****COURSE DESCRIPTION:** This course introduces the concepts of research methods in detail, from conceptualisation to conclusion. Major topics include principle qualitative methods of research, statistical methods of data estimation, testing.**SEMESTER: 1****COURSE CODE: ECNG 6711****COURSE TITLE: ADAPTIVE CONTROL****NO. OF CREDITS: 3****COURSE DESCRIPTION:** In many situations in industrial applications, dynamical models of operating control systems are subjected to unknown parameters that result from either imperfect modeling or abrupt changes in the system dynamics. Systems with such uncertainties are prone to explosive instabilities and inaccuracies which must be anticipated and prevented by feedback control. This course is a complimentary basic course in adaptive control of systems subject to unknown parameters. Practical aspects such as implementation and applications are presented with working examples. A part of the course will be devoted to identification theory and modeling in discrete time. After learning the material of the course, the student should have a good perspective of adaptive techniques, an active knowledge of the key approaches, and a good sense of when adaptive techniques can be used and when other methods are more appropriate.

## MSc Urban & Regional Planning

**SEMESTER: 1****COURSE CODE: PLAN 6000****COURSE TITLE: PHILOSOPHY & PRINCIPLES OF PLANNING****NO. OF CREDITS: 3****PREREQUISITES: NONE****SYLLABUS:** The material covered in this course is related to the context and environment of the Caribbean and illustrated by case studies from the region and other similar societies as far as available. The content covered by this course includes Garden cities, Anglo-American and European tradition, Third World urbanisation and planning, Planning in the Caribbean SIDS, Sustainable development and sustainable planning, National urban strategies, growth centre and secondary cities, Self- Help; architecture of the poor, Globalisation and impacts on planning, Impacts of ICTS.**SEMESTER: 1****COURSE CODE: PLAN 6001****COURSE TITLE: PLANNING PRACTICE LAW & ETHICS IN THE CARIBBEAN****NO. OF CREDITS: 3****PREREQUISITES: NONE****SYLLABUS:** This course examines planning law and the effectiveness of institutions involved in physical planning and development and to determine the need for institutional reform given the goals and objectives of planning. The evolution of Caribbean legislation; Public and private property rights and policy instruments; Constitutional powers and responsibility of the government for the provision of land and environmental resources, utilities, transport, social services and public health; Planning-related legislation such as the Public Health Ordinance, Municipal Corporations Act, the Housing Act, Slum Clearance and Housing Act; Public decision making in the Caribbean-the roles of government, political parties, interest groups, entrepreneurs and individuals; decision making and the judicial review of public decision and appellate tribunals.**SEMESTER: 1****COURSE CODE: PLAN 6004****COURSE TITLE: PLANNING ANALYSIS & EVALUATION****NO. OF CREDITS: 3****PREREQUISITES: NONE****SYLLABUS:** This course deals with tools and techniques of Data Collection and Analysis; encompassing Survey techniques; Site analysis and processing of development applications; Settlement Planning; Sampling; Probability analysis; Project analysis; Planning evaluation tools; Goal achievement matrices; Multiple criteria evaluation; Planning balance sheets; Time value of money; Internal Rate of Return; NPV; Demographic Projections.

**SEMESTER: 1****COURSE CODE: PLAN 6002****COURSE TITLE: GRAPHIC & DESIGN STUDIO****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course offers a practical, problem-solving approach that involves students in varied planning projects, and introduces students to various graphic methods used to aid in design. It is intended to give students an introduction to graphics and spatial data analysis and presentation, including the use of digital techniques. It will be done in a studio context and will include a range of graphic and design problems and techniques, such as AutoCAD, sketchup, cartography, and other graphic software used in planning.

**SEMESTER: 2****COURSE CODE: PLAN 6003****COURSE TITLE: DESIGN FOR DEVELOPMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course is designed around a studio project which aims at highlighting the physical aspects of urban development and its relationship to the economic, social and environmental features of human settlements development. The content of this course includes the following topics: Existing urban centres and towns, Re-development and renewal, Development of coherent communities into the real neighbourhoods and diverse districts, public spaces. Conservation of natural environments and the preservation of the built legacy, Urban places framed by architecture and landscape design rooted in local history, climate, ecology and building practice, Infrastructure and amenity design and standards, including local traffic distribution, transportation and related land-use controls, Re-establishment of the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

**SEMESTER: 2****COURSE CODE: PLAN 6014****COURSE TITLE: SMALL ISLAND DEVELOPING STATES (SIDS) RESOURCE MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course is aimed at giving the student an appreciation of the critical issues in land use and natural resources management, and to foster a solution-oriented approach to the management of these vital resources. The content of this course includes: The concept of ecosystems, Debates on development and the environment, Challenges of rural environments, The Brown Agenda, Land Use and integrated water resources management, Natural Hazards, Policy framework, Institutional strengthening, The human face of land use planning and natural resource management, The green agenda and protected areas, Coastal development.

**SEMESTER: 1****COURSE CODE: PLAN 6011****COURSE TITLE: PLANNING IN THE COASTAL ZONE****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** The course is designed to enhance the student's understanding of the challenges in planning for coastal areas in the Caribbean given the concentration of development on lands along the coast. It will cover the importance of the coast, coastal issues, governing the coast and coastal zone management approaches, drawing on case studies from the Caribbean Region. The content of this course includes the following: Stress from development and conflict, Development constraints: pollution, natural hazards, global climate change etc., Development potential in the coastal zone, The integrated planning framework, Legislative and administrative framework, Institutional environment and stakeholders, Land use optimisation, Planning process/planning methodology, Industry norms and standards.



**SEMESTER: INACTIVE****COURSE CODE: PLAN 6007****COURSE TITLE: COMMUNITY & PARTICIPATORY PLANNING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course deals with the history, role and functions of both community and participatory planning, including the growing role of the public and stakeholder interests in the planning process. The evolution of planning in the Anglo-American and international experience, the specific process and tools of public consultation and participation in the development of and regulatory functions, the problems associated with community planning and participation in the planning process, Tools and techniques used in community planning exercises which include Community mapping, Needs assessment, Strategic planning and lobbying, Community Visioning.

**SEMESTER: 1****COURSE CODE: PLAN 6009****COURSE TITLE: TRANSPORTATION PLANNING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course introduces transportation planning, and its relationship to land-use planning, it will acquaint students with the profession of transportation planning and the types and activities that transport planners are required to conduct. Urban transportation planning and its relationship to land-use planning, including procedures for traffic impact analysis of urban development sites, analysis framework for long-range planning, data collection procedures, basic demand forecasting, assessment of alternative transport plans and impact on the environment and land development at the regional scale.

**SEMESTER: 1****COURSE CODE: PLAN 6006****COURSE TITLE: SUSTAINABLE HOUSING & SETTLEMENTS PLANNING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course aims at demonstrating the ways in which human settlements planning is undertaken, whether this is for small towns, villages, neighbourhoods or extensive urban areas, with the focus being on sustainability of these developments. Housing Demand Analysis; Housing Finance; Housing Infrastructure; Construction; residential environment and community development, with the associated issues of fostering employment opportunities, responding to social and educational needs, commercial and recreational facilities demand transportation, infrastructure, and environmental concerns.

**SEMESTER: INACTIVE****COURSE CODE: PLAN 6005****COURSE TITLE: URBAN DESIGN****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** Cultural basis for design, new approaches: smart cities, sustainable cities, new urbanism. The competing goals and objectives in urban design, Users versus providers of the built environment, urban structure, public space, safety and security in urban design. Elements and components: neighbourhood, block, street, individual building. Guidelines and standards.

