UWI
MONA CAMPUS
JAMAICA, WEST INDIES

FACULTY OF
ENGINEERING

2018-2019

Undergraduate Information Handbook

Regulations & Syllabuses

CONTENTS

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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 https://www.mona.uwi.edu/engineering/orientation. The handbook includes:

- 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:

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.

Notwithstanding the contents of the Faculty Handbook, the University reserves the right to modify, add or altogether remove from a Programme, certain aspects of any course offered by the University, as described in either the Handbooks, Course outlines or any other Course materials provided.

ACADEMIC DIARY

Semester I Dates

- Semester I begins Sunday August 26, 2018
- Teaching begins Monday September 03, 2018
- Teaching ends Friday November 30, 2018
- Examinations Monday December 03–Friday December 21, 2018
- Semester I ends Friday December 21, 2018

Semester II Dates

- Semester II begins Sunday January 20, 2019
- Teaching begins Monday January 21, 2019
- Teaching ends Friday April 19, 2019
- Semester Break Sunday April 21–Sunday April 28 2019
- Examinations Monday April 29–Friday May 17, 2019
- Semester II ends Friday May 17, 2019

MISSION STATEMENT

The mission of the Faculty of Engineering is to provide high quality education in engineering with emphasis on application via research and development in support of Caribbean business, industry and infrastructure, with its graduates, staff and facilities being at the forefront in propelling growth, development and innovation in the Caribbean and the world.

DRESS CODE AND CONDUCT

Students must at all times conduct and present themselves in a manner in keeping with the nature of the Engineering Profession, and as directed by the Department in which the student is registered. In particular, due to Occupational Health and Safety issues in the laboratories, PRESCRIBED LABORATORY ATTIRE WOULD BE ENFORCED AT ALL TIMES. Any student who is not appropriately attired SHALL NOT BE ALLOWED ENTRY in any Laboratory or Workshop.

Student ID cards MUST be clearly displayed at all times when on UWI premises. Student ID cards are also required to facilitate all transactions in the Faculty/ University.

Food and drink SHALL NOT be brought into classrooms or laboratories.

MESSAGE FROM THE DEAN

On behalf of all staff of the Faculty of Engineering (FoE) of The University of the West Indies, Mona Campus, I happily welcome all new and returning students for the 2018/2019 Academic Year. We have just ended a very eventful year which embraced the first staging of the Preliminary Engineering programme; the very first site visit of ABET Accreditation team; the official approvals to transform the Mona School of Engineering into a Faculty of Engineering, Mona; and a successful joint final year Capstone Engineering project between 8 students of the IBM Watson School of Engineering at SUNY Binghamton University and 6 students of the Mona School of Engineering, UWI.

As our student numbers keep trending up, this year promises its own set of exciting events. We are now a Faculty of Engineering and have been restructured to meet all the UWI requirements and expectations, thereof. In addition to an increased staff complement, four Deputy Deans have been appointed to oversee undergraduate, graduate, outreach and quality assurance matters. Their roles and responsibilities are described later in this booklet and may be used as a guide in seeking assistance to resolve any queries you may have. We have commenced exploration of joint-degree programmes with the University of Florida (UF) where Caribbean students will do 2 years at UWI Mona, and another 2 years at UF, and upon successful completion will be awarded dual degrees (one from each university). The increase in our programme offerings along with the growing number of applicants, signifies the Faculty's positive response to the call from the Government of Jamaica (GoJ) and various industries for increases in the number of engineering graduates. Our MPhil and PhD research activities will also commence this year where over 50 applicants were processed for research projects across all our engineering programmes.

We continue to strengthen our partnerships with local and international industries and academia. New Fortress Energy has increased the number of scholarships to engineering students from 5 to 10. The UWI Graduating Class of 1967 has established a Legacy Award to be given to a student who demonstrates excellence and innovation. Mona-Tech Engineering Services, the commercial arm of the Faculty of Engineering, is in the implementation phase of

(Continued on page 6)

constructing a 7 MW CHP plant for the Mona campus that will see the campus being independent of the JPS power grid. We have partnered with University of Pennsylvania (UPenn) to offer a Global Seminar Course in rehabilitative robotics with a focus on applications that are relevant in the Jamaican context. The course will provide exposure to the principles of human-centred design focusing on rehabilitative systems. The class will be offered in Semester 2 and will contain two cohorts of students, one based at UPenn and the other in Jamaica, including joint projects with UPenn students being hosted by UWI for 10 days.

We encourage your participation in the activities of the student engineering clubs (JIE, IEEE, I-StructE), and also your support to our team preparing for the annual international robotics competition by IEEE South East USA. We have continued to excel in this competition and last academic year (April 2018) we were awarded 3rd Place of 54 participating universities. The FoE continues to work hard towards creating a world class teaching and research facility, with strong synergies with our industrial and commercial partners.

We wish you a very successful 2018/2019 academic year.

Paul Aiken, PhD, PE, Senior Member IEEE
Dean, Faculty of Engineering

STAFF LISTING

DEAN'S OFFICE

DEAN

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HEADS OF PROGRAMMES

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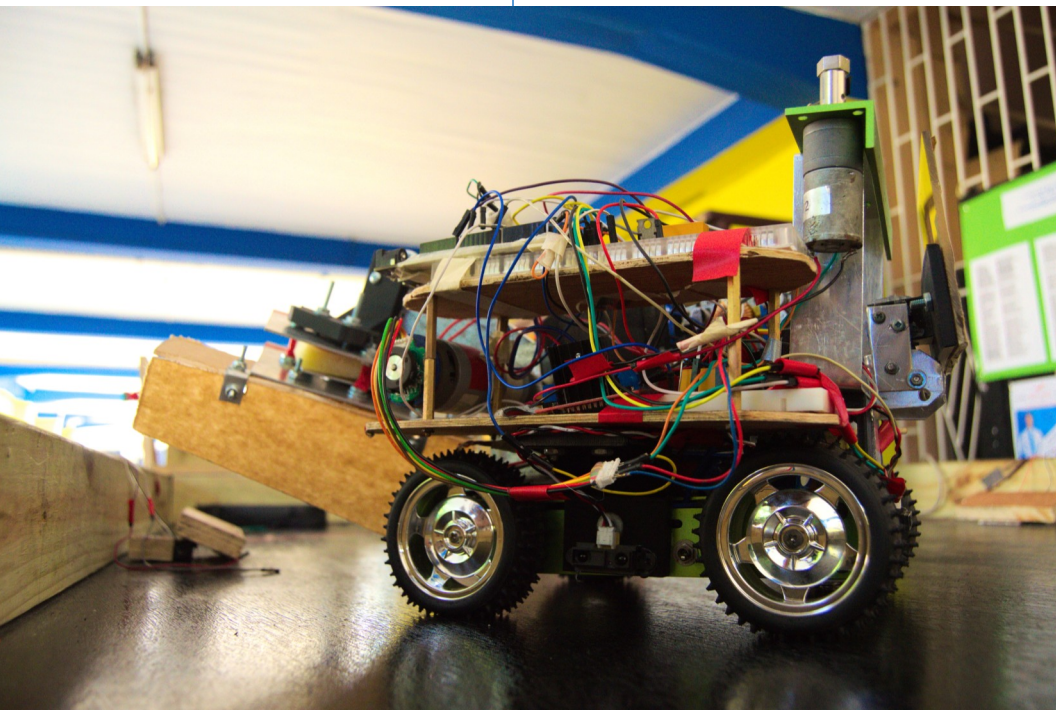

SENIOR LECTURERS

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Rannie, Richard
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Industry: Architect, Semiotics Ltd
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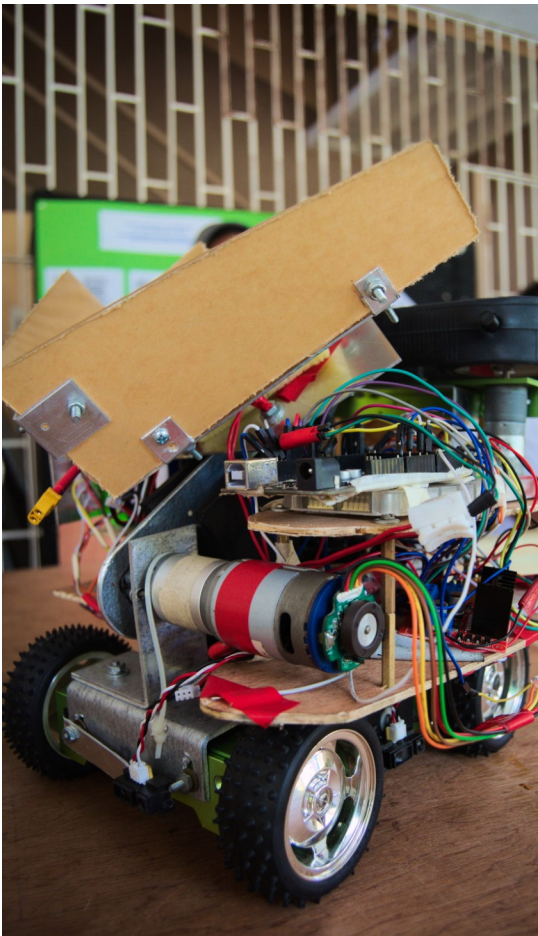
Rowe, Camille
MSc, University of London; MPhil, University of Cambridge
Industry: Office of Utilities Regulations
(Engineering Mathematics)

Young, Garfield
PhD
Geomatics Education
(Geomatics for Civil and Environmental Engineers)



SECTION 1: GENERAL INFORMATION

PROGRAMMES OF STUDY

The Faculty of Engineering, Mona offers four (4) MPhil/PhD programmes and four (4) of Bachelor of Science, Engineering (BSc (Eng.)) degree programmes.

BSc Engineering (Mona) Programme Specialisations

1. Biomedical Engineering
2. Civil Engineering
3. Electrical Power Engineering
4. Electronics Engineering

The BSc Programmes are divided into Levels 1, 2 and 3 and are conducted over three (3) academic years; each year consisting of two (2) semesters. A candidate becomes eligible for the award of a BSc degree only upon satisfactory completion of one of these programmes, as determined by the prescribed regulations. Degrees may be awarded in each programme with First Class Honours, Second Class Honours (Upper or Lower Division), or Pass.

Preliminary Engineering programme

The Preliminary Engineering programme is a 1-year programme that serves as a qualifying year for students seeking to access any one of the 3-year BSc engineering programmes. The existing BSc. Engineering programmes have a minimum entry requirement of passes in CAPE mathematics and physics (or equivalent). Students who do not meet this requirement will now have the opportunity for admissions to the preliminary year. This preliminary year allows students from any country to access our engineering programmes. It creates a pathway for students from non-traditional educational backgrounds, such as City and Guilds.

ACADEMIC QUALITY ASSURANCE

Quality assurance systems are aligned with that of ABET international accreditation. The BSc in Electronics has been reviewed by ABET and received accreditation for 2016 – 2021. The lessons learned from this process are being used to bring all other programmes in line with ABET standards. Each BSc Engineering programme at Mona will apply for ABET accreditation .

COURSE MATERIALS

Upon payment of tuition fees (either in full or part payments) , the student shall receive an E-tablet with the prescribed texts for each course within the programme for which they are registered .

SECTION 2: STUDENT PRIZES

The Faculty prides itself on its strong tradition of nurturing top class graduates who have gone on to distinguish 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 has an honour society programme which recognises the top students in the faculty each semester and encourages a culture of excellence among students. The faculty also offers bursaries to all Jamaicans resident in Jamaica who are registered in the Pre-Engineering Programme and to needy students who have maintained a GPA of 3.0 or higher.

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 2017/2018 Academic Year:

- New Fortress Energy
- Gore Developments Ltd.
- UWI Class of 1967
- Elaine Bryan Foundation

SECTION 3: UNDERGRADUATE REGULATIONS

All students of the University are subject to the General Regulations for Students approved by the Senate of The UWI. Where there is conflict between the regulations of any Faculty and the University Regulations, the University Regulations shall apply.

QUALIFICATIONS FOR ADMISSION TO BSc ENGINEERING PROGRAMMES

Applicants who wish to begin an undergraduate degree programme in the Faculty of Engineering must fulfil the general University regulations concerning matriculation and the specific requirements of the Faculty.

University Requirements

Proficiency in English

3.1.(a) Persons applying to enter undergraduate degree programmes at the University of the West Indies, Mona are required to sit the English Language Proficiency Test (ELPT) set by the University. Only persons who are successful in this test or who have been granted exemption, based on distinction grades in CXC CSEC English and CAPE Communication Skills (or equivalent), will normally be considered for entry into the degree programme at Mona.

Applications Deadline

3.1.(b) Applications for all BSc Engineering programmes are usually opened in November of the previous academic year and extends up to end of August, prior to the start of the academic year for which the applications are being made. Applications must be submitted to the Senior Assistant Registrar, Admissions, The University of the West Indies, Mona, Kingston 7, Jamaica, either online, by mail or walk-ins.

University's Matriculation Requirements

3.1.(c) Applicants must have passes in at least five (5) subjects at CXC (CSEC) General Proficiency (Grades I or II pre-1998 and I-III from 1998) or GCE O-Levels or BSCSE (Grades A-C) or approved equivalents, which must include English Language.

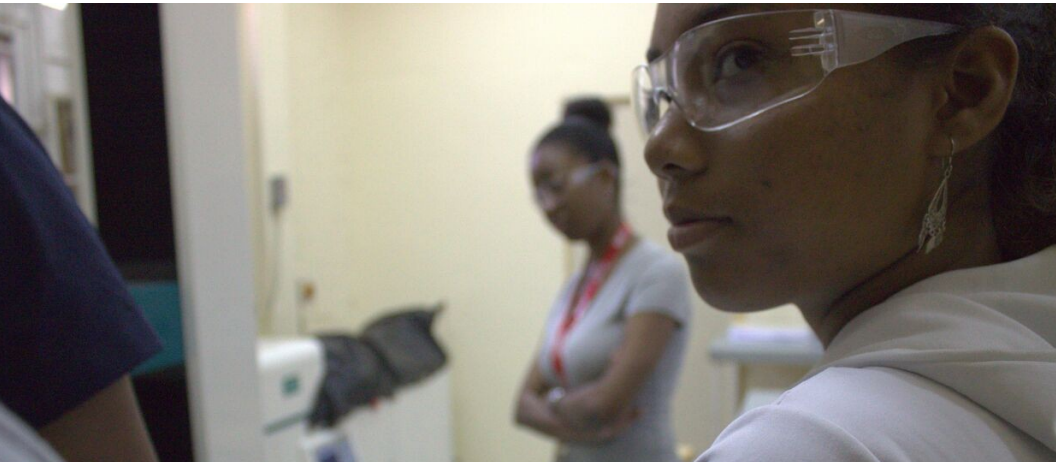
Faculty Requirements

3.1.(d) The specific requirements of the Faculty vary by programme, and are set out below.

1. Preliminary Engineering Programme (1-year)

   Minimum entry requirements to the preliminary Engineering programme are:

   i. Passes in at least 5 CXC CSECs, or 5 GCE O'Levels, or 5 International Baccalaureate® (IB) all including Mathematics, English, Physics (or equivalent) and any other two subjects; or
   ii. Certificate or Diploma in City & Guilds engineering examinations; or
   iii. Relevant high school and SAT passes from international institutions, or
   iv. Relevant passes in 'Gaokao' (China's National College Entrance Examination) examination, or
   v. Passes in relevant college entry exams from other countries, or
   vi. Passes in high school Mathematics and Physics (or other sciences) and completed HEART/NTA diploma in relevant technical discipline, or has been working in relevant technical field for at least 4 years.