**SEMESTER: 2****COURSE CODE: PLAN 6008****COURSE TITLE: TOURISM PLANNING****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course introduces the land-use, infrastructure, coastal and environmental impacts and needs of the tourism industry, this will be done at the macro, national, and regional planning levels as well as the more detailed project site and community levels.



**SEMESTER: 2****COURSE CODE: PLAN 6024****COURSE TITLE: RESEARCH METHODS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Preparation and methods of research. Problem definition: research objectives, quantitative and qualitative methods, data collection and analysis, field surveys, preparation of questionnaires, literature reviews, testing hypotheses, case studies, historical and policy analysis, report preparation.

**SEMESTERS: I & II****COURSE CODE: PLAN 6025****COURSE TITLE: INDEPENDENT STUDY IN URBAN AND REGIONAL PLANNING****NO. OF CREDITS: 3****PREREQUISITES:** Must have completed all core courses in the programme.

**SYLLABUS:** A special topic involving a specialised area of urban and regional planning not normally available through taught courses will be made available to the students. The course will be evaluated by a combination of the following: a technical report, design project, or a major research paper which may include a seminar presentation.

**SEMESTER: NOT APPLICABLE****COURSE CODE: PLAN 6030****COURSE TITLE: MSC RESEARCH PROJECT****NO. OF CREDITS: 12****PREREQUISITES:**

**SYLLABUS:** The research project is expected to be the result of a comprehensive investigation and independent analysis of a topic that is germane to the area of interest to the student. The goal of the research should be to study a specific area or phenomenon and to provide a contribution of new knowledge to the field of study or produce a new interpretation of existing information.

## Postgraduate Diploma in Land Administration

**SEMESTER:****COURSE CODE: LAND 5000****COURSE TITLE: INTRODUCTION TO LAND ADMINISTRATION****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course introduces the concepts of land administration including the legislative provisions and policy concepts relating to land, its transfer and control. Land settlement in the Caribbean is covered including evolution of policy frameworks. State lands and their management, land policy formulation, information needs are also introduced with land administration and land management concepts in general.

**SEMESTER:****COURSE CODE: LAND 5002****COURSE TITLE: LAND ECONOMY & PROPERTY MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course gives an overview of the land economy of the Caribbean. It introduces the nature of real property, land rent theory, locational theory, the role of the State in the land economy, land and property taxation, the real estate industry and the finance sector, land and property speculation, and the relationship between formal and informal economy. Also covered are property and real estate management, and project and programme financing and management. The project cycle is also investigated including management formulation and appraisal, project evaluation, public good vs. economic good, time value of money, internal rate of return, net present value and discounting and shadow pricing.

**SEMESTER:****COURSE CODE: LAND 5003****COURSE TITLE: LAND LAW****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course introduces Caribbean legal systems including introduction to case laws. Discussed are sources of land law including equity and statutes. Covered are doctrines of estates, reception of English law in the Caribbean and its evolution, the meaning of 'law', estates and interests including freehold, leasehold, absolute, co-ownership, joint tenancies, tenancies in common, profits-a-prendre. Also covered are easements, restrictive covenants, adverse possession, prescription, contracts for sale of land, the doctrine of part performance, pre-contract enquiries and inspection. An investigation of title of unregistered land, forms of deed and other documents, registration of deeds and other documents, and registration of title including the Torrens system.

**SEMESTER:****COURSE CODE: LAND 5004****COURSE TITLE: LAND INFORMATION MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course examines the concept of systems, information systems, geographic systems, and land information systems. It discusses data in LIS, their acquisition, input, pre-processing, verification, structures, management, manipulation, analysis, output and quality. Hardware and software considerations are investigated including project specification and national systems, their design and development.

**SEMESTER:****COURSE CODE: LAND 5006****COURSE TITLE: SPECIAL PROJECT****NO. OF CREDITS: 6****PREREQUISITES:**

**SYLLABUS:** Students will be expected to do a Special Project of approximately 10,000 - 15,000 words. The topic will be chosen in collaboration with the agencies sending students to make it relevant to their work situation.

**SEMESTER:****COURSE CODE: LAND 5007****COURSE TITLE: CADASTRAL SYSTEMS****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course examines the importance of cadastral systems to land administration. The cadastral system as a foundational element of the land information system is discussed. The evolution of cadastral systems to their current role in the socio-economic development of a country is covered along with aspects of establishment, maintenance reform and re-engineering of systems.

**SEMESTER:****COURSE CODE: PLAN 6014****COURSE TITLE: SMALL ISLAND DEVELOPING STATES (SIDS) RESOURCE MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** This course is aimed at giving the student an appreciation of the critical issues in land use and natural resources management, and to foster a solution-oriented approach to the management of these vital resources. The content of this course includes: The concept of ecosystems, Debates on development and the environment, Challenges of rural environments, The Brown Agenda, Land Use and integrated water resources management, Natural Hazards, Policy framework, Institutional

# Postgraduate Diploma/MSc in Geoinformatics

**SEMESTER:**
**COURSE CODE:** GINF 6007

**COURSE TITLE:** ISSUES & APPLICATIONS IN REMOTE SENSING

**NO. OF CREDITS:** 4

**PREREQUISITES:** GINF 6015 OR EQUIVALENT

**SYLLABUS:** The course is intended to familiarise students with the range of management and scientific problems that may be addressed with remote sensing. Scale issues in remote sensing, multi-spectral image processing methods, image interpretation, analysing spatial patterns, issues in data integration, accuracy assessment, remote sensing and GIS. Remote sensing and change detection, remote sensing in the Caribbean. Remote sensing and hazard assessment and mitigation, remote sensing and biodiversity, remote sensing and coastal zone management, global remote sensing. New directions in remote sensing.

**SEMESTER: 2**
**COURSE CODE:** GINF 6010

**COURSE TITLE:** APPLICATIONS OF GEOINFORMATICS IN URBAN DEVELOPMENT

**NO. OF CREDITS:** 4

**PREREQUISITES:**

**SYLLABUS:** Introduction to GIS concepts; GIS application areas in urban development; database design and development; building applications in urban planning and development: site selection models, locating landfill sites, estimating the carrying capacity of land resources; urban crime analysis; modelling equity in the distribution of social facilities.

**SEMESTER: 1**
**COURSE CODE:** GINF 6100

**COURSE TITLE:** PRINCIPLES OF GEOINFORMATICS

**NUMBER OF CREDITS:** 3

**PREREQUISITES:** NONE, COMPUTER SKILLS WOULD BE AN ASSET

**SYLLABUS:** Introduction to GIS: definitions of GIS, The Geography, Information and Systems in the GIS, Current Issues and Views of GIS, Spatial data issues- Acquisition and Input, introduction to GNSS measurements and processing, Data Management, Data Processing. GIS Data Structures, Raster GIS Capabilities, Vector GIS capabilities, GIS and Network Analysis, GIS functionality and applications, Manipulating and extracting information, Spatial data quality issues, Hardware and Software Systems, Introduction to designing and implementing GIS.

**SEMESTER: 2**
**COURSE CODE:** GINF 6015

**COURSE TITLE:** EXTRACTION AND MANAGEMENT OF INFORMATION FROM GEO-IMAGES

**NUMBER OF CREDITS:**
**PREREQUISITES:** NONE

**SYLLABUS:** Electromagnetic radiation: properties and behaviour; Interaction of EM with Earth's atmosphere and surface features. Aerial photographs: geometry of aerial photograph: scale, relief, and tilt displacement; Principles of photo interpretation. Space borne sensors and systems (optical, thermal, radar). Principles of digital image processing: digital images; Image correction and enhancement; Thematic information extraction. Applications in the environment and natural resource management. Practical Work: photo interpretation, digital image processing, multi-spectral classification.

**SEMESTER: 1**
**COURSE CODE:** GINF 6020

**COURSE TITLE:** SPATIAL DATABASES

**NUMBER OF CREDITS:**
**PREREQUISITES:** NONE

**SYLLABUS:** A review of basic concepts of databases; Spatial database design; The Extended Entity-Relationship Model; Object-Oriented Database for GIS; Distributed and Networked Spatial Databases; Web-based GIS database design and management.

**SEMESTER: 2****COURSE CODE: GINF 6021****COURSE TITLE: GIS AND SOCIETY****NUMBER OF CREDITS:****PREREQUISITES: NONE**

**SYLLABUS:** This course examines the interrelationships between GIS and the structures of modern society. Through case studies of related to private and public organisations as well as the public, the broader social implications of GIS will be examined. How GIS systems and spatial data are embedded in particular economic, political, social and legal structures create social barriers affecting the wider use of GIS, such barriers will be debated throughout the course. The way in which GIS is employed in society can influence values, perceptions and knowledge, the representation of knowledge in GIS will be discussed with particular reference to how information held by marginalised groups of society is represented. Other areas of importance include the impact of internet mapping, ethics and privacy and the use and misuse of GIS.

**SEMESTER: 2****COURSE CODE: GINF 6022****COURSE TITLE: SPATIAL ANALYSIS AND MODELLING****NUMBER OF CREDITS:****PREREQUISITES: GINF 6100 OR EQUIVALENT**

**SYLLABUS:** Introduction to spatial analysis; spatial phenomenon types and relationships. Spatial analysis and GIS; raster and vector capabilities, network analysis, spatial phenomena, and relationships; analysis for discrete entries, spatial data modelling; cartographic modelling, vector and raster overlay. Statistical analysis of attributes: univariate and bivariate descriptions. Spatial interpolation; polynomials, splines, TIN, Geostatistics; spatial correlation, modelling of a spatial process, geostatistical interpolation, semivariogram, kriging, Digital Elevation Models, surface analysis techniques. Spatial Analysis Applications.

**SEMESTER: 1****COURSE CODE: GINF 6023****COURSE TITLE: ENTERPRISE GIS DESIGN AND DEVELOPMENT****NUMBER OF CREDITS: 4****PREREQUISITES: GINF 6100 OR EQUIVALENT**

**SYLLABUS:** Enterprise GIS design concepts and issues; user requirements analysis including the design of URA questionnaires; conceptual and logical design strategies; executing and evaluating pilot studies, benchmarking methodologies, planning for data collection and automation; GIS system integration, application development, Graphic User Interface development and customisation.

**SEMESTER: 2****COURSE CODE: GINF 6024****COURSE TITLE: RESEARCH METHODOLOGY****NUMBER OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Research and its characteristics, types of research, defining a research topic, originality and thinking of research, identifying issues and objectives for research, developing research methodology, literature review, finding research material, referencing and citation, executing the research, reporting the findings of the research, dealing with supervisors.

**SEMESTER: 2****COURSE CODE: GINF 6025****COURSE TITLE: PROFESSIONAL INTERNSHIP****NUMBER OF CREDITS: 3****PREREQUISITES: ON COMPLETION OF A MINIMUM OF 2 CORE COURSES**

**SYLLABUS:** The content of this course will vary with the agency to which the student is assigned.

**SEMESTER:****COURSE CODE: GINF 6006****COURSE TITLE: RESEARCH PROJECT****NUMBER OF CREDITS: 12****PREREQUISITES: NONE**

**SYLLABUS:** A Research Project is required to be completed for the MSc Geoinformatics. The research project report is expected to be the result of a comprehensive investigation and independent in-depth analysis of a topic that is germane to the concentration that is being pursued by the student. The goal of the research should be to study a specific area or phenomenon and to provide an incremental contribution of new knowledge to the field of study or produce a new interpretation of existing information.

# Agricultural Engineering (Biosystems Engineering)

**SEMESTER:****COURSE CODE: AENG 6000****COURSE TITLE: RESEARCH METHODOLOGY****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Critical discussion of the application of scientific methodology to research in agricultural economics. The role of inductive and deductive logic in scientific research in the Caribbean.

**SEMESTER:****COURSE CODE: AENG 6001****COURSE TITLE: PROCESSING & STORAGE OF PERISHABLE CROPS****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Harvesting and handling of perishable crops; post-harvest physiology; Crop pre-treatment for storage and processing; Water activity; Intermediate moisture foods; Principles of refrigeration and application to chilling and freezing; Thermal properties; Packing-house requirements; Packaging; Perishable process/Preservation principles.

**SEMESTER:****COURSE CODE: AENG 6002****COURSE TITLE: PROCESSING & STORAGE OF DURABLE CROPS****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Crop physical properties and characteristics; Harvest methods; Transient heat and mass transfer; Psychrometrics; Handling; Cleaning; Drying and storage systems; Dehydration; Pest control; Primary processing operations; Milling; Separation and Extraction; Processing of selected tropical crops.

**SEMESTER:****COURSE CODE: AENG 6003****COURSE TITLE: PHYSICAL PROPERTIES OF AGRICULTURAL PRODUCTS****NO. OF CREDITS:**

**SYLLABUS:** Geometry and shape factors. Some flotation and aerodynamic properties. Elastic and viscoelastic behaviour including variation with moisture and temperature. Measurement of toughness, friction, impact strength, and other properties that may be used as quality indicators.

**SEMESTER:****COURSE CODE: AENG 6004****COURSE TITLE: SPECIAL TOPICS IN DESIGN****NO. OF CREDITS:**

**SYLLABUS:** This is a project course graded by coursework only. Students will be required to analyse problems and existing equipment and to carry out design or modification work.

**SEMESTER:****COURSE CODE: AENG 6006****COURSE TITLE: HYDROLOGY & WATER RESOURCES****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Surface water hydrology and movement; Meteorology, Runoff measurement; Hydrograph analysis; Water balance studies; Groundwater resources; Pumping test; Bore hole design; Computer applications.

**SEMESTER:****COURSE CODE: AENG 6007****COURSE TITLE: IRRIGATION & DRAINAGE ENGINEERING****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Surface, sprinkler and trickle irrigation, land grading; On-farm and scheme water requirements; Scheduling of irrigation; Design of canals and hydraulic structures; Drainage design theories; Drain spacing and depth requirement for irrigated areas; Drainage system monitoring; Computer applications.

**SEMESTER:****COURSE CODE: AENG 6008****COURSE TITLE: SOIL MECHANICS & CULTIVATION****NO. OF CREDITS:****PREREQUISITES:**

**SYLLABUS:** Soil shear strength; Coulomb equation; Mohr-Coulomb failure criteria; Active and passive Rankine states; Bearing capacity; The general soil mechanics equation; Techniques for predicting forces on soil engaging tools; Soil cultivation requirements and techniques for effective crop production.