2. Three-year BSc Engineering Degree Programmes

   Admissions for the traditional 3-year BSc engineering programmes (starts at Level 1) requires passes in at least five (5) CSECs (or equivalent) including English A, Mathematics, and Physics, along with:

   i. Passes in units 1 and 2 of CAPE Mathematics and Physics; or
   ii. Passes in GCE A'Levels Mathematics and Physics; or
   iii. Passes in MATH0100, MATH0110, PHYS0411, PHYS0412, PHYS0421 and PHYS0422 from the Preliminary year of the Faculty of Science and Technology of The UWI; or
   iv. Diploma in a relevant Engineering programme from an approved institution; or
   v. Diploma in a relevant Engineering discipline in the City & Guilds examination, inclusive of a pass in the advanced Mathematics and science courses (Unit 351); or
   vi. Associate degrees with Mathematics and Physics or relevant Engineering programmes from approved community colleges; or
   vii. Passes in Higher International Baccalaureate (IB) in Mathematics and Physics; or
   viii. Successful completion of the Preliminary Engineering Year with minimum GPA of 2.0, including passes in all pre-Engineering Mathematics and Physics courses.

3. Applicants with a Diploma in a relevant Engineering discipline

   Applicants with a Diploma in a relevant Engineering discipline (or equivalent) and a minimum GPA of 2.5, may be eligible to matriculate into Level 2, **but** may be required to do prescribed Level 1 course(s).

PROGRAMMES OF STUDY

3.2. In pursuance of a BSc in an Engineering discipline students are normally required to:

   (a) Not carry a course load of more than 18 credits per semester.
   (b) Pursue the approved programme curriculum and obtain, normally within a maximum of 14 semesters, the credits as prescribed in the Programme's Schedule; except as otherwise provided in Regulations 3.3 (Exemptions) and 3.27 and 3.28 (Credit

Transfers). Students who CANNOT complete their programmes of study within 14 semesters of registration would be declared as having failed the programme.

(c) Normally pass prerequisites for courses before being allowed to register for those courses.

(d) Ensure that in registering in any given semester that priority is given to all outstanding or trailing eligible lower level courses and to prerequisite requirements.

(e) Not take more than the normal number of credits as stipulated in the Schedule of Courses for the registered Programme in a particular semester unless a single course is being trailed and a minimum GPA of at least 2.7 has been achieved in the Year preceding that semester. In this case, the student shall seek approval from the Programme concerned for registering for a higher load.

(f) Attend all classes for all courses for which they are registered for examinations, including courses that are being repeated, unless they have been granted permission in accordance with Regulation 3.2(g).

(g) Request permission to register for "Examinations Only", i.e. to not attend classes but to write course examinations, only in courses that are being repeated by the student and up to a maximum of seven (7) credits, provided they are credits needed to graduate, and provided that all coursework was previously and successfully completed.

(h) Along with Regulation 3.2(c), pass all required Level 1 courses before matriculation to Level 3 (final year).

EXEMPTION AND CREDIT

Exemption

3.3. A student who has satisfactorily completed courses outside of the Faculty may be granted exemptions up to a maximum of 36 credits towards the fulfilment of Level 1 and Level 2 requirements provided that not less than four (4) semesters of study for the degree in the Faculty are pursued.

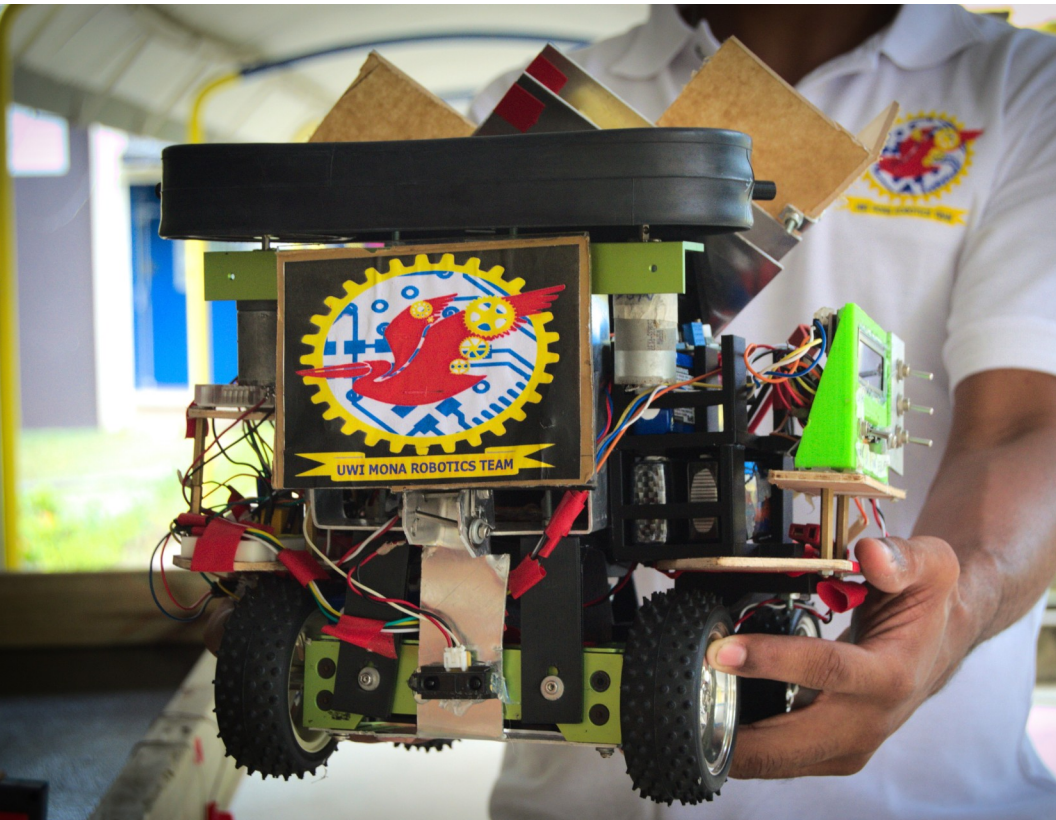
3.4. The programme of study and courses qualifying for such exemption are subject to the approval of the Faculty Board on the recommendation of the Head of Programme.

Credit

3.5. (a) A student who voluntarily withdraws from the University and who applies for re-admission within five (5) years shall be granted exemption and credit for courses previously passed, subject to the time limit for the maintenance of credits stipulated in Regulation 3.5 and subject to the stipulation that the courses previously passed have not substantially changed, and are not determined by the Board of the Faculty to be obsolete.

(b) Credits obtained more than five (5) years prior to an application for re-admission into a programme will not normally be applied to that programme.

(c) Where exemption and credit are granted in accordance with Regulation 3.5.(a), the grades obtained at previous attempts at such courses shall be used in the determination of the student's GPA.



SCHEME OF EXAMINATION

Examination

3.6. (a) The examination of a course shall be conducted by written papers, coursework and/or project(s). Some courses require that students pass coursework as well as the final examination before a pass can be awarded. Students are required to consult their respective Programme Coordinators on the matter.

(b) For students who entered a programme in the Faculty prior to the 2014/2015 academic year a minimum mark of 40% must be made in order to pass a course, subject to any "must-pass" course-component stipulated within the course. For students who enter a programme in the Faculty as of academic year 2014/2015 a minimum mark of 50% must be made in order to pass a course, subject to any "must-pass" course component stipulated within the course.

(c) A candidate may also be orally examined.

(d) Students who have not attended a minimum of 75% of classes may normally be treated as having failed the examination in those courses. Failure of the Faculty to enforce this rule is not to be construed as a waiver for future breach of this regulation.

(e) Candidates are not allowed to re-write an examination once they have already passed the relevant course.

3.7. (a) A candidate who fails to attend any examination and does not submit an acceptable medical certificate for his/her absence, as prescribed in the University Examination Regulations, shall be treated as having failed that examination. If the candidate submits an acceptable medical certificate, he/she will be permitted to write the examination at a later date, without penalty.

(b) A candidate who fails the examination associated with a course may re-register for the course and be exempted from the coursework passed. If such a recommendation has been made, the candidate may apply to the Head of Programme for permission to take the examination without attending the course (Exam Only).

(c) The GPA of courses that are failed are calculated in the final degree GPA.

Coursework

3.8. Coursework shall comprise laboratory, workshop, drawing and field exercises, literature surveys, problem exercises, in-house tests, reports and presentations, or such other assignments as the Faculty Board may approve. With regard to their assessment, there are two types of coursework:

(a) Assessable coursework grades which contribute to the overall course mark attained in the course.

(b) Non-assessable Coursework which is graded on a PASS/FAIL basis only and does not contribute to the overall course mark attained in the course.

3.9. A student who is absent from part of the written assessable coursework tests for grave medical reasons, as prescribed in the University Regulations, shall be graded on the tests he/she has taken as if such tests constitute the full test requirement provided that the tests not taken constitute no more than 20% of the total mark for all the tests. If the tests not taken constitute more than 20% of the total mark for all the tests, the candidate shall have to take make-up tests at a later date.

3.10. (a) Students who fail a course may, within one (1) year of taking the course, request that marks from the passed laboratory coursework be transferred to the next registration of the course. In this regard, requests should be directed to the Head of Programme whose decision on this matter will be final.

(b) Students are required to submit coursework by the prescribed date. Coursework will only be accepted after the deadline, in extenuating circumstances, with the specific written authority of the course lecturer and in any event, not later than the day before the start of the relevant end of semester examinations of the semester in which the particular course is being offered.

Projects

3.11. All Engineering programmes require that students pass their Capstone Project at the first attempt in order to qualify for honours. The regulation governing selection, conduct and assessment of capstone projects are outlined in the Project Manual.

SCHEDULE OF COURSES

Course Listing

3.12. The following types of courses, which may consist of both theoretical and practical parts, are offered by the University:

(a) **In-Faculty courses** which are taught by the Faculty of Engineering and include Preliminary (Level 0) and Level 1, 2 and 3 courses, with each level typically corresponding to a year of study. Courses are offered in each of two semesters in any given academic year, which typically runs from September to May. Some courses are offered during the summer period, usually on a remedial basis. The Schedule of Courses is provided in the Programme Brochure. Preliminary courses may be used to satisfy entry requirements, but

do not contribute towards the credit requirements for the award of a degree.

(b) **Service courses** which provide students with basic techniques and skills needed for dealing with the academic programme.

(c) **Out-of-Faculty courses** which may contribute toward the requirements for the award of a degree.

(d) **Foundation courses** (listed at the end of these regulations) which are given throughout the University to augment the general education of students.

(e) Courses are normally taken during one semester, but in special cases may extend over two semesters.

CO-CURRICULAR CREDITS

3.13. Students are free to apply for co-curricular credits based on activities in sports, clubs, etc. Co-curricular credits will be shown on the transcript but will not count towards the BSc Engineering Degree.

NOTICE OF EXAMINATIONS

3.14. Notice of the dates of end of semester examinations shall be posted on official notice boards and/or the University website within the minimum time as prescribed by the University Regulations. Usually two drafts are posted before the final draft, allowing for student and faculty to identify clashes and breaches and recommend corrective measures.

AEGROTAT DEGREE

3.15. A student who has obtained at least three-quarters of the credits required for a Bachelor's Degree but who has been unable, through illness, to complete the programme, may apply under the University Regulations for the award of an Aegrotat Degree.

3.16. An Aegrotat Degree will not be awarded unless the Board of Examiners considers that, in the courses which he/she has completed, the student has reached a standard which, if also reached in the remainder of the programme, would have qualified him/her for the award of a Degree.

3.17. An Aegrotat degree will be awarded without Class.

3.18. Holders of an Aegrotat Degree are not permitted to re-enter for the same Degree programme, but may proceed to a second or higher degree upon compliance with the Regulations for such Degrees.

CLASSIFICATION OF DEGREE

3.19.(a) For students who entered the Faculty prior to Academic Year 2014/2015, BSc Engineering degrees will be awarded in the following classes based on the overall performance of the graduating students throughout the programme:

i. First Class Honours
ii. Second Class Honours (Upper Division)
iii. Second Class Honours (Lower Division)
iv. Third Class Honours
v. Pass

(b) For students who enter the Faculty as of Academic Year 2014/2015, BSc degrees in the Faculty of Engineering will be awarded as above except for Third Class Honours degrees.

(c) The notice of the award of the BSc degrees shall be published in a separate "Pass List" for each discipline with the ID numbers of the successful graduating students.

3.20. (a) The class of degree shall be awarded as First Class Honours, Second Class Honours (Upper Division), Second Class Honours (Lower Division), or Pass on the basis of the final Grade Point Average (GPA) as given in Regulation 3.22, subject to Regulation 3.11.

(b) Where a full-time student completes the Degree in more than eight (8) semesters, he/she shall not normally be eligible for Honours. Such a student, who would otherwise meet the requirements for the award of a degree in accordance with the Faculty's regulations, shall be awarded a Pass Degree.

CALCULATION OF GPA

3.21. (a) For purposes of these regulations, the following meanings shall apply, except where the context otherwise requires:

i. **Credits**

The contact hours for a course are expressed in terms of Credits. The credit rating for each course is outlined in its course description document and follows the guidelines below for a semester:

- 3 hours of teaching per week, constitutes 3 credits
- 3 hours of laboratory exercises per week constitutes 1 credit
- Tutorial times are assigned zero credits

The total number of credits awarded to courses, as well as for projects, laboratory sessions, foreign language classes or other approved contact hours, shall be determined by the Faculty Board and approved by the Board for Undergraduate Studies.

ii. **Credit Hours Earned**

'Credit Hours Earned' means the credits for each course that count toward the degree requirement and for which a passing grade is obtained.

iii. **Quality Hours**

'Quality Hours' mean the credits for each course that is included in the GPA calculations. Quality hours shall be assigned even when a grade of F is obtained in a course. Courses that are not used in the determination of the GPA shall be assigned zero quality hours.

iv. **Quality Points**

'Quality Points' means the numerical value assigned to the relevant letter grade earned.

(b) For the purpose of these Regulations the following meanings shall apply:

i. **Levels 1, 2 and 3 Courses**

Levels 1, 2 and 3 Courses are courses so designated by the Board for Undergraduate Studies. The numbers indicate the depth of knowledge and specialisation relevant to the respective discipline. Normally, all courses at a particular Level are offered in the corresponding year of the programme, e.g. Level 1 courses at Year 1 etc.

ii. **Grade Points**

Grade points are determined by multiplying the quality hours by the quality points for a course.

iii. **Grade Point Average (GPA)**

Grade Point Average is the average obtained by dividing the total grade points earned by the total quality hours for which the student has registered, excluding courses taken on a Pass/ Fail basis and courses with designations entitled Additional Regulations.

iv. **Weighted Grade Point Average**

The Weighted Grade Point Average is the cumulative average determined by applying appropriate weights of 10%, 30% and 60% for Levels 1, 2 and 3 courses, respectively, (except for the Final Year Project), to the grade points and the quality hours used in determining grade point average. Failed courses are also included in the determination of the GPA. Prior to any attempt at the final year project, the Weighted GPA is given by

$$\text{Wgpa} = \frac{(\Sigma Q_i C_i + 3\Sigma 2 Q_i C_i + 6\Sigma 3 Q_i C_i)}{\Sigma C_i + 3\Sigma 2 C_i + 6\Sigma 3 C_i}$$

where:

Wpga is the weighted GPA,

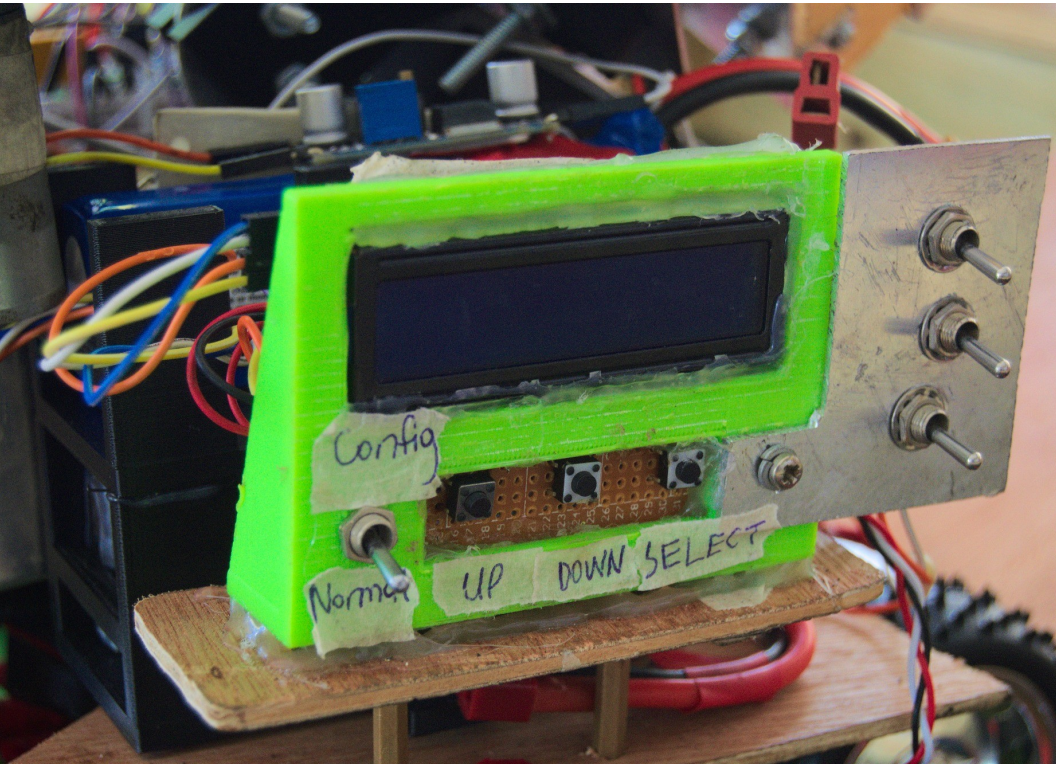
$\Sigma_j Q_i C_i$ is the summation of the product of quality points Q_i and credits C_i, for all courses taken at Level j.