**SEMESTER:****COURSE CODE: AENG 6009****COURSE TITLE: SOIL & WATER CONSERVATION ENGINEERING****NO. OF CREDITS:**

**SYLLABUS:** Soil erosion study as a basis for designing soil conservation schemes; Water and wind erosion; Erosivity; Erodibility; Soil loss prediction; Design of terraces; Waterways; Shelter belts; Gully control structures; Conservation tillage; Water resources conservation and development. Computer applications.

**SEMESTER:****COURSE CODE: IENG 6000****COURSE TITLE: TOTAL QUALITY MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Principles of Quality Systems, Quality Assurance, and Total Quality Management. Company-wide planning for quality. Quality improvement tools. Basic philosophies of Deming, Juran, Crosby, Taguchi, Imai, etc., training for quality. Cost of quality systems. Quality Standards and ISO 9000 - Implementation, Certification, Auditing. Design of experiment; Taguchi approaches to robust design.

**SEMESTER:****COURSE CODE: IENG 6001****COURSE TITLE: EXPERT SYSTEMS****NO. OF CREDITS: 3****PREREQUISITES: COMP 2800 OR IENG 3004**

**SYLLABUS:** Expert systems, applications, and domains. Languages, shells, and tools. Procedural paradigms/non-procedural paradigms. Knowledge engineering process (knowledge, acquisition, knowledge representation, inference methods, etc.). Prototyping, hardware and software support. Reasoning under uncertainty. Approximate reasoning/fuzzy sets/logic. Neural networks.

**SEMESTER:****COURSE CODE: IENG 6002****COURSE TITLE: DISTRIBUTED INFORMATION SYSTEMS & DATABASES****NO. OF CREDITS: 3****PREREQUISITES: IENG 3013**

**SYLLABUS:** Information systems in business/industry. Systems planning, requirements analysis. Systems analysis and design methods including structured methodologies. Data communications and distributed processing. Distributed database system, Management support systems.

**SEMESTER:****COURSE CODE: IENG 6003****COURSE TITLE: COMPUTER INTEGRATED MANUFACTURING SYSTEM****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Overview of CIM. CIM user-computer interface. Interactive display techniques for CIM. Modelling in manufacturing design. Concurrent engineering techniques in design. Distributed processing and networks. Automated assembly. Quality control in CIM. Planning for CIM. Implementation and management of CIM systems.

**SEMESTER:****COURSE CODE: IENG 6004****COURSE TITLE: OCCUPATIONAL BIOMECHANICS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to anatomy and neurophysiology. Work physiology. Anthropometry in Occupational Biomechanics. Basic statics and dynamics and its application to the human body. Modelling in Biomechanics. Mechanical work-capacity evaluation. Measurement systems and bioinstrumentation. Electromyography. Applications to Industry.

**SEMESTER:****COURSE CODE: IENG 6005****COURSE TITLE: INDUSTRIAL ERGONOMICS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to the attributes of the human as a functioning system. The human sensory processes as human information input channels. Anthropometry and physical workspace and arrangement. Displays, controls and workplace design. Manual material handling and human strength. The working environment - atmospheric conditions; light, color, illumination; noise and vibration. Circadian rhythms, chronobiology, and shift work in the workplace. Human-computer interaction.

**SEMESTER:****COURSE CODE: IENG 6006****COURSE TITLE: OCCUPATIONAL SAFETY & HEALTH****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to occupational safety and health. Occupational health. Occupational safety. Ergonomics applied to occupational safety and health. Insurance. Management of occupational safety and health. Information sources and databases. Training programmes in occupational safety and health. Economics. Analytical tools. Legal aspects of occupational safety and health.

**SEMESTER:****COURSE CODE: IENG 6007****COURSE TITLE: INDUSTRIAL AUTOMATION****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to control systems. Discrete models for machines and processes. Analog and discrete controllers. The B-transform. Transfer functions and block diagrams. Solution of difference equations. Stability analysis. Discrete function generation. Response of computer control systems. Final value theorem. Discrete controller design. Sampling. Feedforward and cascaded control systems. Binary logic. Architecture of computer systems. Assembly programming. Interfacing techniques. Boolean algebra. Ladder diagrams. Sequential logic design.

**SEMESTER:****COURSE CODE: IENG 6009****COURSE TITLE: ROBOTIC TECHNOLOGY & APPLICATIONS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Basic structure of robotics; classification and structure of robotic systems. Drives and control systems. Co-ordinate transformation and kinematic analysis. Trajectory planning and control. Programming. Intelligent robotic systems. Robotic applications and installations.

**SEMESTER:****COURSE CODE: IENG 6010****COURSE TITLE: OPERATIONS RESEARCH IN MANUFACTURING I****NO. OF CREDITS: 3****PREREQUISITES: IENG 3013**

**SYLLABUS:** Application of Operations Research methodology to Strategy, Planning, Scheduling, Sequencing, and distribution decisions in manufacturing organisations.

**SEMESTER:**

**COURSE CODE: IENG 6011**

**COURSE TITLE: OPERATIONS RESEARCH IN MANUFACTURING II**

**NO. OF CREDITS: 3**

**PREREQUISITES: IENG 3007**

**SYLLABUS:** Application of operations research methodology to distribution, independent inventory, layout and handling, and Maintenance decisions in manufacturing organisations.

**SEMESTER:**

**COURSE CODE: IENG 6012**

**COURSE TITLE: OPERATIONS RESEARCH IN SERVICES**

**NO. OF CREDITS: 3**

**PREREQUISITES: IENG 3007**

**SYLLABUS:** Application of operations research methodology to strategy, facilities, logistics, and scheduling decisions in service organisations.

**SEMESTER:**

**COURSE CODE: IENG 6013**

**COURSE TITLE: DIRECTED READINGS**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** A critical review of the current literature in a special topic of importance to Industrial Engineering.

**SEMESTER:**

**COURSE CODE: MATH 3530**

**COURSE TITLE: MATHEMATICS III**

**NO. OF CREDITS: 3**

**PREREQUISITES: MATH 2240**

**SYLLABUS:** Linear algebra. Systems of equation, vector spaces, determinants, eigen values, similarity, positive definite matrices, singular value decomposition. Optimisation and mathematical programming. Calculus of variations.

**YEAR:1**

**SEMESTER:2**

**COURSE CODE: MENG 6200**

**COURSE TITLE: PRODUCTION TECHNOLOGY**

**NO. OF CREDITS: 3**

**PREREQUISITES: MENG 2008**

**SYLLABUS:** This course follows on from the fundamental principles of the manufacturing process and design in the undergraduate programme and emphasises the broader aspects of the production systems as opposed to the processes themselves. Topics will include welding design considerations and specifications, foundry systems, metal-forming equipment, polymer technology, machining system, automation, and Computer Integrated Manufacturing.

**YEAR:**

**SEMESTER:**

**COURSE CODE: MENG 6201**

**COURSE TITLE: MACHINE TOOL TECHNOLOGY**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Functional study of different types of machine tool elements such as spindles drives, bedways, bearings, tool holders, and work holding devices; effect of vibrations and methods of controlling vibrations; lubrication and cooling; acceptance test for machine tools; machine tools for newer machining techniques; large machine tool systems, numerical control of machine tools.



**YEAR: 2****SEMESTER:2****COURSE CODE: MENG 6202****COURSE TITLE: APPLIED MATERIALS TECHNOLOGY****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course follows on from the fundamental principles in the undergraduate programme and goes further into the more applied aspects of materials performance. The emphasis would be on preventive and investigative methods and would include such topics as inspection techniques, failure mechanisms and analysis.

**YEAR: 2****SEMESTER:1****COURSE CODE: MENG 6203****COURSE TITLE: ROBOTIC TECHNOLOGY & APPLICATIONS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Basic structure of robots; Classification and structure of robotic systems; Drives and control systems; Co-ordinate transformation and kinematic analysis; Trajectory planning and control; Programming; Intelligent robotic systems; Robotic applications and installation. Programmable Logic Controls.

**YEAR:****SEMESTER:****COURSE CODE: MENG 6204****COURSE TITLE: ADVANCED MACHINING METHODS & ANALYSIS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Overview of methods and systems for material removal; Machining methods employing tools of defined geometry; Mechanics of orthogonal and oblique cutting; Nature of contact between chip and tool; Thermal aspects; Tool wear and Tool life; Machinability; Cutting fluids; Analysis of turning, drilling, and milling processes; Abrasive machining processes; Developments in non-traditional machining methods; Economics of machining.

**YEAR:****SEMESTER:****COURSE CODE: MENG 6205****COURSE TITLE: ADVANCED FORMING METHODS & ANALYSIS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Stress and strain analysis; Yield conditions; Stress-strain relations in elastic and plastic deformations; Workhardening; Formulation of elastic and plastic problems; Methods of solution: Slab method; Slip-line fields and extremum principles; Applications of theory of plasticity to metal-working operations viz: wire drawing, extrusion, rolling, forging, deep drawing, spinning, etc; Friction in metal-forming; Recent developments in technology and theory of metal-forming.

**YEAR:****SEMESTER:****COURSE CODE: MENG 6206****COURSE TITLE: PLASTICS PROCESSING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Properties and applications of common and engineering plastics; Manufacturing methods for products of thermosetting and thermoplastic polymers; Design for production and development of tooling for Extrusion, Injection moulding; Thermoforming; Calendering; Rotational moulding; Compression moulding; Transfer moulding; Blow moulding; Film blowing; Analysis of polymer melt-flow; Processing of reinforced plastics.

**YEAR:****SEMESTER:****COURSE CODE: MENG 6207****COURSE TITLE: COMPUTER INTEGRATED MANUFACTURING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to CIM; Role of the computer in manufacturing; Hardware and software components of computer automation; Advanced computer architectures used in manufacturing; Computer Aided Design (CAD); Computer Aided Manufacturing (CAM); Linking CAD with CAM; Control of manufacturing equipment; Computer controlled parts handling and assembly; Simulation of manufacturing processes; Quality in CIM perspective; Programmable factory.

**YEAR:****SEMESTER:****COURSE CODE: MENG 6208****COURSE TITLE: PRODUCT TOOL & MANUFACTURING ENGINEERING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Product domain/process domain; Product design/product quality; Process flow chart; Sheet metal forming design considerations; Metal cast parts design; Plastic component design; Wood products design; Design for assembly; Finishes; Detailed tool, dye, and mould design; Equipment selection; Manufacturing support systems.

**YEAR: 1****SEMESTER: 2****COURSE CODE: MENG 6300****COURSE TITLE: APPLIED ERGONOMICS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Effect of heat on workers, acclimatisation; noise in industry, hearing loss, noise control; Colours in working environments; Light sources, illumination standards, brightness and contrast, visual fatigue; Levers, dials, and controls; Human vibration control; Man-machine systems; Work design, hand-tool design, work-station design; Wider application of ergonomics.

**YEAR: 1****SEMESTER: 1****COURSE CODE: MENG 6301****COURSE TITLE: COMPUTER APPLICATIONS IN MANUFACTURING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course provides an overview of how computers are used to improve competitiveness in manufacturing enterprises. It takes a holistic viewpoint, tying together more detailed considerations of elements of the manufacturing business that are presented in other courses. Understanding how computers and especially modelling and simulation have transformed product and process development is a key theme. Another is how computer applications are used in management of production operations and support functions.

**YEAR: 2****SEMESTER: 1****COURSE CODE: MENG 6302****COURSE TITLE: DESIGN OF PLANT & SERVICES****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Product, process and schedule design, line balancing; Activity relationships and space requirements; Personnel requirements; Material handling including robotic and automatic-guided vehicles; Plant layout; Computer-aided plant layout; Receiving and shipping; Storage and warehousing; Office planning; Facility services - electricity, water, air-conditioning communications.

**YEAR: 2****SEMESTER: 2****COURSE CODE: MENG 6303****COURSE TITLE: COMPUTER CONTROL SYSTEMS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Concepts of computer control; Process modelling, solution of difference equations; Stability analysis; System inputs and generating functions; System response; Discrete controller design, stability and realisability; sample period selection, feed forward control and cascade control; control computers; computer interfacing and sensors for computer control.

**YEAR: 1****SEMESTER: 1****COURSE CODE: MENG 6305****COURSE TITLE: FINITE ELEMENT ANALYSIS IN MANUFACTURING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Introduction to Finite Element Analysis (FEA). Material properties. Truss and beam elements. Two-dimensional brick elements. Combining elements. Static linear analysis, modal analysis and buckling. Verification of accuracy of results. Introduction to non-linear analysis. Application to manufacturing problems.

**YEAR: 1****SEMESTER: 2****COURSE CODE: MENG 6306****COURSE TITLE: ADVANCED CAD/CAM FOR PRODUCT REALIZATION****NO. OF CREDITS: 3****PREREQUISITES: MENG 3014**

**SYLLABUS:** Review of the role and elements of Computer Aided Design (CAD) and Computer Aided Manufacture (CAM); Solid and Surface Modeling Techniques for Design, Evaluation and Manufacture; Generation of Tool Path Data from Solid and Surface Models using Manual Part Programming and Computer-assisted Part Programming with Mastercam; Elements of Computer Integrated Manufacturing (CIM).

**YEAR: 1****SEMESTER: 1****COURSE CODE: MENG 6307****COURSE TITLE: DESIGN & SIMULATION OF MANUFACTURING SYSTEMS****NO. OF CREDITS: 3****PREREQUISITES: MATH 2240 INDUSTRIAL STATISTICS OR A SIMILAR COURSE**

**SYLLABUS:** Simulation and System Dynamics: Introduction to Simulation, System Dynamics, Simulation Basics, Discrete Event Simulation, Monte-Carlo Simulation; System Modeling and Analysis: Data Collection and Analysis, Model Building, Verification and Validation, Simulation Output Analysis; Simulation Application: Modeling of Various Manufacturing Systems Such as Job, Cellular and Virtual Cellular, Modeling of Manual and Automated Assembly Lines, Modeling of Various Material Handling Systems Such as AGVs, Robots and AS/RS, Modeling of Automated Manufacturing System.

**YEAR: 2****SEMESTER: 1****COURSE CODE: MENG 6400****COURSE TITLE: PRODUCTION PLANNING & CONTROL****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Computer-controlled production and inventory systems; Computer-aided process planning techniques; Database configuration and techniques for forecasting and implementation of aggregate plans; Groups Technology for planning and control; Manufacturing Automation Protocol at the Shop Floor; Computer-controlled scheduling and sequencing techniques; Computerised costing systems.