In the Faculty of Engineering the Final Year project contributes 20% to the Weighted GPA calculation used to determine the class of degree. Once the Final Year project is attempted, the weighted average is determined as follows :

$$\text{Wgpa} = 0.8\left(\frac{\Sigma_1 Q_i C_i + 3\Sigma_2 Q_i C_i + 6\Sigma_3 Q_i C_i}{\Sigma_1 C_i + 3\Sigma_2 C_i + 6\Sigma_3 C_i}\right) + 0.2\left(\frac{\Sigma Q_{pi} C_{pi}}{C_{pi}}\right)$$

where:

Q_{pi} is the quality points earned in each attempt at the final year project.



v. **Semester Grade Point Average**
Includes *all* approved courses for which the student is registered in a semester, whether passed or failed, will be calculated for the determination of academic standing.

vi. **A Cumulative grade point average**
Includes all courses completed excluding those taken on a Pass/Fail basis, audited courses, Preliminary courses and courses designated Intermediate or Intermediate Pass will be calculated and recorded on the student's transcript.

vii. **Programme/Degree grade point average**
Includes all Levels 1, 2 and 3 courses, whether passed or failed, will be calculated for determination of the class of the degree. All courses included in the computation of the grade point averages are weighted according to the number of credits for the course.

(c) Courses for which credit and exemption have been given on the basis of qualifications obtained outside the Faculty/University shall not be taken into account in this calculation, except where the prescribed Schedule of Courses allows for a student to take a course outside of the Faculty of Engineering for credit.

(d) Credit hours earned in courses taken on a Pass-Fail basis shall not be included in calculating grade point averages.

3.22. The class of degree shall be awarded on the basis of the Weighted GPA as set out in these Regulations.

3.23. First Degrees awarded by the University for the Bachelor of Science in the Faculty of Engineering shall be classified as follows:

3.24. For students who first entered the Faculty as of academic year 2014/2015, graduation honours will be awarded upon completion of all course requirements using the new GPA scheme as follows:

DEGREE CLASS	CUMULATIVE GPA
First	≥ 3.60
Upper Second	3.00 – 3.59
Lower Second	2.50 – 2.99
Pass	2.00 – 2.49

Students with final weighted averages below 2.00, will be recorded as having failed the programme.

3.25. In the determination of GPA, the defined grades and the matching range of marks with the corresponding quality points shall be, for students who enter the Faculty as of Academic Year 2014/2015:

GRADE GPA	QUALITY POINTS	MARKS %
A+	4.30	90-100
A	4.00	80-89
A-	3.70	75-79
B+	3.30	70-74
B	3.00	65-69
B-	2.70	60-64
C+	2.30	55-59
C	2.00	50-54
F1	1.70	40-49
F2	1.30	30-39
F3	0.00	0-29

3.26. (a) The scheme to be used for conversion of numerical marks to letter grades shall be as prescribed in Regulation 3.24.

(b) The courses to be used for the purpose of determining the Weighted GPA for the class of degree to be awarded shall be as prescribed for the programme for which the student is registered and in keeping with the course listing.

(c) For the purpose of determining the Weighted GPA, all attempts at a course, failed or passed, and the grades obtained shall be included in the GPA calculation.

Transfer of Credit

3.27. (a) Where credit for a course taken at another institution is requested, it is the student's responsibility to provide all the information needed by the University to enable the University to assess this course.

(b) Credit hours earned from another institution at the time of admission to The University of the West Indies shall not be used in the computation of a grade point average.

3.28. The following shall apply to credits earned by a UWI undergraduate from another approved institution:

(a) A UWI student who wishes to take academic courses elsewhere and apply those credits toward the UWI degree must obtain approval in advance from the relevant Academic Board on the recommendation from the Board of the Faculty in which he/she is registered.

(b) A UWI student must have a minimum GPA of 3.00 to qualify for consideration for approval to take courses as an exchange student in another approved institution.

(c) Only the grade equivalent, as determined by the Board for Undergraduate Studies, of the results achieved and not the marks or grades so earned at another Institution shall be used in the computation of the student's GPA.

Warnings and Withdrawals

3.29. (a) For students who enter the Faculty as of 2014/2015 a student whose GPA for a given semester is less than 2.00 shall be deemed to be performing unsatisfactorily and shall be placed on Warning. The Semester GPA is obtained by removing the weights in the Weighted GPA calculation and applying it only to the courses registered for in the relevant semester:

$$W_{semester} = \frac{\Sigma Q_i C_i}{\Sigma C_i}$$

where:
$W_{semester}$ is the semester GPA,
$\Sigma Q_i C_i$ the summation of the product of quality points Q_i and credits C_i, for all courses taken in the relevant semester.

(b) For students who enter the Faculty as of 2014/2015 a student on Warning whose semester GPA for the succeeding semester is less than 2.00 will be required to withdraw. This regulation will be waived for all students who require seven (7) credits or less to graduate.

(c) Summer School will NOT be counted as a semester in the determination of student status when using Regulations 3.28(a) and 3.28(b). As such Summer School will not normally be used to positively or negatively change the status of any student.

(d) A student on warning shall be counselled by the Dean or a designated Faculty advisor. Such a student may, except where otherwise prescribed in Faculty Regulations, be permitted by the Academic Board

on the recommendation of Faculty Board to carry a reduced course load.

Note: **A DEAN'S HOLD will be put on the record of students who are on warning. This Hold will only be removed after counselling by the relevant representative of the Department to which the student belongs or the Administrative Officer.**

3.30. Readmission of persons who were Required to Withdraw:

(a) A person who was required to withdraw from the University in accordance with Regulation 3.28(b) may be re-admitted after a minimum of one (1) year has passed since the date of withdrawal.

(b) A person who was required to withdraw from the University can only be readmitted after submission of on-line application at the same time as when applications are invited for new students and subsequent approval of the application by the Faculty.

(c) If a student has been readmitted as per Regulations 3.29(a) and 3.29(b), all grades previously obtained shall continue to apply for the purpose of determining the student's GPA, provided that these are relevant to the degree being pursued.

(d) If a student has been readmitted as per Regulations 3.29(a) and 3.29(b), all semesters in which the grades described in 3.29(c) were obtained shall be counted towards the student's degree and shall be subject to Regulation 3.2(b) (i.e., Fail Programme determination).

(e) If a student has been readmitted as per Regulations 3.29(a) and 3.29(b), work done during the period between the student being required to withdraw and being granted re-admission may be eligible for credit under Regulation 3.26.

Course Audits

3.31. Students can register for a course on audit. This allows them to attend the lectures, tutorials and laboratory sessions for a given course without the requirement of sitting the final exam.

(a) A registered student may be permitted to audit a course on the approval of the Head of Programme.

(b) Satisfactory attendance certified by the Head of Programme shall be awarded the designation V. In the absence of such certification, the designation 'NV' shall be recorded.

No academic credit shall be granted for an audited course.

Cheating, Plagiarism and Collusion

3.32. Cheating, Plagiarism and Collusion are serious offences under University Regulations

(a) Cheating is any attempt to benefit one's self or another by deceit or fraud.

(b) Plagiarism is the unauthorised and/or unacknowledged use of another person's intellectual efforts and creations howsoever recorded, including whether formally published or in manuscript or in typescript or other printed or electronically presented form and includes taking passages, ideas or structures from another work or author without proper and unequivocal attribution of such source(s), using the conventions for attributions or citing used in this University. Plagiarism is a form of cheating.

N.B: Please refer to Guidelines for Staff and Students on Plagiarism and The University's Regulations on Plagiarism.

(c) For the purposes of these Regulations, 'collusion' shall mean the unauthorised or unlawful collaboration or agreement between two or more students in the preparation, writing or production of a course assignment for examination and assessment, to the extent that they have produced the same or substantially the same paper, project report, as the case may be, as if it were their separate and individual efforts, in circumstances where they knew or had reason to know that the assignment or a part thereof was not intended to be a group project, but was rather to be the product of each student's individual efforts.

Penalties

3.33. Cheating, plagiarism and collusion shall be reported to the Campus Committee on Examinations and the penalties would be in accordance with the University Examination Regulations.

Dress Code and Conduct

3.34. The following regulations are included in the interest of safety and the development of a professional environment similar to what would obtain in the world of work.

(a) Students must at all times conduct and present themselves in a manner in keeping with the nature of the Engineering Profession.

(b) In consideration of Occupational Health and Safety issues in the laboratories, PRESCRIBED LABORATORY ATTIRE WILL BE ENFORCED AT ALL TIMES.

(c) Students who are not appropriately attired, SHALL NOT BE ALLOWED ENTRY in any Laboratory, Workshop, Field Trip or other locations where such attire is required in the interest of safety. Students must wear whole, closed shoes. No shorts, short skirts nor any revealing clothing will be allowed. Limit your jewelry. Tie back long hair to keep away from moving objects.

(d) Students are required to comply with all rules posted in the various laboratories and workshops. Any student who is deemed non-compliant with the rules will be expelled from the laboratory or workshop.

(e) Student ID cards MUST be clearly displayed at all times when on UWI premises. Student ID cards are also required to facilitate all transactions in the Faculty/University.

(f) Food and drink SHALL NOT be brought into classrooms or laboratories.

Other Guidelines for Registration

3.35. (a) Students must register for courses at the beginning of the academic year. Time limits governing changes in registration are as outlined in the student handbooks for each Campus or by the Campus Registrar.

(b) A student is deemed to be registered for a course only after his/her financial obligations to the University have been fulfilled.

(c) In selecting courses, including out of programme electives, students must ensure that time-tabling constraints do not interfere with their ability to effectively pursue the desired course or programme.

(d) A student who has passed a course will not be permitted to re-register for that course.

SECTION 4: POSTGRADUATE STUDIES IN THE FACULTY OF ENGINEERING

Before you select your programme of study or your courses for the year, consider whether or not you would like to proceed to the postgraduate level after graduation. Even in today's Engineering job market, a Bachelor's degree is only the first step in the learning process that you should continue throughout your professional career.

However, your choices at the undergraduate level can affect your postgraduate options. This brief guide provides you with basic information on the Faculty's current graduate programmes, our research areas and any undergraduate requirements or prerequisites.

4.1 ABOUT POSTGRADUATE STUDY

The Faculty of Engineering at the University of the West Indies, Mona Campus offers 4 MPhil programmes and 4 PhD programmes in the following areas:

1. Biomedical Engineering
2. Civil Engineering
3. Electrical Power Engineering
4. Electronics and Computer Systems Engineering

Our research programmes (MPhil and PhD) allow students to follow their passion and provide the opportunity, resources and support for them to develop their own innovative products or processes.

4.2 DEFINITIONS AND ADMISSION REQUIREMENTS

Master of Science

Through our partnership with SUNY Binghamton, we intend to introduce programmes that will allow our graduates to have access to taught Master's programmes there.

Master of Philosophy

Master of Philosophy (MPhil) degrees are research degrees and are awarded on the basis of an examination by thesis.

Admission requirements for the MPhil programme are as follows:

- First degree in engineering, physics or another related natural sciences
- First degree in any discipline plus relevant experience working in a related field.
- A minimum GPA of 3.0, or an Upper Second Class Honours degree or its equivalent, unless the Campus Committee in any particular case otherwise decides.
- All students who seek entry without an engineering degree in the relevant discipline may be required to pursue qualifying courses and undertake examinations in these courses. The qualifying courses will be determined by the Head of Department and will normally not exceed twelve (12) credits.

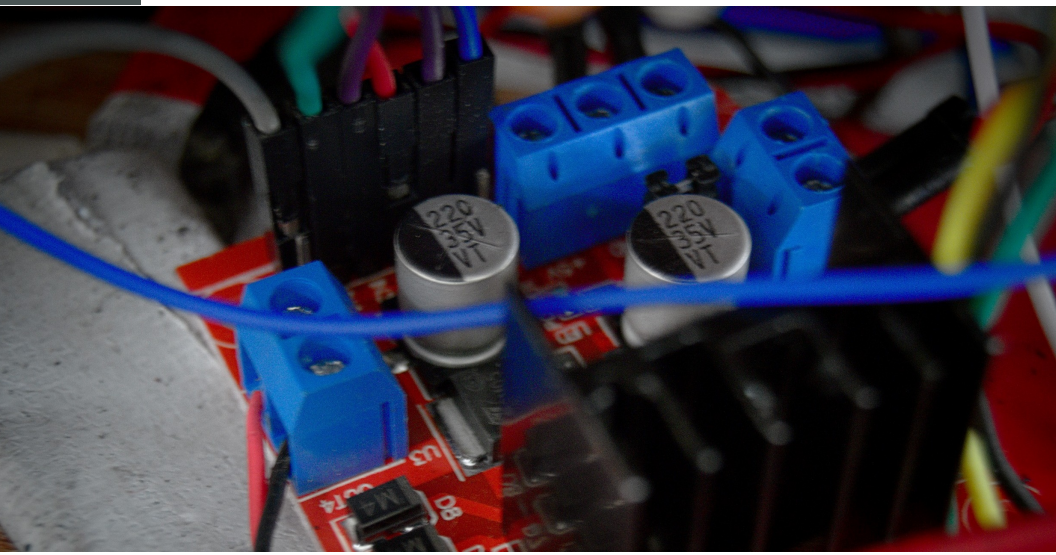
Doctor of Philosophy

PhD degrees are research degrees and are awarded on the basis of an examination by thesis.

Admission requirements for the PhD programme are as follows:

- Approved graduate degrees awarded primarily for research
- 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
- Approval of upgrade application
- Such other qualifications and experience as the Board for Graduate Studies and Research may approve

Students wishing to pursue one of the Engineering degrees would apply through the potential supervisor which is the closest match to the proposal submitted. As with other graduate applications the school will decide on acceptance. The



school will give administrative support as well as to provide laboratory and research space to students. Students will be encouraged to apply for research grants both internally and externally where specialised equipment is required that is not already available within the school. Library resources by way of texts and access to journals are sufficient to support the programmes.

NOTE: 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.