**YEAR: 1**

**SEMESTER: 1**

**COURSE CODE: MENG 6402**

**COURSE TITLE: HUMAN RESOURCE MANAGEMENT I**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Formal and informal organisation; The bureaucratic model; The organisational environment; Modern organisation theory; The individual in the organisation; SKAO; Theories of motivation and leadership industrial relations; IRA, RSBA; Communication in organisations; Performance appraisal systems.

**YEAR: 1**

**SEMESTER: 2**

**COURSE CODE: MENG 6403**

**COURSE TITLE: HUMAN RESOURCE MANAGEMENT II**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** External staffing; Internal staffing; Base wage and salary systems; Training and development; Job evaluation systems; HRM planning; OD and change; Occupational health and safety; Future issues.

**YEAR 1:**

**SEMESTER: 1**

**COURSE CODE: MENG 6404**

**COURSE TITLE: MAINTENANCE ENGINEERING & MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Objectives and policies of maintenance; Reliability, availability, and maintainability; Failure statistics and analysis. Terotechnology and life cycle costing; Preventive maintenance: Condition-based and scheduled maintenance; Corrective maintenance and overhauls; Plant turnarounds; Work-planning and control; Performance and productivity analysis; Quantitative technique; Computer in maintenance.

**YEAR: 2**

**SEMESTER: 2**

**COURSE CODE: MENG 6405**

**COURSE TITLE: TOTAL QUALITY MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Philosophy and principles of total quality management; Customer satisfaction; Quality systems; Quality tools; Continuous improvement; Employee involvement and empowerment; Supplier partnerships; Benchmarking; Quality function deployment; Statistical process control; Taguchi's quality engineering; Experimental design.

**YEAR: 1**

**SEMESTER: 2**

**COURSE CODE: MENG 6500**

**COURSE TITLE: INDUSTRIAL MARKETING**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Nature and scope of marketing; Characteristics of industrial marketing; Organisational buyer behaviour; Industrial marketing research; Industrial marketing planning; Product planning, industrial innovation and new product strategies; Choice of channels and physical distribution; Price determination; Industrial advertising and sales promotion; Personal selling; Marketing audit, cost analysis and controls.

**YEAR:**

**SEMESTER:**

**COURSE CODE: MENG 6501**

**COURSE TITLE: STATISTICAL METHODS IN ENGINEERING**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Probability distributions; Estimation and hypothesis testing; Correlation and regression analysis of variance; Experimental design; Multivariate statistics.

**YEAR: 2**

**SEMESTER: 2**

**COURSE CODE: MENG 6502**

**COURSE TITLE: FINANCIAL MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Analysis of financial statements; Financial forecasting and planning; Risk, return and valuation; Capital budgeting; Financial structure and leverage; Cost of capital; Financing mix decisions; Current asset management: Cash, marketable securities, accounts receivables, inventory and short-term financing; Long-term financing; Common stock, debt, preferred stock, term loans, and leasing; Dividend policy.

**YEAR:**

**SEMESTER:**

**COURSE CODE: MENG 6503**

**COURSE TITLE: APPLIED OPERATIONS RESEARCH**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Modelling and optimisation of large-scale systems; Linear and non-linear models, stochastic models, multi-criteria models; Use of computer software packages; Decision support systems.

**YEAR: 1**

**SEMESTER: 1**

**COURSE CODE: MENG 6504**

**COURSE TITLE: TECHNOLOGY & PRODUCT DEVELOPMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES: MENG 3013**

**SYLLABUS:** Relationship between technology transfers, technological change, and economic development. Technology diffusion and innovation industry; Technology selection and capacity planning; Design axioms and corollaries; Features in design and manufacturing; Management of product development; Strategic approval; Integration of expert systems; Databases and CAD; Neural networks in design of products.

**YEAR: 2**

**SEMESTER: 1**

**COURSE CODE: MENG 6505**

**COURSE TITLE: HEALTH, SAFETY & THE ENVIRONMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Hazards associated with manual work, machinery, mechanical systems, construction and other common industrial scenarios; Safety technology and engineering controls; Electricity and fire; Principles of industrial hygiene; Occupational health hazards; Personal Protective Equipment; Ergonomics; Welfare issues - the working environment; Risk assessment and hazard analysis; Job safety analysis; Safe systems of work, including permit to work systems; Inspection techniques; Accidents: causation, investigation, reporting and costs; Communication; Motivation and training; Psychological factors in safe behaviour; Safety and health legislation (in Trinidad and Tobago, and key legislation in the UK and USA).

**YEAR: 2**

**SEMESTER: 1**

**COURSE CODE: MENG 6506**

**COURSE TITLE: PROJECT MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Project identification in context of investment programme at national and sectorial level; Pre-investment studies; Detailed project preparation, development and evaluational project organisation; Project analysis and evaluation (technical, economics, financial, social and environmental). Project implementation (procurement/contracts programming and control); ex-post evaluation.

**YEAR:**

**SEMESTER:**

**COURSE CODE: MENG 6507**

**COURSE TITLE: ENTREPRENEURSHIP & INNOVATION**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Entrepreneurship (Theory and Practice); Entrepreneurship in small businesses; Entrepreneurial ventures; Creative design and innovation; Patterns of creativity and innovation (Ideas to Product to Market); Design, marketing, and the consumers; Diffusion and transfer of technology and innovation; Strategic planning (Business Planning and New Ventures).

**YEAR: 2**

**SEMESTER: 2**

**COURSE CODE: MENG 6508**

**COURSE TITLE: RESEARCH METHODS**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Introduction to research methods. Research process from conceptualisation to analysis and conclusions. The use of constructs. Operationalisation of constructs. Measurement. instruments - design, testing, and administration. Data collection. Data coding and encoding. Data entry and verification. Hypothesis testing. Data analysis. Model building. Drawing conclusions from data analysis. Report writing and presentation of results. References and searches.

**YEAR: 2**

**SEMESTER: 1**

**COURSE CODE: MENG 6506**

**COURSE TITLE: PROJECT MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Project identification in the context of investment programmes at national and sectoral levels; Pre-investment studies; Project management, development and evaluation; Project organisation; Project analysis and evaluation (market, technical, economic, financial, social and environmental); Project implementation (procurement/contracts programming and control); Export evaluation.

**YEAR: 1**

**SEMESTER: 1**

**COURSE CODE: MENG 6700**

**COURSE TITLE: STRATEGIC ASSET MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Historical development of maintenance practices. Strategic characteristics of physical assets. Business Plans. Operations Strategy and Plans. Maintenance Objectives and Goals. Maintenance Strategies and Tactics. Maintenance Organisation and Staffing. Outsourcing Maintenance. Quality and Maintenance. Asset Strategy and Acquisitions. Life Cycle Costing. Measurement of Performance. Data Collection and Reporting Systems.

**YEAR: 1**

**SEMESTER: 1**

**COURSE CODE: MENG 6701**

**COURSE TITLE: ASSET MAINTENANCE TECHNOLOGIES**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Preventive and Corrective Maintenance. Condition based Maintenance. Predictive Maintenance. Cost, benefits and implementation guidelines. RCM: Concepts and processes; Introduction and implementation issues. TPM: Concepts and processes. Introduction and implementation issues. CMMS: Features and benefits; Systems specification, sourcing and implementation issues.