4.3 RESEARCH INTERESTS

Do you have a curious mind? A passion for knowledge? The need to blaze a trail? Do you think you can make it bigger, better, faster, stronger? Then, whether you decide to pursue full research degree or follow a taught programme, it's never too early to start thinking about the kind of research you would like to do as part of your degree. The following topics currently form part of the research agenda in the Faculty of Engineering at Mona:

Engineering Education

- Quality Assurance in Engineering Education through Accreditation

Civil Engineering

- The effects of climate change on drainage standards for urban roadways.
- Feasibility of wave power generation offshore Palisadoes/Bull Bay areas.
- Design of hybrid coastal protection structures
- Preservation and life-cycle cost models for transportation infrastructure
- Highway traffic flow prediction models
- Risk models for transportation management systems
- Alternative transportation systems
- 'Kinetic' architecture and structures for a subtropical resilient and adaptable city.
- Designing a 'subtropical' zero smart building.
- Reducing the 'death toll' of collapsing high rise building structures during major earthquakes.
- The effects of rising sea levels on coastline subtropical cities
- Total Quality Management in Construction Projects
- Sustainable Construction in Developing Countries
- Critical Success Factors in Construction Projects
- Safety Culture in Construction Projects
- Organisational Culture in Construction Industry
- Leadership Development in Construction Industry
- Construction Contract Management
- Alternative Dispute Resolution in Construction Projects
- Building Information Modelling
- Augmented reality in construction
- Non-destructive testing of concrete
- Coconut fibre reinforced concrete
- Finite element analysis of structures

Electronics and Computer Systems Engineering

- Instrumentation and Control Systems
- Optimal Power Flow

- Robust Control
- Robotics
- Analog and RF Circuits and Systems
- Artificial Intelligence
- Virtual and Online Experimentation
- Computational Intelligence and its applications
- Automatic Speech Recognition
- Modelling Hearing Impairment using Computers
- Machine learning and Embedded Systems
- Robotics, Internet of Things and Voice over IP
- Development of machine learning algorithms to translate sign (Jamaican Sign Language, JSL) to speech (Jamaican English).
- Development of machine learning algorithms to translate speech (Jamaican English) to JSL via a signing avatar.
- Novel technique to improve beam steering and radiation from microwave patch antennas and it application to twisted beam technology
- Using cell phone (and cell tower) radiation to measure atmospheric parameters, such as rainfall.
- RF triangular techniques and position sensing/locator

- Electronic navigation device for the visually impaired
- Solar Panel Tester
- Determination of the observable characteristics of Photovoltaic module/array defects using UAV sensor based systems.
- Using AxticOne to perform geo-location based network optimisation for GSM, UMTS and LTE networks
- Planning and optimising using Cellwize SON Studio for all technologies and cross technologies
- PSO for the automatic placement of multiple indoor antennas
- Robustness for Uncertain Multivariable Feedback Control Systems and Computer Control Systems
- Communications and Information Theory and Computer Networks, Compression Technologies for Packet and Wireless Networks
- Asynchronous Learning Networks and Information Technology-Enhanced Learning
- Fabrication and characterization of Nano Field Effect Transistors (FETs)
- Novel micro electrical mechanical systems (MEMS) devices
- Paper substrate and piezo electric materials
- Fabricated SiC metal insulator semiconductor (MIS) devices
- Superconductive boron doped diamond for device applications
- Characterized samples with tools such as scanning electron and atomic force microscopes (SEM and AFM), Raman, SIMMS.
- Lab on a chip using diamond sensors and detectors
- Cryogenic superconductive FET using superconductive boron doped diamond, which is currently has the interest of NASA GSFC.
- The influence of chemical and contact doping and external driving forces on the optoelectronic and magnetic properties of 2-D van der Waals materials and heterostructures

Biomedical Engineering

- Bio-instrumentation
- Biosensors
- Natural product extraction, phytochemical screening, individual and synergistic cell culture analysis using prostate cancer cell lines
- Drug delivery system analysis-Particle size analysis using Zetasizer.

SECTION 5: ADDITIONAL REGULATIONS

ADDITIONAL GPA DESIGNATIONS

AB:	Absent – when a student is absent from an examination for acceptable reasons other than a medical problem
AM:	Absent Medical
CR:	Credit
DIS:	Disqualified
E:	Exemption
EC:	Exemption with credit
EI:	Irregularity — Candidate disqualified from examination on account of breach of the Regulations
EQ:	Examination Query
FA:	When a student is absent from an examination without a valid reason
FC:	Failed Coursework – indicates that a candidate has failed to satisfy the Examiner in the coursework component of the course.
FE:	Failed Examination – when a candidate has successfully completed the coursework requirement but has failed to satisfy the Examiners in the examination component of the course
FM:	Failed Medical – when a student is absent from an examination for medical reasons or where failure in an examination is attributed to medical reasons as supported by a certificate from an authorized medical practitioner
FNP:	Failed – No Penalty
FO:	Failed Oral (where an oral examination forms part of the assessment of the course)
FP:	Failed Practical
FPR:	Failed Programme
FT:	Failed Theory
FWS:	Fail/Supplemental Examination granted

I:	Incomplete — indicates that the student has made progress in a course but at the end of the semester has not finished the work required to receive a letter grade. An **I** designation is not counted in credit hours earned, or quality hours until a letter grade is reported. If neither a letter grade nor notification of an extension of time is received by the Registry from the Office of the Dean, the 'I' designation is replaced by an 'F' grade at the end of the first six (6) weeks into the next semester. An extension of time may be granted but shall not normally extend beyond the end of the semester in which the extension is granted. Any remaining 'I' symbol at the end of the period of extension will be deemed an 'F'
IM:	Incomplete Medical
IP:	In Progress — when a dissertation, thesis, project, student teaching, practicum, internship, proficiency requirement, or other course intended to last more than one semester is not completed during the semester in which the student is registered. The 'IP' designation must be replaced with an appropriate grade on completion of the course
NFC:	Not for credit
NP:	Not Passed – when a student has failed a course taken on a Pass/Fail basis
NR:	Grade not yet available
NV:	When a student has been permitted to audit a course but has not done so satisfactorily
P:	Pass – a pass obtained in a course taken on a Pass/Fail basis
PC:	Preliminary Credits – used for matriculation purposes or the satisfying of prerequisites only
R1:	Required to Withdraw
V:	Audited - when the course has been taken in accordance with Regulation 22
W1:	Warning
W2:	Required to Withdraw – Waived by Dean
XM:	Medical Accepted

SUPPORT SERVICES FOR STUDENTS

Office of Student Services and Development

The Department is the first and most important stop for high quality academic support for the diverse populations of students throughout The University including full-time, part-time evening and mature students, international and

regional students, student athletes and students with special needs (disabilities).

The units within the office include:

- Halls of Residence including Postgraduate Housing
- Sports
- Placement and Career Services
- The Lodgings Office
- Office of Special Students Services & Development (Students with disabilities)
- Facilities Management Unit (FMU)

Office of Special Student Services

Students with special needs should make contact with the Office of Special Student Services before or during registration. Every effort will be made to facilitate your on-campus requirements in terms of mobility, accommodation, coursework, examinations, and other areas. No student of The UWI will be discriminated against on the basis of having special needs. Sharing your needs before registration will enable us to serve you better as a part of the Campus community.

Support Services for STUDENTS WITH SPECIAL NEEDS (Temporary and Permanent) includes:

- Provision of Aids and Devices such as laptops, USB drives, tape recorders and special software.
- Special Accommodations for Examinations
- Classroom Accommodations
- Liaison with Faculties and Departments

University Health Centre

The University Health Centre (UHC) at the University of the West Indies, Mona Campus, provides a wide range of primary and secondary health care services to members of the university community including full time and part time students. Their fully licensed medical and counselling practitioners are particularly sensitive to the needs, stress and rigour of student life.

All visits to the University Health Centre are treated confidentially. The UHC will not disclose any aspect of your visit to the Centre with any third party. Only disclosures explicitly required to conform to public health reporting requirements will be made.

University Counselling Service

Counselling and Psychological Services are offered through the University Health Centre Counselling Unit. Counselling is provided for several issues, including the following:

- Self Esteem
- Academic Performance
- Depression
- Abuse/trauma
- Adjustment to university life
- Marital issues

The clinic offers individual and group counselling, and other educational programmes which address topics listed above.

GUIDELINES 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 following is an extract from The University of the West Indies Policy on Graduate Student Plagiarism approved by the Board for Graduate Studies and Research at its meeting in October 2010:

Definition of Plagiarism:

Plagiarism is defined as the unacknowledged use of the words, ideas or creations of another. The principal categories of unacknowledged use are unacknowledged quotation, which is failure to credit quotations of another person's spoken or written words; and unattributed borrowing, which is failure to credit another person's ideas, opinions, theories, graphs or diagrams.

Unattributed borrowing also includes the failure to credit another person's work when paraphrasing from that work.

Cosmetic paraphrasing is also plagiarism. This occurs when, even with acknowledgment, the words are so close to the original that what is deemed to have been paraphrased is, in fact a modified quote, but is not presented as such. A more technical form of plagiarism is wrongly attributed borrowing, where one does not acknowledge the work from which one obtained an idea, but quotes, instead, the original source without having read it. This may well convey a broader research effort than that actually expended and may perpetuate misinterpretation.

It is now a requirement for all students to pass their written assignments, be it coursework, theses, research papers, project reports, through plagiarism detection software. In the case of theses, research papers and project reports, SUPERVISORS ARE REQUIRED TO SIT WITH THEIR STUDENTS AND RUN THE THESIS, RESEARCH PAPER OR PROJECT REPORT THROUGH TURNITIN in order to provide guidance on any revisions that may be required as a result of this process. SUPERVISORS MUST THEN SIGN THE RELEVANT FORMS indicating that the student has indeed run their work through a plagiarism detection software.

Post Graduate Students submitting theses, research papers or project reports for examination **must submit an electronic copy of the Turnitin report to the Office of Graduate Studies and Research**. The similarity index in the Turnitin report should **NOT BE HIGHER THAN 9%.**

Please note that if it exceeds 9%, the thesis, project report, or research paper will not be accepted for examination by the Office of Graduate Studies and Research.

The University has created an account to allow you to check your papers for plagiarism.

Here are some instructions for **creating a new student account:**

1: Please visit Turnitin's website at **www.turnitin.com** then click on create account.

2: Under ***New Students Start Here*** click on Create a User Profile.

3: Below ***Have you Ever Used Turnitin?*** Scroll down until you see ***Create A New Account*** click on ***Student***

(Please note the credentials will not work in any other instance).

4: Under ***Create A New Student Account***, please insert the credentials (i.e. Class ID and enrolment password), complete the rest of the form and follow the instructions.

In order to obtain the credentials necessary to create your new student account please visit the Office of Graduate Studies and Research to pick up your UWI GRIP Card.

Useful Turnitin Links

Getting Started:

http://www.turnitin.com/en_us/training/getting-started

For further assistance with Turnitin please visit **www.turnitin.com/help** and submit an e-mail.

UNIVERSITY REGULATIONS ON PLAGIARISM

Application of these Regulations

1. These Regulations apply to the presentation of work by a student for evaluation, whether or not for credit, but do not apply to invigilated written examinations.

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, for example:
   (a) The unacknowledged use is required for conformity with presentation standards;
   (b) The task set or undertaken is one of translation of the work of another into a different language or format;
   (c) The task set or undertaken requires producing a result by teamwork for joint credit regardless of the level of individual contribution;
   (d) The task set or undertaken requires extensive adaptation of models within a time period of such brevity as to exclude extensive attribution;
   (e) 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. It is not a justification under Regulations 2 and 3 for the unacknowledged use of the words, ideas and creations of another that the user enjoys the right of use of those words, ideas and creations as a matter of intellectual property.

Other definitions

5. In these Regulations, *"Chairman"* means the Chairman of the relevant Campus Committee on Examinations; *"Examination Regulations"* means the Examination and other forms of Assessment Regulations for First Degrees Associate Degrees Diplomas and Certificates of the University; "*set of facts"* means a fact or combination of facts.

Evidence of plagiarism

6. In order to constitute evidence of plagiarism under these Regulations, there shall be identified as a minimum the passage or passages in the student's work which are considered to have been plagiarised and the passage or passages from which the passages in the student's work are considered to have been taken.

Student Statement on Plagiarism

7. When a student submits for examination work under Regulation 1, the student shall sign a statement, in such form as the Campus Registrar may prescribe, that as far as possible the work submitted is free of plagiarism including unattributed quotation or paraphrase of the work of another except where justified under Regulation 3.

8. Quotation or paraphrase is attributed for the purpose of Regulation 7 if the writer has indicated using conventions appropriate to the discipline that the work is not the writer's own.

9. The University is not prohibited from proceeding with a charge of plagiarism where there is no statement as prescribed under Regulation 7.

Electronic vetting for plagiarism

10. The results of any electronic vetting although capable, where the requirements of Regulation 7 are satisfied, of constituting evidence under these Regulations, are not thereby conclusive of any question as to whether or not plagiarism exists.

Level 1 plagiarism

11. In work submitted for examination where the Examiner is satisfied that Level 1 plagiarism has been committed, he/she shall penalise the student by reducing the mark which would have otherwise been awarded taking into account any relevant Faculty regulations.

Level 2 plagiarism

12. Where an examiner has evidence of Level 2 plagiarism in the material being examined, that examiner shall report it to the Head of Department or the Dean and may at any time provide the Registrar with a copy of that report. In cases where the examiner and the Dean are one and the same, the report shall be referred to the Head of the Department and also to the Campus Registrar.

13. Where any other person who in the course of duty sees material being examined which he or she believes is evidence of Level 2 plagiarism that other person may report it to the Head of Department or the Dean and may at any time report it to the Campus Registrar who shall take such action as may be appropriate.

14. Where a Dean or Head of Department receives a report either under Regulation 12 or 13, the Dean or Head of Department, as the case may be, shall:

    (a) where in concurrence with the report's identification of evidence of Level 2 plagiarism, report the matter to the Campus Registrar; or

(b) where not concurring in the identification of evidence of plagiarism, reply to the examiner declining to proceed further on the report; or

(c) where concluding that there is evidence of Level 1 plagiarism, reply to the examiner indicating that conclusion and the Examiner shall proceed as under Regulation 11.

15. Where a report is made to the Campus Registrar under Regulation 14a or 16, the Campus Registrar shall lay a charge and refer the matter to the Campus Committee on Examinations.

16. Where the Campus Registrar receives a report alleging Level 2 plagiarism from the Examiner or any other person except the Dean or Head of Department, the Campus Registrar shall refer the matter to a senior academic to determine whether there is sufficient evidence to ground a charge of plagiarism and where such evidence is found, the Campus Registrar shall proceed as under Regulation 15.

17. Where the matter has been referred to the Campus Committee on Examinations pursuant to Regulation 15, the proceedings under these Regulations prevail, over any other disciplinary proceedings within the University initiated against the student based on the same facts and, without prejudice to Regulation 21, any other such disciplinary proceedings shall be stayed, subject to being reopened.

18. If the Campus Committee on Examinations is satisfied, after holding a hearing, that the student has committed Level 2 plagiarism, it shall in making a determination on the severity of the penalty take into consideration:

    (a) the circumstances of the particular case;

    (b) the seniority of the student; and

    (c) whether this is the first or a repeated incidence of Level 2 plagiarism.

19. Where the Campus Committee is of the view that the appropriate penalty for an offence of Level 2 plagiarism is for the student to be:

    (a) awarded a fail mark;

    (b) excluded from some or all further examinations of the University for such period as it may determine;

    (c) be dismissed from the University, it shall make such recommendation to the Academic Board.

Clearance on a charge of Level 2 plagiarism

20. A determination of the Campus Committee on Examinations that Level 2 plagiarism has not been found will be reported to the Campus Registrar who shall refer it to the Examiner and notify the student. Where the Committee has not identified Level 2 but has identified Level 1, it shall be reported to the Campus Registrar who shall refer it to the examiner.

Level 2 plagiarism: Appeal to the Senate

21. A student may appeal to the Senate from any decision against him or her on a charge of plagiarism made by Academic Board.

Delegation by Dean or Head of Department

22. The Dean or Head of Department, as the case may be, may generally or in a particular instance delegate that officer's functions under these Regulations.

Conflict of interest disqualification

23. Any person who has at any time been an examiner of work or been involved in procedures for laying charges in relation to which an issue of plagiarism is being considered under these Regulations shall withdraw from performing any functions under these Regulations other than those of supervisor and examiner.

PLAGIARISM DECLARATION FORMS

THE UNIVERSITY OF THE WEST INDIES

The Office of the Board for Undergraduate Studies

INDIVIDUAL PLAGIARISM DECLARATION

STUDENT ID:
COURSE TITLE:
COURSE CODE:
TITLE OF ASSIGNMENT:

This declaration is being made in accordance with the **University Regulations on Plagiarism (First Degrees, Diplomas and Certificates**) and must be attached to all work, submitted by a student to be assessed in partial or complete fulfilment of the course requirement(s), other than work submitted in an invigilated examination.

STATEMENT

1. I have read the Plagiarism Regulations as set out in the Faculty or Open Campus Student Handbook and on University websites related to the submission of coursework for assessment.
2. I declare that I understand that plagiarism is a serious academic offence for which the University may impose severe penalties.
3. I declare that the submitted work indicated above is my own work, except where duly acknowledged and referenced and does not contain any plagiarized material.
4. I also declare that this work has not been previously submitted for credit either in its entirety or in part within the UWI or elsewhere. Where work was previously submitted, permission has been granted by my Supervisor/Lecturer/Instructor as reflected by the attached Accountability Statement.
5. I understand that I may be required to submit the work In electronic form and accept that the University may subject the work to a computer-based similarity detention service.

NAME _____

SIGNATURE _____

DATE _____

GROUP PLAGIARISM DECLARATION

COURSE TITLE:

COURSE CODE:

TITLE OF ASSIGNMENT:

When submitting a group assignment for assessment each member of the group will be required to sign the following declaration of ownership which will appear on the coursework submission sheet.

We the undersigned declare that:

1. We have read the Plagiarism Regulations as set out in the Faculty or Open Campus Student Handbook and on University websites related to the submission of coursework for assessment.
2. We declare that I understand that plagiarism is a serious academic offence for which the University may impose severe penalties.
3. The submitted work indicated above is our own work, except where duly acknowledged and referenced.
4. This work has not been previously submitted for credit either in its entirety or in part within the UWI or elsewhere. Where work was previously submitted, permission has been granted by our Supervisor/Lecturer/ Instructor as reflected by the attached Accountability Statement.
5. We understand that we may be required to submit the work In electronic form and accept that the University may check the originality of the work using a computer-based similarity detention service.

NAME _____

SIGNATURE _____

NAME _____

SIGNATURE _____

NAME _____

SIGNATURE _____

DATE _____

ADDITIONAL ACCOUNTABILITY STATEMENT WHERE WORK HAS BEEN PREVIOUSLY SUBMITTED

1. I/We have set out in an attached statement the details regarding the circumstances under which this paper or parts thereof has been previously submitted.
2. I/We have received written permission from my Supervisor/Lecturer/ Instructor regarding the submission of this paper and I have attached a copy of that written permission to this statement.
3. I/We hereby declare that the submission of this paper is in keeping with the permission granted.

NAME _____

SIGNATURE _____

DATE _____

SECTION 6: UNDERGRADUATE PROGRAMME DESCRIPTIONS

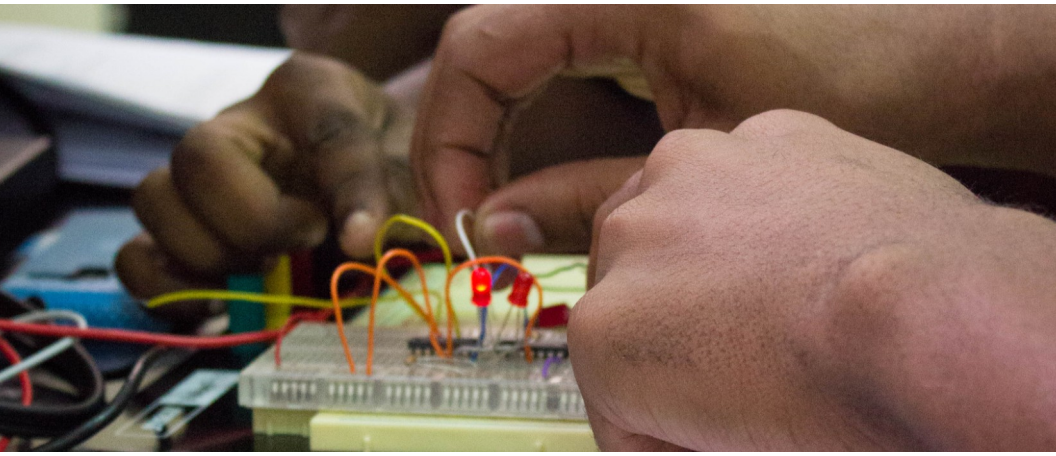
Definition Course Codes:

BMNG	Biomedical Engineering
COMP	Computer Science
CVNG	Civil Engineering
ECNG	Electrical and Computer Engineering
ELET	Electronics
ELNG	Electronics Engineering
ENGR0	Preliminary Engineering Courses
ENGR	Faculty of Engineering
FOUN	Foundation Courses
GEOM	Geomatics and Geoinformatics
INFO	Information Technology
MGMT	Management Studies
MATH	Mathematics
PHYS	Physics

Note: The letter ‘E’ or ‘C’ preceding the credit allocation indicates Examination by Written Papers or by Course Work, respectively.

PRELIMINARY ENGINEERING (1 year qualifying programme)

Head of Programme: Mrs. Roxann Stennett-Brown



The overall aims of this preliminary engineering programme are to:

- provide a programme structure that allows students to qualify for transition into any of the BSc Engineering programmes within The UWI;
- provide the requisite foundation in mathematics, sciences, laboratory techniques and communication skills that are required for a beginner engineering student; and
- facilitate increased enrolment in engineering to meet the future needs of our industries.

Students are required to register for 30 credits of courses across two semesters. These courses will facilitate the development of competences in mathematics, sciences, laboratory skills, technical writing, along with exposure to softer skills via electives from social sciences and humanities. The credits for these courses **will not** be added to any of the BSc Engineering programmes in The UWI and will only serve to qualify students for access to the BSc Engineering programmes .

PROGRAMME STRUCTURE AND CONTENT

Note: E = Examination, C = Coursework, and the numeral after E or C = Number of Credits

ONE YEAR (all courses are compulsory)

Semester 1: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ENGR0110	Pre-Engineering Physics I	E3
ENGR0120	Pre-Engineering Mathematics I	E4
ENGR0130	Chemistry for Engineers	E3
ENGR0230	Biology for Engineers	E3
ELECTIVE 1	Humanities/Social Sciences course	E3

Semester 2: 15 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ENGR0210	Pre-Engineering Physics II	E3
ENGR0220	Pre-Engineering Mathematics II	E4
ENGR0240	Computer Applications for Beginning Engineers	C2
FOUN1014	Critical Reading & Writing in the Sciences	E3
ELECTIVE 1	Humanities/Social Sciences course	E3

Note: Students with CAPE passes (or equivalent) in mathematics or sciences may be eligible for respective exemptions.

BSc IN BIOMEDICAL ENGINEERING

Head of Programme: Dr Paul Aiken

Students are required to complete a minimum of 97 credits for the award of the BSc in Biomedical Engineering.

PROGRAMME STRUCTURE AND CONTENT

Note: E = Examination, C = Coursework, and the numeral after E or C = Number of Credits

LEVEL 1 (all courses are compulsory)

Semester 1: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG1000	Electrical Circuits	E3
ECNG1009	Introduction to Programming	C3
ELET1400	Introduction to Electronics	E3
ENGR1000	Introduction to Engineering	E3
ENGR1105	Engineering Laboratory and Designs I	C1
ENGR1180	Engineering Mathematics I	E3

Semester 2: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
BMNG1210	Introduction to Biomedical Engineering	E3
COMP1161	Object Oriented Programming	E3
ELNG1101	Physics for Engineers	E3
ENGR1200	Engineering Tools and Practice	C3
ENGR1205	Engineering Laboratory and Designs II	C1
FOUN1014	Critical Reading & Writing in the Sciences	E3

LEVEL 2 (all courses are compulsory)

Semester 1: 15 Credits

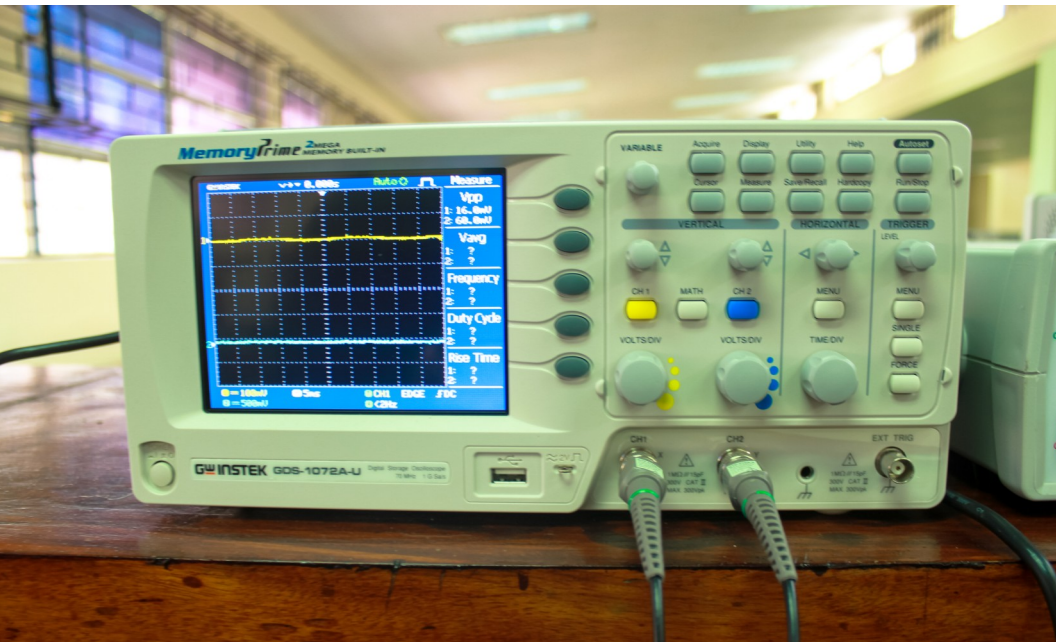
COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG2004	Laboratory and Project Design II	C3
ELET2450	Embedded Systems	E3
ELET2460	Signals and Systems	E3
MATH2230	Engineering Mathematics II	E3
PHYS2386	Electromagnetism and Optics	E3

Semester 2: 14 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
BMNG2210	Biomedical Instrumentation I	E3
ECNG2005	Laboratory and Project Design III	C3
ECNG2009	Control Systems	E3
ELET2410	Analysis and Design of Analog Circuits	E3
MATH2240	Probability and Statistics	E2

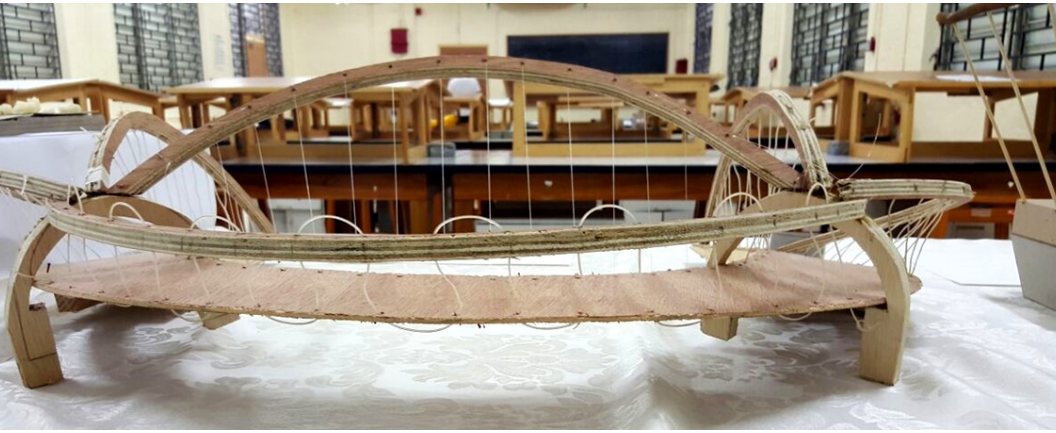
LEVEL 3 (Core 22 Credits)

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CORE COURSES		
BMNG3110	Biomedical Instrumentation II	E3
ECNG3020	Capstone Project	C6
ECNG3021	Introduction to Engineering Management and Accounting System	E4
ELET3460	Digital Signal and Image Processing	E3
PHYS3391	Biomedical Optics and Biomechanics	E3
PHYS3397	Medical Radiation Physics and Imaging	E3
ELECTIVES (select any two) — 6 Credits		
MDSC3104	Health Services Management	E3
MGMT3136	Venture Capital and Entrepreneurship	C3
BMNG3230	Clinical Engineering	E3
BMNG3240	Rehabilitation Engineering and Design	E3
ELECTIVE 1	Social Science (Level 2 or 3)	E3
ELECTIVE 2	Humanities (Level 2 or 3)	E3



BSc IN CIVIL ENGINEERING

Head of Programme: Dr. Nicolas McMorris



Students are required to complete a minimum of 105 credits for the award of the BSc in Civil Engineering.

PROGRAMME STRUCTURE AND CONTENT

Note: E = Examination, C = Coursework, and the numeral after E or C = Number of Credits

LEVEL 1 (all courses are compulsory)

Semester 1: 19 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG1005	Science of Materials	E3
CVNG1009	Engineering Graphics	C3
CVNG1012	Civil Engineering Law	E2
CVNG1013	Introduction to Engineering Mechanics	E2
ECNG1009	Introduction to Programming	C3
ENGR1000	Introduction to Engineering	E3
ENGR1180	Engineering Mathematics I	E3

Semester 2: 18 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG1000	Mechanics of Solids	E3
CVNG1001	Mechanics of Fluids I	E3
CVNG1002	Civil Engineering Design I	C3
CVNG1007	Introduction to Geotechnical Engineering	C2
CVNG1008	Building Services Engineering	E4
CVNG1011	Geology	E3

LEVEL 2 (all courses are compulsory)

Year-Long Courses (Semesters 1 and 2): 7 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG2003	Civil Engineering Design II	C3
CVNG2006	Structural Design I	C4

Semester 1: 13 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG2001	Structural Mechanics	E3
CVNG2005	Mechanics of Fluids II	E3
CVNG2008	Soil Mechanics I	E2
GEOM2015	Geomatics for Civil & Environmental Engineers	E2
MATH2230	Engineering Mathematics II	E3

Semester 2: 12 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG2009	Soil Mechanics II	E2
CVNG2010	Civil Engineering Management	E3
CVNG2011	Engineering Hydrology	E3
MATH2240	Probability and Statistics	E2
GEOM2017	Geoinformatics for Civil & Environmental Engineers	E2

LEVEL 3

Year-Long (Semesters 1 & 2): 12 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG3014	Civil Engineering Design Project	C6
CVNG3015	Special Investigative Project	C6

Semester 1: 14 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG3002	Structural Analysis	E3
CVNG3003	Structural Design II	C2
CVNG3005	Foundation Engineering	E3
CVNG3007	Environmental Engineering I	E3
CVNG3009	Highway Engineering	E3

Semester 2: 6 Credits (Select any two courses)

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
CVNG3001	Structural Engineering	E3
CVNG3008	Environmental Engineering II	E3
CVNG3010	Transportation Engineering	E3
CVNG3011	Pavement Design & Management	E3
CVNG3013	Coastal Engineering	E3

BSc in Electrical Power Engineering

Head of Programme: Dr Paul Aiken

All Electrical Power Engineering students are required to complete a minimum of 101 credits for the award of the BSc in Electrical Power Engineering. The Foundation courses are not shown.