**YEAR: 1**

**SEMESTER: 2**

**COURSE CODE: MENG 6702**

**COURSE TITLE: WORK PLANNING AND SCHEDULING**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Maintenance Plans and Programs. Job Planning. Work Order Systems. Work Measurement. Maintenance Resource Planning. Quality Assurance. Work Scheduling, Monitoring and Control. Backlog Control. Budget Preparation and Control. Inventory Control Systems. Inventory usage analysis and control. Shutdowns and Overhauls: Planning; Estimating and Budgeting; Scheduling, Feedback and Control.

**YEAR: 1**

**SEMESTER: 2**

**COURSE CODE: MENG 6703**

**COURSE TITLE: CONDITION MONITORING AND DIAGNOSTICS**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Predictive Maintenance: Condition Monitoring Techniques. Selection, Justification, and Applications. Vibration Basics. Vibration Analysis Techniques Lubricating Oil Analysis. Wear Debris Analysis. Thermography Process Parameters. Ultrasonics. Visual Inspection Selection and Implementation of System Optimisation and Control of Programme.

**YEAR: 2**

**SEMESTER: 2**

**COURSE CODE: MENG 6704**

**COURSE TITLE: MAINTENANCE ANALYSIS AND OPTIMISATION**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Component Replacement Decisions: Individual Replacement Policies; Group Replacement Policies Inspection Decisions to Maximise Profits Inspection Decisions to Maximise Availability. Equipment Replacement for Minimisation of Cost. Equipment Replacement for Maximisation of Discounted Benefits Optimum Number of Machines to Meet Service Demand Optimum Crew Size to Meet Service Demand

**YEAR: 2**

**SEMESTER: 1**

**COURSE CODE: MENG 6705**

**COURSE TITLE: MAINTAINABILITY ENGINEERING AND MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Maintainability Functions and Measures. Maintainability Tools. Availability. Maintainability Design Characteristics. Maintainability Design for Human Factors and Safety. Maintainability Prediction and Demonstration.

**YEAR: 1**

**SEMESTER: 2**

**COURSE CODE: MENG 6706**

**COURSE TITLE: ASSET RELIABILITY MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Reliability of components and systems. Reliability Modeling and Prediction Failure Mode Effects and Criticality Analysis. Fault Tree Analysis. Design for Reliability Reliability Data Collection and Analysis. Reliability Testing and Demonstration. Root Cause Failure Analysis. Reliability Improvement.

**SEMESTER: 2**

**COURSE CODE: MENG 6707**

**COURSE TITLE: ASSET PERFORMANCE MANAGEMENT**

**NO. OF CREDITS: 3**

**PREREQUISITES:**

**SYLLABUS:** Maintenance Scorecard: Strategy Level Functional Level Implementation. Benchmarking Fundamentals. Benchmarking Best Practices. Maintenance Improvement Plans. Corrective Action and Continuous Improvement.

**YEAR: 2****SEMESTER: 1****COURSE CODE: MENG 6708****COURSE TITLE: RELIABILITY CENTERED MAINTENANCE****NO. OF CREDITS: 3****PREREQUISITES:****SYLLABUS:** Developments in RCM. RCM Process: Equipment Functions, Standards, and Failures. Maintenance Tasks. Maintenance Plans and Schedules. Implementation Plans. Review and Control.**SEMESTER:****COURSE CODE: ENGR 6701****COURSE TITLE: MANAGEMENT & LEADERSHIP****NO. OF CREDITS: 3****PREREQUISITES:****SYLLABUS:** Leadership and Team-Building; Decision Making, Communication and Presentation; Motivation and People Management; Time and Project Management; Business Processes; New Venture Development; Supply Chain Management; other related areas.

## Project Management Core Courses

**SEMESTER: 1****COURSE CODE: PRMG 6001****COURSE TITLE: PROJECT LEADERSHIP & ORGANISATIONAL BEHAVIOUR****NO. OF CREDITS: 3****PREREQUISITES:****SYLLABUS:** This course examines interpersonal and intrapersonal dynamics as they affect the achievement of corporate goals. Topics include: leadership, theories of organisational behaviour including motivation, group dynamics, organisational communication processes, leadership skills for project managers (profile of effective project managers), project leadership, developing a project vision, leadership and team building, team dynamics and cultural diversity, Project organisational design and structure, managing stress, negotiation, understanding conflict in the project environment, managing change in a complex domestic and international environment, leadership, power, influence and politics in project management**SEMESTER: 2****COURSE CODE: PRMG 6002****COURSE TITLE: PROJECT MANAGEMENT INFORMATION SYSTEMS (PMIS)****NO. OF CREDITS: 3****PREREQUISITES:****SYLLABUS:** This course addresses project management principles and methods from the standpoint of the project and programme manager who must organise, plan, implement and control non-routine activities to achieve schedule, budget and performance objectives. Topics include project life cycles, definition of PMIS, the planning system and the control systems, networking systems, performance management systems, cost and resource management systems, capacity planning systems. Evaluating systems, project management procedures, system selection and implementation, project management software, earned value techniques and project audits are studied.**SEMESTER: 1****COURSE CODE: PRMG 6003****COURSE TITLE: PROJECT & PROGRAMME MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:****SYLLABUS:** This course will explore the strategic and tactical dimensions of project and programme management. The course will address foundation and advanced principles associated with the management of projects and programmes in today's complex and dynamic business environment. Critical project and programme management tools and techniques associated with key Project Management Bodies of Knowledge will be addressed. These tools and techniques include, Internal and External Analyses, Turner's 7 Forces, Project Appraisal and Selection Models, Project Charter, Work Breakdown Structures, Project Schedules, Risk Management Frameworks and Earned Value Management. Student will also be introduced to critical aspects of the Project Management Office, Project Management Maturity Models and Project Management Methodologies. The course will be delivered using lectures, project-based learning, problem-based learning, class discussions, and group presentations. Assessments will be conducted via written coursework, groups presentations and examination.



**SEMESTER: 1****COURSE CODE: PRMG 6004****COURSE TITLE: PROJECT ACCOUNTING & FINANCE****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** The objective of this course is to apply principles, concepts, tools and techniques of accounting and finance to the different phases of project conception, imitation and planning, scheduling and control and implementation, termination and post-evaluation; financial statements and analysis; accounting principles and policies, valuing projects - engineering economic analysis, financial methods (NPV, IRR, profitability index), multi-criteria methods of evaluation, real options analysis, social cost-benefit analysis and development impacts, cost capacity relationships/life cycle costing, earned value approach, the costing of products and services (product-costing, job-costing), projects budgets in planning, cost control and performance evaluation.

**SEMESTER: 2****COURSE CODE: PRMG 6007****COURSE TITLE: PROCUREMENT MANAGEMENT, LOGISTICS & CONTRACTING****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Principles and concepts essential to effecting large procurement programmes. Planning, sourcing, and contractual design for diverse acquisitions. This course examines processes through which works, goods and services are acquired in the project management. Topics include what is procurement management, contract and procurement strategies [IDB, WB, EEC, CDB, private sector and public sector]; legal issues, contracting pricing alternatives; writing terms; reference, technical, managerial and commercial requirements, request for proposals (RFP) development, source selection, invitation to bid, bid evaluation (process criteria report), risk assessment, contract negotiation and administration, contract close out and case studies.