PROGRAMME STRUCTURE AND CONTENT

Note: E = Examination, C = Coursework, and the numeral after E or C = Number of Credits

LEVEL 1

Semester 1: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG1000	Electrical Circuits	E3
ECNG1009	Introduction to Programming	C3
ELET1400	Introduction to Electronics	E3
ENGR1000	Introduction to Engineering	E3
ENGR1105	Engineering Laboratory and Designs I	C1
ENGR1180	Engineering Mathematics I	E3

Semester 2: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG1015	Introduction to Electrical Energy Systems	E3
ELNG1101	Physics for Engineers	E3
EPNG1201	Intro to Thermodynamics and Fluid Mechanics	E3
ENGR1200	Engineering Tools and Practice	C3
ENGR1205	Engineering Laboratory and Designs II	C1
FOUN1014	Critical Reading & Writing in the Sciences	E3

LEVEL 2

Semester 1 : 15 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG2000	Electromechanical Energy Conversion Systems	E3
ECNG2004	Laboratory & Project Design II	C3
ELET2450	Embedded Systems	E3
ELET2460	Signals and Systems	E3
MATH2230	Engineering Mathematics II	E3

Semester 2 : 17 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG2005	Laboratory & Project Design III	C3
ECNG2009	Control Systems	E3
ELET2410	Design and Analysis of Analogue Circuits	E3
EPNG2010	Nuclear Physics and Reactor Theory	E3
EPNG2020	Renewable Energy Systems	E3
MATH2240	Probability and Statistics	E2

LEVEL 3

Year-Long (Semesters 1 & 2): 12 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG3020	Final Year Engineering Special Project	E6

Core Courses: 25 Credits

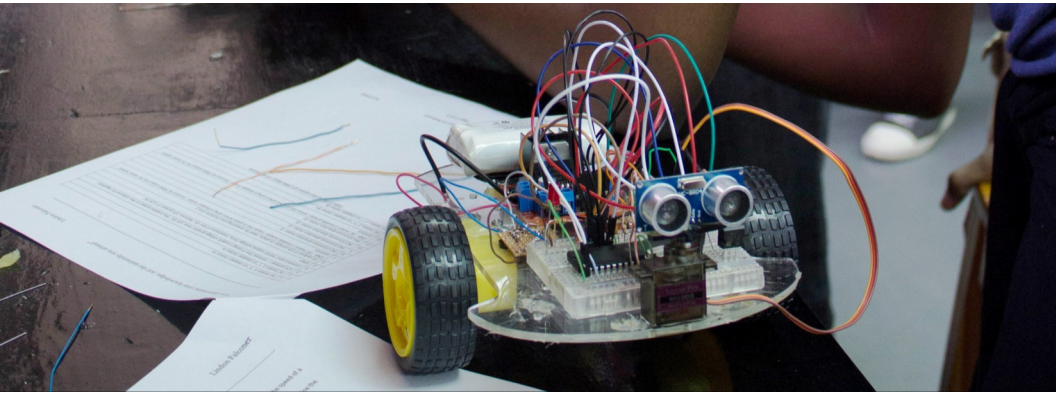
COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG3013	Electrical Transmission and Distribution Systems	E3
ECNG3015	Industrial and Commercial Electrical Systems	E3
ECNG3021	Introduction to Engineering Management and Accounting Systems	E4
ELET3405	Practical Analysis of Advanced Circuits and Systems	E3
ELNG3030	Power Electronics	E3
EPNG3010	Nuclear Power Systems and Reactor Operations	E3
MGMT3058	New Venture Management	C3
PHYS3385	Electromagnetism	E3

Electives: 6 Credits (Select any two courses)

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ELET3611	Integrating Alternative Energy	E3
ECNG3010	Electrical Machines & Drive Systems	E3
ECNG3012	Power Systems Analysis	E3
EPNG3030	Integrating Electrical Power Systems	E3

BSc in ELECTRONICS ENGINEERING

Head of Programme: Mr Lindon Falconer



Students are required to complete a minimum of 101 credits for the award of the BSc in Electronics Engineering. The Foundation courses are not shown.

PROGRAMME STRUCTURE AND CONTENT

Note: E = Examination, C = Coursework, and the numeral after E or C = Number of Credits

LEVEL 1 (all courses compulsory)

Semester 1: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG1000	Electrical Circuits	E3
ECNG1009	Introduction to Programming	C3
ELET1400	Introduction to Electronics	E3
ENGR1000	Introduction to Engineering	E3
ENGR1105	Engineering Laboratory and Designs I	C1
ENGR1180	Engineering Mathematics I	E3

Semester 2: 16 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
COMP1161	Object-Oriented Programming	E3
ECNG1015	Introduction to Electrical Energy Systems	E3
ELNG1101	Physics for Engineers	E3
ENGR1200	Engineering Tools and Practice	C3
ENGR1205	Engineering Laboratory and Designs II	C1
FOUN1014	Critical Reading & Writing in the Sciences	E3

LEVEL 2 (all courses are compulsory)

Semester 1: 15 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG2004	Laboratory & Project Design II	C3
ELET2430	Digital Circuits and Microprocessors	E3
ELET2450	Embedded Systems	E3
ELET2460	Signals and Systems	E3
MATH2230	Engineering Mathematics II	E3

Semester 2: 17 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG2005	Laboratory & Project Design III	C3
ECNG2009	Control Systems	E3
ELET2410	Analysis and Design of Analogue Circuits	E3
ELET2420	Semiconductor Devices	E3
ELET2480	Modern Communications	E3
MATH2240	Probability and Statistics	E2

Summer Apprenticeship/Internship

- **Approved Industry (Summer between Level 2 and Level 3)**

  Summer Apprenticeship is meant to expose students to the practical applications of the concepts learnt in classes and is expected to be a source of motivation and inspiration. It also provides an opportunity to identify potential projects.

- **HEART NTA**

  Complete selected certification courses.

LEVEL 3

Students taking Level 3 courses must:

1. Register for all courses listed as compulsory and core for chosen option.
2. Select one of the following options:
   a. Telecommunications or
   b. Industrial Instrumentation
3. Select a year-long project (ECNG3020) from the Project Listing.

YEAR-LONG (compulsory): 6 Credits

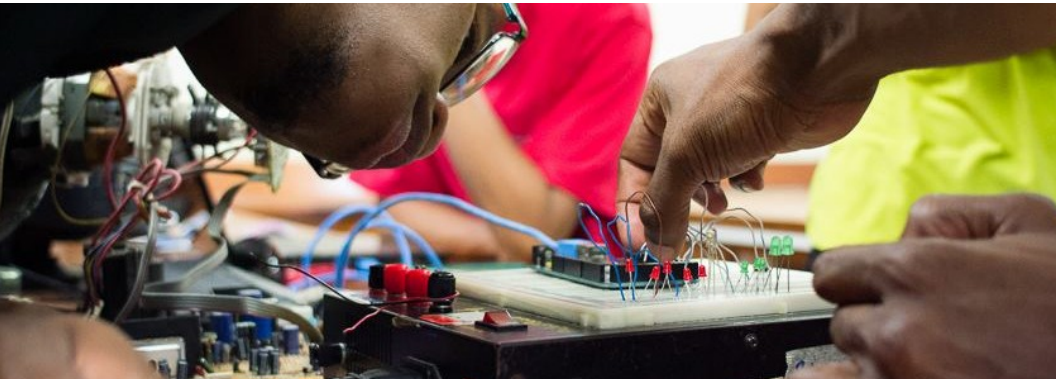
COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG3020	Special Project	C6

One Semester (compulsory): 13 Credits

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ECNG3021	Introduction to Engineering Management and Accounting Systems	E4
ELET3405	Practical Analysis of Advanced Electronics	C3
MGMT3058	New Venture Management	C3
PHYS3385	Electromagnetism	E3

Option 1: Telecommunications (compulsory) *(12 Credits)*

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ELET3460	Digital Signal and Image Processing	E3
ELET3470	Wireless Transmission & Fiber-Optics	E3
ELET3480	Wireless Communication Systems	E3
ELNG3050	Broadband Networks	E3



Option 2: Industrial Instrumentation (compulsory) *(12 Credits)*

COURSE CODE	COURSE TITLE	NUMBER OF CREDITS
ELET3430	Instrumentation and Measurements	E3
ELNG3030	Power Electronics and Protection Circuits	E3
ELNG3040	Industrial Automation	E3
ELNG3060	Power Plant Instrumentation	E3

Electives (3 credits)

Choose any other Level 2 or Level 3 course from Faculty of Science and Technology (FST) or a language course from Faculty of Humanities and Education (FHE).

SECTION 7: CO-CURRICULAR, FOUNDATION & FOREIGN LANGUAGE COURSES

The Co-curricular, Foundation and Foreign Language courses are an integral part of the official credit system at undergraduate level at The University of the West Indies. They provide students with valuable opportunities for skill development in areas not available in their core programme. These courses are designed to help students become well-rounded graduates - prepared for their role in society and in the workplace.

CO-CURRICULAR CREDITS

At the Mona Campus, Co-curricular credits are three credits and offered in Semester 2, Level 2 for involvement in the following courses:

- COCR2005 Netball
- COCR2003 Cricket
- COCR2004 Football
- COCR2008 Track and Field
- COCR2010 Debating
- COCR2009 Photography (Camera Club)
- COCR2007 Panoridim (Steel Orchestra)
- COCR2015 UWI Leads

For more information contact the Office of the Director of Student Services and Development, Sports Department or Phillip Sherlock Centre for the Creative Arts.

FOUNDATION COURSES

Faculty of Engineering students at the Mona Campus MUST complete 3 Foundations Courses. It is also highly recommended that students complete

their Foundation Courses in Semester 2 of each academic year. The following are eligible Foundation Courses:

- FOUN1014 Critical Reading and Writing in Science & Technology and Medical Sciences
- FOUN1101 Caribbean Civilisation
- FOUN1301 Law, Governance, Economy and Society

FOREIGN LANGUAGE COURSES

UWI Mona students may substitute one of the non-language Foundation Courses (i.e. FOUN1101, or FOUN1301) with a foreign language course at the level of their competence. Students may choose a course in Chinese, French, Japanese, Portuguese or Spanish.

The courses which may be used as substitutes, based on the student's level of competence in the particular language are as follows:

Chinese, Japanese, Portuguese

- ALL students are eligible to do Beginners' courses

French

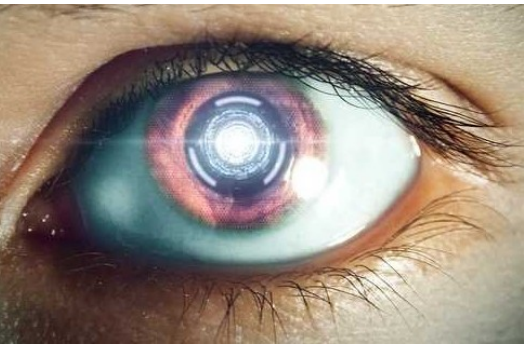
- Students without CSEC — Basic French or Beginners' French I
- Students with CSEC — Beginners' French II (Intermediate)
- Students with CAPE — French Language IA

Spanish

- Students without CSEC — Basic or Beginners' Spanish
- Students with CSEC — Intermediate Spanish
- Students with CAPE — SPAN1001

After completing the course substitution, a student may continue on to other levels, if so desired.

SECTION 8: COURSE DESCRIPTIONS



SEMESTER: **2**
COURSE CODE: **BMNG1210**
COURSE TITLE: **INTRODUCTION TO BIOMEDICAL ENGINEERING**
NUMBER OF CREDITS: **E3**
Course Description: This course provides an introduction to biomedical engineering principles using foundational resources from molecular and cellular biology and physiology, and relating them to various subspecialties of biomedical engineering. The essential molecular biology, cellular biology, and human physiology background are included for students to understand the context in which biomedical engineers work. The course also highlights important advances made over recent years, including iPS cells, microRNA, Nano medicine, imaging technology, biosensors, and drug delivery systems, giving students a modern description of the various subfields of biomedical engineering. Further, this introductory course will provide concrete examples of applying engineering knowledge to solve problems related to human medicine as well as concrete examples of recent technological breakthroughs.

SEMESTER: **2**
COURSE CODE: **BMNG2210**
COURSE TITLE: **BIOMEDICAL INSTRUMENTATION I**
NUMBER OF CREDITS: **E3**
Course Description: This course will expose the students to the basic principles of biomedical instrumentation and measurements employed in the health care industry. Emphasis will be placed on how the biological signals of human body can be acquired and used in a successful manner. This course is part 1 of a two-part course in biomedical instrumentation and will explore the operation and application of a range of medical equipment dealing with instrumentation techniques for measuring common physiological signals, including bioelectric and biochemical sensors bio-stimulation, electronic circuit design issues, digital signal acquisition, electrical safety, signal conditioning and protection against noise. The practical work required in the use, servicing and maintenance of these instruments/equipment will be explored in ECNG2005 Laboratory and Project III.

SEMESTER: **1**
COURSE CODE: **BMNG3110**
COURSE TITLE: **BIOMEDICAL INSTRUMENTATION II**
NUMBER OF CREDITS: **E3**
Course Description: This course This course covers the advanced principles, concepts, and operations of medical sensors and devices. The origin and nature of measurable physiological signals are studied, including chemical, electrochemical, optical, and electromagnetic signals. The principles and devices used to make the measurements, including design of electronic instrumentation, will be rigorously presented. This course will cover emerging frontiers of general diagnostics, including Electrophysical methods like ECG, EEG, EMG, defibrillator and pacemaker; imaging techniques: X-rays, nuclear medicine, ultrasound, and magnetic resonance. Supporting instrumentation such as incubators, respirators, anaesthesia and dialysis machines. Surgical techniques with diathermy and laser.

SEMESTER: **1**
COURSE CODE: **BMNG3230**
COURSE TITLE: **CLINICAL ENGINEERING**
NUMBER OF CREDITS: **E3**
Course Description: This course covers the critical issues relating to the risk management and implementation of new technologies in the healthcare sector. It represents a comprehensive summary of the advances in clinical engineering and presents guidance on

compliance and safety for hospitals and engineering teams. Students will solve common problems in the area of healthcare technology. Topics include compliance with the European Directive on Medical Devices 93/42/EEC, European Norms EN 60601-1-6, EN 62366, and the American Standards ANSI/AAMI HE75: 2009. Content coverage includes decision support systems, clinical complex systems, and human factor engineering. Examples are fully supported with case studies, and global perspective is maintained throughout. The course emphasizes how to assess new healthcare technologies and what are the most critical issues in their management, and provides information on how to carry out risk analysis for new technological systems or medical software. Various tactics on how to improve the quality and usability of medical devices will be explored .

SEMESTER: **2**
COURSE CODE: **BMNG3240**
COURSE TITLE: **REHABILITATION ENGINEERING AND DESIGN**
NUMBER OF CREDITS: **E3**
Course Description: This course introduces the fundamentals and applications of rehabilitation engineering and assistive technologies (ATs). It is an introduction to a field of engineering dedicated to improving the lives of people with disabilities. A range of disabilities and assistive technologies will be investigated. The course will examine the three basic approaches of assistive technologies and rehabilitation engineering, namely: design for use by the broadest possible population, design for subpopulations, and design for the individual. The relationship between engineering innovation, the engineering design process, the human-technology interface, and the physical medicine and rehabilitation medical community will be explored. The course highlights the models for AT service delivery, the design tools and principles of universal design, and various technology-transfer mechanisms, models, and principles. It explains the process for creating assistive device standards, followed by a review of seating biomechanics and soft tissue biomechanics, followed by the design and service delivery principles of wheelchairs and scooters, functional electrical stimulation and its applications, wheelchair-accessible transportation legislation, and the applications of robotics in medical rehabilitation. Prosthetic and orthotic design and usage, visual and hearing impairment, and augmentative and alternative communication (AAC) technology are also discussed .

SEMESTER: **2**
COURSE CODE: **COMP1161**
COURSE TITLE: **OBJECT-ORIENTED PROGRAMMING**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **ECNG1009**
Course Description: Class of objects; methods; members; message passing; encapsulation and information hiding; separation of behavior and implementation. Imperative control structures, assignment state, parameter passing models. Inheritance; polymorphism; class hierarchies. Interface vs. multiple inheritance. Templates/ generics. Using APIs; class libraries. Module/ packages; name space solution; primitive types; array, string processing; I/O processing; pointers and references; linked structures; strategies for choosing the right data. Collection classes and iteration protocols; event -driven and concurrent programming; exception handling; Introduction to GUI programming; thread programming. OO testing; debugging tools. Object-Oriented Methods: analysis and design, design for re-use; modeling tools, comparison of OOD and top-down/bottom-up design; intro to the concept and use of design patterns.

SEMESTER: **2**
COURSE CODE: **CVNG1000**
COURSE TITLE: **MECHANICS OF SOLIDS**
NUMBER OF CREDITS: **E3**
Course Description: Simple static forces, stress, strain. Hardness, impact & temperature effects. Two-dimensional stress and strain, torsion, combined stresses. Statically determinate beams and plane frames. Bending theory and moment, shearing, force, slope, deflexion, moment-area.

SEMESTER: **2**
COURSE CODE: **CVNG1001**
COURSE TITLE: **MECHANICS OF FLUIDS I**
NUMBER OF CREDITS: **E3**
Course Description: Physical properties of fluids — statics: pressure distribution, forces on plane and curved surfaces, floating stability.

Kinematics: ideal and real fluid, streamlines, path lines, streak lines; graphical plotting of streamlines. Dynamics: continuity, momentum and energy equations for one-dimensional flow. Laminar and turbulent flow, flow in pipes, flow Measurements. Introduction to dimensional analysis. Dynamic similarity. Boundary layers. Pipe friction. Darcy Equation. Rotodynamic machines: selection; performance, cavitation.

SEMESTER: **2**
COURSE CODE: **CVNG1002**
COURSE TITLE: **CIVIL ENGINEERING DESIGN I**
NUMBER OF CREDITS: **C3**
Course Description: Concept of design and its contribution to the quality of life; Civil Engineering Design, the role of geomatics, the environment, and scientific laws in design; Introduction to the design of buildings and Civil Engineering Infrastructure, site appraisal; Risk and vulnerability in design; Health and safety in Civil Engineering Design, environmental impact assessment; Civil Engineering drawing, CAD techniques, introduction to GIS techniques. (Coursework)

SEMESTER: **1**
COURSE CODE: **CVNG1005**
COURSE TITLE: **SCIENCE OF MATERIALS**
NUMBER OF CREDITS: **E3**
Course Description: Fundamental structure, properties and behaviour of other major materials used in Civil Engineering; concrete, asphalt, timber, soil, rock, paints, polymers, adhesives, composite materials; Durability and deterioration; Hazardous materials, classification and handling ion; Hazardous materials, classification and handling.

SEMESTER: **2**
COURSE CODE: **CVNG1007**
COURSE TITLE: **INTRODUCTION TO GEOTECHNICAL ENGINEERING**
NUMBER OF CREDITS: **C2**
Course Description: The course starts with a general description of typical geotechnical works. The main issues and timescales for these works are discussed, and the roles and responsibilities of the geotechnical engineer working as part of an engineering team are discussed. The characterization of soil is introduced, in terms of particle sizes and shapes, plasticity, consistency, and strength. Some practical activities involved in the preparation of ground are described. The student is given an introduction to the design issues associated with all of the typical geotechnical works.

SEMESTER: **2**
COURSE CODE: **CVNG1008**
COURSE TITLE: **BUILDING SERVICES ENGINEERING**
NUMBER OF CREDITS: **E4**
Course Description: The course aims to provide an introduction to, and a basic understanding of the scientific principles underlying the major environmental issues related to the built environment. The module also incorporates knowledge of design techniques and issues relating to the internal 'indoor' environment.

SEMESTER: **1**
COURSE CODE: **CVNG1009**
COURSE TITLE: **ENGINEERING GRAPHICS**
NUMBER OF CREDITS: **C3**
Course Description: Sketching as communication of design ideas: types of drawings; components of drawing; drawing standards; plans, sections, elevations, perspectives, projections, isometrics; introduction to typical production drawings of Civil Engineering components; fundamentals of using AUTOCAD for civil engineering design drawings.

SEMESTER: **2**
COURSE CODE: **CVNG1010**
COURSE TITLE: **INFORMATION TECHNOLOGY FOR ENGINEERS**
NUMBER OF CREDITS: **E2**
Course Description: Numerical analysis methods – f(x)=0; integration; solutions of differential equations, introduction to computer programming – flow charts; algorithms; variables, types, storage, scope; sequence, branch, loop; graphical output; introduction to using MATLAB for numerical analysis.

SEMESTER: **2**
COURSE CODE: **CVNG1011**
COURSE TITLE: **GEOLOGY**
NUMBER OF CREDITS: **E3**
Course Description: Fundamental geology for Civil Engineers: The Rock Cycle Structure and geological history of the Earth, surface

geological processes, structural geology, geologic maps and their interpretation. Engineering geology — topics and concepts: Principles of rock mechanics, engineering properties of rocks, the stability of slopes and cuttings, industrial rocks and minerals, hydrogeology, geotechnical investigation, engineering seismology, dams and reservoirs. Field trips, tutorial sessions.

SEMESTER: **1**
COURSE CODE: **CVNG1012**
COURSE TITLE: **CIVIL ENGINEERING LAW**
NUMBER OF CREDITS: **E2**
Course Description: 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 organizations; 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: **CVNG1013**
COURSE TITLE: **INTRODUCTION TO ENGINEERING MECHANICS**
NUMBER OF CREDITS: **E2**
Course Description: The theory and application of engineering mechanics is presented to students through an introduction of the components of statistics and dynamics. Force vectors, Equilibrium of particle, Force System Resultants, Equilibrium of a rigid body, structural analysis, Kinematics of a Particle, Kinematics, Kinetics of a Particle: Work and Energy, Boussinesq Theory.

SEMESTER: **1**
COURSE CODE: **CVNG2001**
COURSE TITLE: **STRUCTURAL MECHANICS**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **CVNG1000 MECHANICS OF SOLIDS**
Course Description: Introductory concepts, equilibrium and compatibility, statical determinacy; compatibility of deformations, flexibility method applied to simple flexural systems; analysis of beams (flexure, shear, thin-walled sections); compression members, strain energy and related theorems. Analysis of beams (asymmetrical bending); simple plastic theory (hinges, mechanism, equilibrium diagram method, redistribution of bending moments, moment capacity, fundamental theorems of plastic collapse), approximate methods of analysis; influence lines for statically determinate systems.

SEMESTER: **YEAR-LONG**
COURSE CODE: **CVNG2003**
COURSE TITLE: **CIVIL ENGINEERING DESIGN II**
NUMBER OF CREDITS: **C3**
PREREQUISITES: **CVNG1002 CIVIL ENGINEERING DESIGN I**
Course Description: Innovation and creativity in conceptual design; sustainability; health and safety; investigative procedures. The use of analysis, synthesis and optimisation in design; project planning, networks and graphs. Design of embankments, dams; drainage design; route location and alignment design of roads; assessment of natural hazard impacts and environmental impacts. (Coursework)

SEMESTER: **1**
COURSE CODE: **CVNG2005**
COURSE TITLE: **MECHANICS OF FLUIDS II**
NUMBER OF CREDITS: **E3**
PREREQUISITE: **CVNG1001 MECHANICS OF FLUIDS I**
Course Description: Rotational and irrotational flow; potential flow. Euler and Navier-Stokes equations. Bernoulli theorem, Reynolds stresses, lift and drag, curved flow, vortices. Open channel flow, energy and momentum principles, critical depths, hydraulic jump, backwater curves, surges, resistance to flow, waves, model analysis, and sediment transport.

SEMESTER: **YEAR-LONG**
COURSE CODE: **CVNG2006**
COURSE TITLE: **STRUCTURAL DESIGN I**
NUMBER OF CREDITS: **C4**
PREREQUISITES: **CVNG1000 MECHANICS OF SOLIDS**
Course Description: Conceptual design of structures; structural design of steel, reinforced concrete, timber and masonry structures, use of construction materials in design. (Coursework)

SEMESTER: **1**
COURSE CODE: **CVNG2008**
COURSE TITLE: **SOIL MECHANICS I**
NUMBER OF CREDITS: **E2**
PREREQUISITE: **CVNG1007 INTRODUCTION TO GEOTECHNICAL ENGINEERING**
Course Description: Calculations for various different measures of particle packing and density are developed, culminating in Terzaghi's Fundamental Principle of Effective Stress. The theory of elasticity is applied to soils, and practical calculations are developed for short-term elastic settlements of various types of foundation. Concepts of different types and timescales for stress, deformations, and strength are developed. Terzaghi's Theory of Primary Consolidation is introduced.

SEMESTER: **2**
COURSE CODE: **CVNG2009**
COURSE TITLE: **SOIL MECHANICS II**
NUMBER OF CREDITS: **E2**
PREREQUISITE: **CVNG2008 SOIL MECHANICS II**
Course Description: Starting from the principles developed in the previous course Soil Mechanics 1, an introduction is presented to the procedures, stages, and approaches of a geotechnical job. After recalling Darcy's Law, calculations are developed for aquifers, pumping from wells, and more generally the flow of water through soils and its effects on compositional and mechanical stability. The ideas of limit equilibrium and mechanisms are introduced and used to analyze the stability of slopes. Some aspects of landslide stabilization and avoidance are also covered.

SEMESTER: **2**
COURSE CODE: **CVNG2010**
COURSE TITLE: **CIVIL ENGINEERING MANAGEMENT**
NUMBER OF CREDITS: **E3**
PREREQUISITE: **NONE**
Course Description: Introduction to management theory; human resource management, leadership, corporate strategy, communication, conduct of meetings; Management Information Systems (MIS); resolution of engineering ethics, Civil Engineering case studies, resources and reasoning methods; Civil Engineering project management, networks and graphs, quality management; Facilities Management, maintenance management, managing Health and Safety; Introduction to Management Accounting and Financial Management.

SEMESTER: **2**
COURSE CODE: **CVNG2011**
COURSE TITLE: **ENGINEERING HYDROLOGY**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **CVNG2005 MECHANICS OF FLUIDS II**
Course Description: The water resource system, meteorology, hydrologic cycle, hydro-meteorologic measurements and instrumentation, hydrologic statistics, rainfall

and run-off, unit hydrographs, low flows, impoundment reservoirs, reservoir safety, groundwater flow, flow to wells, seawater intrusion, and contaminant transport.

SEMESTER: **1**
COURSE CODE: **CVNG3002**
COURSE TITLE: **STRUCTURAL ANALYSIS**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **CVNG2001 STRUCTURAL MECHANICS; CVNG2006 STRUCTURAL DESIGN I**
Course Description: Symmetry and anti-symmetry, indeterminacy, slope deflection, moment distribution, structural dynamics, stability, pre-stressed concrete, plates, combined bending and axial loads, arches, influence lines, suspension cables.

SEMESTER: **1**
COURSE CODE: **CVNG3003**
COURSE TITLE: **STRUCTURAL DESIGN II**
NUMBER OF CREDITS: **C2**
PREREQUISITES: **CVNG2001 STRUCTURAL MECHANICS; CVNG2006 STRUCTURAL DESIGN I**
Course Description: Computer modelling, hurricane resistant design, earthquake resistant design of concrete and steel moment frames, pre-stressed concrete. (Coursework)

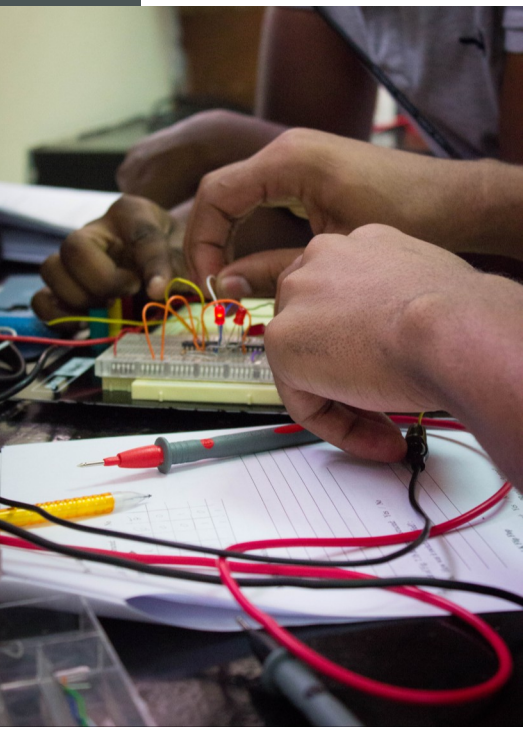
SEMESTER: **1**
COURSE CODE: **CVNG3005**
COURSE TITLE: **FOUNDATION ENGINEERING**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **CVNG2008 SOIL MECHANICS; CVNG2009 SOIL MECHANICS II**
Course Description: Site investigations, bearing capacity and settlement, design of spread footings and rafts, pile foundations, sheet pile walls.

SEMESTER: **1**
COURSE CODE: **CVNG3007**
COURSE TITLE: **ENVIRONMENTAL ENGINEERING I**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **NONE**
Course Description: Environmental needs and priorities, pollution, the role of environmental engineering, water quality standards, unit operations in water treatment, sources of wastewater, wastewater quality and effluent standards, unit operations in wastewater treatment, on site treatment and disposal, stream purification processes, sources of solid wastes, treatment of solid and fecal wastes, control of leachates, recycling, environmental impact assessment, soil conservation systems and mitigation of forest destruction.

SEMESTER: **2**
COURSE CODE: **CVNG3008**
COURSE TITLE: **ENVIRONMENTAL ENGINEERING II**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **CVNG3005 and CVNG3007**
Course Description: Water supply systems, wastewater collection and disposal systems, hydraulics of treatment plants, pumping stations, urban storm water drainage systems, industrial wastewater and pollutants, treatment systems for industrial and agricultural waste water, solid waste collection systems disaster mitigation, environmental engineering in the built environment.

SEMESTER: **1**
COURSE CODE: **CVNG3009**
COURSE TITLE: **HIGHWAY ENGINEERING**
NUMBER OF CREDITS: **E3**
PREREQUISITES: **MATH2230, MATH2240, CVNG2003, CVNG2009**
Course Description: Highway traffic characteristics, capacity of roadways and intersections, design of intersections, traffic management, parking studies; environmental impact, road safety; route location, economic analysis, introduction to transportation planning; pavement materials, pavement and drainage design; quality control and pavement maintenance management systems.

SEMESTER: **2**
COURSE CODE: **CVNG3010**
COURSE TITLE: **TRANSPORTATION ENGINEERING**
NUMBER OF CREDITS: **E3**
PREREQUISITE: **CVNG3009 HIGHWAY ENGINEERING**
Course Description: Transport policy, economics and mathematics; design operation and management of air, land and sea transportation systems; Transportation planning, Intelligent Transportation Systems (ITS), architecture design and management; Road safety management systems; managing the environmental impact of transportation.



SEMESTER: **2**
COURSE CODE: **CVNG3011**
COURSE TITLE: **PAVEMENT DESIGN & MANAGEMENT**
NUMBER OF CREDITS: **E3**
PREREQUISITE: **CVNG3009 HWY ENG**
Course Description: Roads and highways pavement design, airport runway design, seaports and special pavements, pavement management systems, road rehabilitation and maintenance.

SEMESTER: **2**
COURSE CODE: **CVNG3013**
COURSE TITLE: **COASTAL ENGINEERING**
NUMBER OF CREDITS: **E3**
PREREQUISITE: **CVNG2005 MECH OF FLUIDS II**
Course Description: Introduction to coastal zone management; The marine environment, coastal processes; Wave generation and propagation; Coastal sediment transport, sediment budget; Port and marine structures. Design of coastal defense works; Port-planning and management. Coastal pollution control, EIA and waste disposal in the coastal zone.