**SEMESTER: 2****COURSE CODE: PRMG 6010****COURSE TITLE: RISK MANAGEMENT FOR PROJECT MANAGERS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course will emphasise risks and risk management processes in projects and firms that are involved in project management. It will discuss and explore the concept of risk management both from the strategic and tactical levels. Topics: Why project risk management? The risk management cycle, the nature of risk management, risk and decision-makers, integration, general approach and definitions, risk identification, risk assessment goals and methodology, computer applications, risk response and documentation, management of contingency allowances, managing the risks of the project environment dealing with risks in contracts and project risk analysis and management (tools and techniques) e.g. assumption analysis, check lists, prompt lists, brainstorming, Delphi technique, probability impact tables, interviews, risk register, decision trees, influence diagrams, Monte Carlo simulation, sensitivity analysis, PERT and control techniques). The practical use of statistics in collecting, organising, analysing, interpreting, and presenting data both descriptive and inferential techniques are covered. The perspective will be aimed at medium and upper-level project managers in various organisations.

**SEMESTER: 1****COURSE CODE: PRMG 6015****COURSE TITLE: CONTRACT MANAGEMENT & CONTRACT LAW FOR PROJECT MANAGERS****NO. OF CREDITS: 3**

**SYLLABUS:** An introduction of the different legal systems, the hierarchy of local courts, creation of laws and the role of the Parliament and Statute. Contract and the conduct of business. Types of Contracts (Oral v. Written). Employment contract, contracts of service and contracts for services (Consultation, etc.). Elements of the law of Contract and application to business. Sale of Goods Contracts, Insurance Contracts, Warranties, Guarantees. Different types of Contracts, Admeasurement Contracts, Cost plus Imbursement Contracts, Lump Sum Contracts, Labour only contracts, their Application and Management. Standard Form Contracts and their parts. Standards, Specification and Codes of Practice. The different procurement systems; Design and Build (D&B) Turnkey contracts, Design, Finance and Contracts.

**SEMESTER: 2****COURSE CODE: PRMG 6019****COURSE TITLE: RESEARCH METHODS FOR PROJECT MANAGERS****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Recognizing the uniqueness of projects and project environments, this course provides an introduction to the key components of applied scientific research. As a complement to the programme's research project, it is specifically tailored to meet the research needs, at the local, regional or international setting, of candidates enrolled in the MSc Project Management programme. In addition to the core tenets of research methodology such as conceptualization and data collection, learners will be exposed to advanced concepts such as error analysis and open-source data.

## Project Management Electives

**SEMESTER: 2****COURSE CODE: PRMG 6005****COURSE TITLE: MARKETING MANAGEMENT & BUSINESS COMMUNICATION****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course presents a structured approach to understanding the marketing function. Each student chooses a product or service and develops a written marketing plan to learn how to determine and integrate the elements of marketing strategy. Topics include marketing segregation, targeting and positioning, market research, product decisions, pricing, channels of distribution, sales management, advertising, marketing budgets. Business communication emphasises communication competencies that can help ensure business success. Topics covered include how to conduct research, analyse information, and prepare business reports, deliver effective information and persuasive oral presentations, work successfully with an assigned group and communicate effectively in a global workplace.

**SEMESTER: 1****COURSE CODE: PRMG 6008****COURSE TITLE: PROJECT ESTIMATING & COST MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course addresses the need for project managers to understand and apply advance tools and techniques to the development and management of project financial plans. Topics include project cost and benefit estimation, project financial analysis, project simulation, budgeting, cost/schedule integration, the cost breakdown structure, the cost commitment profile, techniques for monitoring and controlling project cost, methods of payment and their uses, types of estimate, estimates at different stages of the project life cycle, estimating methods such as: parametric, comparative, bottom-up estimating, computerised tools, analytical, accuracy of estimates, earned value management systems.

**SEMESTER: 2****COURSE CODE: PRMG 6009****COURSE TITLE: MANAGING INFORMATION TECHNOLOGY PROJECTS****NO. OF CREDITS: 3****PREREQUISITE: PRMG 6002**

**SYLLABUS:** This course addresses all areas of IT project management, hardware, software, systems integration, and human resources. It extends traditional project management concepts into the IT arena. Topics covered: IT project phases, strategies for IT projects, Project initiation and requirements definition, establishing IT project teams, project planning estimation, project execution and control, project close-out, managing hardware and telecommunications projects, managing software projects, managing systems, integration projects.

**SEMESTER: 2****COURSE CODE: PRMG 6011****COURSE TITLE: ADVANCED PROJECT MANAGEMENT PRACTICE****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Advanced PM practice and professional exam preparation examines current topics in the project management field and provides a comprehensive review of the project management body of knowledge PMBOK (USA) and BOK (Europe). Topics include: global project management, leadership, virtual teams and project information systems.

**SEMESTER: 1****COURSE CODE: PRMG 6012****COURSE TITLE: VALUE ENGINEERING & MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** This course provides students with central concepts and practical tools and techniques in Value Engineering (VE), Value Management (VM) and Value Analysis (VA). Topics include: the value concept, value engineering methodology [information phase, speculative phase, analytical phase, proposal phase and final report phase]. Several techniques for project selection e.g., breakdown analyses, cost modelling techniques, delphi techniques, energy modelling, lifecycle cost model. Life cycle costing methodology. Value management plan, keys to successful VE implementation and programme management strategy for a VE/VA programme.

**SEMESTER: 1****COURSE CODE: PRMG 6013****COURSE TITLE: INTERNATIONAL PROJECT MANAGEMENT****NO. OF CREDITS: 3****PREREQUISITES:**

**SYLLABUS:** Geography, culture and society, transnational commerce, and finance; international principles and regulations for procurement of finance, goods and services, tendering procedures; project preparation, planning, financing and execution; international contract law and operations in the conduct of transnational projects, preparing contracts, negotiating contracts, dispute resolution; transnational joint ventures and the management of resources for project execution and closure.

**SEMESTER: 2****COURSE CODE: PRMG 6017****COURSE TITLE: PROJECT MANAGEMENT FOR SMALL AND MEDIUM SIZE ORGANISATIONS****NO OF CREDITS: 3****PREREQUISITES: NONE**

**SYLLABUS:** The course discusses the business environment within the informal sector, small and medium enterprises, sole traders, the NGOs, and CBOs. It discusses the unique challenges to the conduct of business within this sector. It treats with the principal weaknesses of management operations and practice in the sector and the role of documentation, availability and use of technology, written and oral communication and the preparation of a business plan as well as managing finance, organisational structure, applications of management tools in respect of time, cost, and quality management. It discusses the unique challenges of applying management tools to this sector. The course is about identifying and studying the unique nature of small business and seeks to answer the question; does small business require a separate and distinct managerial strategy and distinct tools?

**SEMESTER: 2****COURSE CODE: PRMG 6018****COURSE TITLE: FINANCIAL RISK MANAGEMENT AND REGULATORY COMPLIANCE (BANKS AND FINANCIAL INSTITUTIONS)****NO OF CREDITS: 3****PREREQUISITES: PRMG 6010; PRMG 6004**

**SYLLABUS:** The course is offered as a specialist course in Risk Management as it applies to the financial sector. It provides knowledge and understanding of the key elements of risk management and their ability to protect business organizations and add value to the organisation and shareholder value. It identifies the key risks facing financing services institutions and identifies the source of risks especially in banks, insurance companies and other financial institutions. It discusses the question of due diligence and the role of central banks and regulatory legislation. It explores the relevance and application of various statistical measures within risk analysis. It also discusses special issues e.g., Efficient Market Hypothesis; Mean Variance Portfolio Theory, Arbitrage Pricing Theory and Factor Models and Risk Adjusted Measures. The course uses case studies as the principal vehicle of treating with financial risk management practices.



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