SEMESTER: **YEAR-LONG**
COURSE CODE: **CVNG3014**
COURSE TITLE: **CIVIL ENGINEERING DESIGN PROJECT**
NUMBER OF CREDITS: **C6**
PREREQUISITES: **NORMALLY ALL LEVEL 1 AND LEVEL 2 COURSES**
Course Description: The purpose of this course is to develop the student's ability in Civil Engineering Design as well as the ability to work in a team. The emphasis is on self -learning, creativity, design, understanding, project team working and communication skills, as well as engineering judgment and problem solving. The project gives professional orientation to work in the final year by simulating as closely as is possible, the investigation and design works which are required for substantial Civil Engineering works and projects in the provision of buildings, lifeline facilities and Civil Engineering infrastructure. The integration of health and safety, and risk and vulnerability in the design process gives the student a complete outlook on the design process.

SEMESTER: **YEAR-LONG**
COURSE CODE: **CVNG3015**
COURSE TITLE: **SPECIAL INVESTIGATIVE PROJECT**
NUMBER OF CREDITS: **C6**
PREREQUISITES: **NORMALLY ALL LEVEL 1 AND LEVEL 2 COURSES**
Course Description: This course is a project-based one, designed to generate an investigative learning atmosphere. The project work is carried out year-long, engenders a sense of enquiry, research and verification in the student, and draws on the first two years of learning in the programme. The emphasis is on self-learning, creativity, understanding, communication skills, as well as on engineering analysis and problem solving. The projects are supervised by tutors from the Department of Civil & Environmental Engineering. Special permission may be sought to pursue a relevant engineering-based project in other Departments in the Faculty of Engineering.

SEMESTER: **1**
COURSE CODE: **ECNG1000**
COURSE TITLE: **ELECTRICAL CIRCUITS**
NUMBER OF CREDITS: **3**
Course Description: This course introduces students to the fundamental building blocks of

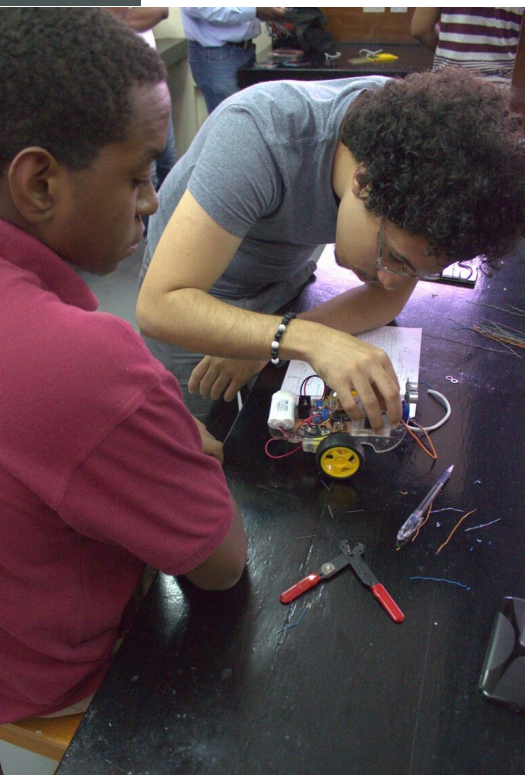
electrical circuit theory. These include the basic electrical circuit analysis tools required to analyse the behaviour and functional as well as performance characteristics of electrical subsystems containing resistors, inductors and capacitors. These tools are applied to obtain both the full dynamic performance of circuits and the steady state performance of sinusoidal systems. Topics include: concepts of basic electrical quantities such as electric charge, current, voltage, power and energy; network theorems such as The venin's theorem, Norton's theorem, superposition and maximum power transfer; Laplace transform and the Laplace model; steady state and dynamic responses of simple networks; ac steady state analysis and the complex power model.

SEMESTER: **2**
COURSE CODE: **ECNG1006**
COURSE TITLE: **LABORATORY & PROJECT DESIGN I**
NUMBER OF CREDITS: **3**
PREREQUISITES: **NONE**
Course Description: This course is the first in a series of three Laboratory and Project Design courses. It consists of laboratory exercises to develop models for, and demonstrate the behaviour of energy storage devices operating under various conditions. The properties of energy storage devices would be utilised in a design project which is of use to industry. Students would be exposed to the recommended approach and procedure required to execute a design from a design brief, utilising project planning, time management and safe operating procedures. This course also includes a group project which aims to build team skills.

SEMESTER: **1**
COURSE CODE: **ECNG1009**
COURSE TITLE: **INTRODUCTION TO PROGRAMMING**
NUMBER OF CREDITS: **3**
Course Description: This course introduces students to the field of computing for the purpose of problem solving. Basic concepts of computer architecture and operating systems are discussed leading to compilers and interrupters. Students will be able to describe and analyze data structures, such as those created by using arrays, lists and pointers. This course also involves knowledge of the concepts of loops and iteration techniques, and recursion, in algorithms which include character codes and mathematical operations such as base converters, masking and base arithmetic. The uses of algorithms are introduced for basic problem solving such as brute force/exhaustive methods, greedy methods and divide and conquer. Students are introduced to programming in C and C+ and the visual studio environment, along with data base concepts.

SEMESTER: **2**
COURSE CODE: **ECNG1012**
COURSE TITLE: **ENGINEERING SCIENCE AND TECHNOLOGY**
NUMBER OF CREDITS: **4**
Course Description: This is an introductory course in Engineering Science and consists of five modules to expose students to the following: the science of materials used in the production of electrical engineering components; an understanding of the mechanics of fluids when driven by electrical machines; the techniques involved in the production of engineering drawings, and the function and utilization of basic mechanical workshop tools and equipment. On the electrical side, students would be taught to use the oscilloscope, meters, power supplies and signal generators; verify network theorems; design simple circuits, and perform computer simulation on these circuits.

SEMESTER: **1**
COURSE CODE: **ECNG1015**
COURSE TITLE: **INTRODUCTION TO ELECTRICAL ENERGY SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **NONE**
Course Description: This course presents an introduction to Electrical Energy Systems. It is divided into two sections, introduction to the electromechanical energy conversion process and the analysis of three-phase electrical systems. In the first section, electromagnetic systems are analyzed utilizing the law of conservation of energy to develop mathematical models to represent energy conversions from electrical to magnetic and magnetic to mechanical. These mathematical models are used to develop equivalent circuits to represent the electrical, magnetic and mechanical systems. In the second section on three-phase electromagnetic systems, the analysis of these systems are performed by utilizing their electric and magnetic equivalent circuits to produce the



vector voltage and current phasors associated with the electromagnetic system. These vector voltage and current phasors are used to analyse the system and deduce and improve its performance.

SEMESTER: **1**
COURSE CODE: **ECNG2000**
COURSE TITLE: **ELECTROMECHANICAL ENERGY CONVERSION SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ECNG1000 and ECNG1015**
Course Description: This course provides an introduction to the more common types of electrical machines for students, who, as engineers, will treat with electrical machines as a critical element of a system or subsystems. Electronic and mechanical drive systems, control systems and power systems depend on the functioning characteristics of electrical machines. This course will provide the depth necessary for students requiring a comprehensive understanding of the steady state behaviour of the basic electrical machines. The principles of operation, steady state analysis and application of four machines, in particular, will be discussed. These are transformers, three-phase induction motors, synchronous machines and DC machines.

SEMESTER: **1**
COURSE CODE: **ECNG2004**
COURSE TITLE: **LABORATORY & PROJECT DESIGN II**
NUMBER OF CREDITS: **3**
PREREQUISITES: **NONE**
Course Description: This course is the second in a series of Laboratory and Project Design courses. It consists of laboratory exercises to demonstrate the principles presented in ECNG1014 Digital Electronics and ECNG2012 Electronics and Instrumentation. The knowledge gained in these two courses, together with the principles demonstrated in the laboratory exercises would then be utilised in a project to design and fabricate an electronic system to meet quality, safety, and environmental standards, and take industry performance parameter requirements and legal issues into consideration.

SEMESTER: **2**
COURSE CODE: **ECNG2005**
COURSE TITLE: **LABORATORY & PROJECT DESIGN III**
NUMBER OF CREDITS: **3**
PREREQUISITES: **NONE**
Course Description: This course is the last in a series of Laboratory and Project Design courses. It consists of laboratory exercises to demonstrate the principles presented in Communication Systems (ECNG 2001, Introduction to Microprocessors (ECNG 2006) and Control Systems (ECNG 2009).The knowledge gained in these courses, together with the principles demonstrated in the laboratory exercises would then be utilised in a project to design and fabricate a system to solve an industrial problem. The project must meet quality, safety, and environmental standards, and take industry performance parameter requirements and legal issues into consideration, while utilising project planning and time management techniques. This course also includes a group project, which builds team skills. This project aims to meet a socioeconomic need of a particular community.

SEMESTER: **2**
COURSE CODE: **ECNG2009**
COURSE TITLE: **CONTROL SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ENGR1180**
Course Description: The area of automatic control involves the use of procedures and strategies for forcing dynamic systems to behave in a specified fashion. We are all directly engaged in the control of dynamic systems on a continual basis – consciously or otherwise. For example, driving requires control of both direction and speed of an automobile; effective walking and running requires control of direction, speed and balance; our body systems control body parameters such as heart-rate, blood-pressure, temperature etc. with little conscious intervention This course uses what is termed the "classical or frequency domain" approach to control systems design. The techniques borrow heavily from the telecommunications industry of the early 1920's when engineers like Bode and others developed frequency response methods for solving problems encountered in the design of equalisers and amplifiers for long distance communication over the transatlantic cable. This course emphasises industrial application of theoretical concepts. Students require a good grasp of signals and systems theory as well as mathematics to successfully navigate this course.

SEMESTER**: 2**
COURSE CODE: **ECNG3013**
COURSE TITLE: **ELECTRICAL TRANSMISSION AND DISTRIBUTION SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ECNG3015**
Course Description: This is a 3 credit mandatory course for the students who opt for the Energy Systems option. The current energy systems offering focuses on the generation of the electricity and the general health of the system. This course addresses the void existing in the engineering analysis and the application of technology to the transmission and distribution area. The course is divided into 33 lecture and 6 tutorial one hour sessions. There will also be three research papers/projects and a mid-semester exam.

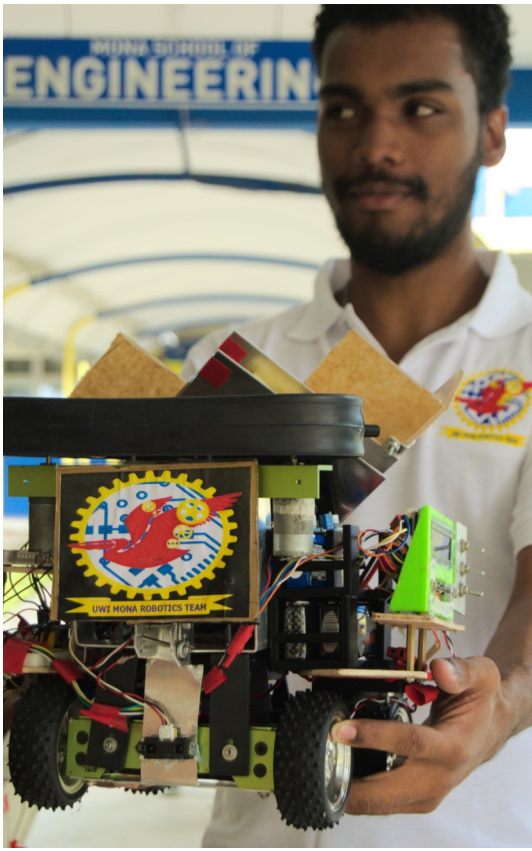
SEMESTER**: 2**
COURSE CODE: **ECNG3015**
COURSE TITLE: **INDUSTRIAL AND COMMERCIAL ELECTRICAL SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ECNG2000**
Course Description: This is a 3-credit compulsory course for all students in the Electrical and Computer Engineering Department. This course provides all the knowledge required to analyse an industrial power network from determination of the design ratings of equipment to the setting of protection relays. Human safety issues, in the handling of electrical equipment, are emphasised in all the topics covered. Topics delivered in the course are all linked as all topics depend on theory delivered in the previous topics. All topics are done by first delivering the required theory and then the application of the theory to a typical industrial design problem. This course is divided into 34 lecture and 5 tutorial sessions, each of one hour duration. Evaluation is done through 4 investigative laboratory experiments, a maximum of 5 take-home assignments, a midterm exam and a final exam.

SEMESTER**: YEAR-LONG**
COURSE CODE: **ECNG3020**
COURSE TITLE: **SPECIAL ENGINEERING PROJECT**
NUMBER OF CREDITS: **6**
PREREQUISITES: **ELET2405, ELET2415 and at LEVEL 3**
Course Description: This is the capstone course of the entire BSc Engineering Programme. The course is a student-driven,

research and development project. Monthly seminars, intended to support the student in the research process are held and students are assessed by a final project submission and dissertation presentation. The course is year-long and counts for 6 credits and contributes 20% of the final weighted average used in the determination of honours. ECNG3020 Special Project is designed to develop technical skills in the following areas: Design to specification; Formulation of creative solutions to engineering problems; Engineering analysis and enquiry; Validation and testing against benchmarks; Project management; Time management; and Communication. The course presents the opportunity to build upon the core of engineering skills gained in the earlier years and to broaden the scope of knowledge already gained. Project details are provided in a Project Handbook.

SEMESTER**: 1**
COURSE CODE: **ECNG3021**
COURSE TITLE: **INTRODUCTION TO ENGINEERING MANAGEMENT AND ACCOUNTING SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **at LEVEL 3**
Course Description: This course provides final year engineering students with a background in management and accounting skills to equip them to function in the business world. It provides a working understanding of the main elements of the successful planning, operation and control of industries and businesses as they relate to the following essential areas: Accounting and Finance; Management and Organizational Theory; Project Management, Production Planning and Control Techniques; and Introduction to Business Law. The course is loaded with examples of its applications in engineering firms and industries.

SEMESTER: **1**
COURSE CODE: **ELET1400**
COURSE TITLE: **INTRODUCTION TO ELECTRONICS**
NUMBER OF CREDITS: **3**
Course Description: Introduction to Semiconductor Theory and the P-N Junction: Review of the atomic structure and bonding; Energy level diagrams; Intrinsic and Extrinsic semiconductors; Electrical properties; the Fermi Dirac Distribution function; The P-N Junction



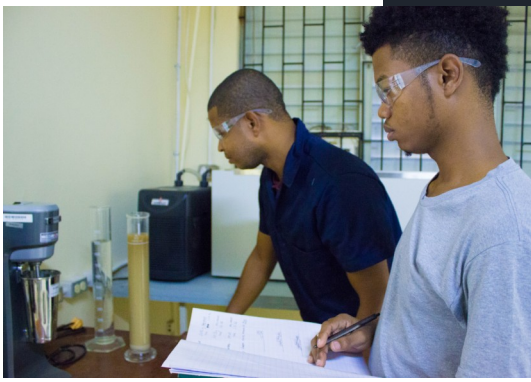
and the diode; light emitting diodes (LED); The Bipolar Junction Transistor (BJT); the Field Effect transistor; Biasing the transistor circuit; DC Transistor circuits. Introduction to Digital Electronics: Analog and digital concepts; binary digits and logic levels; digital waveforms; logic gates and truth tables; Boolean algebra and logic simplification; DeMorgan's theorem; Circuit minimization; Terminologies used in logic designs; Combinational logic circuits: BCD; Latches, Flip-Flops; Memory circuits and devices; Simple programmable arrays: ADC and DAC Circuits. Introduction to Analog Electronics and Communication Systems: Introduction to alternating current (AC); Frequency dependent RLC circuits; Bandwidth and half-power. The Operational Amplifier and its applications; Fundamentals of analog and digital Communication Systems; Noise and its effect on communication systems.

SEMESTER: **1**
COURSE CODE: **ELET2405**
COURSE TITLE: **PRACTICES IN ELECTRONICS DESIGNS I**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101, ELET1400 and ELET1405**

Course Description: *Investigative labs (30%)*: Six lab exercises will be assigned that are consistent with the electronics courses that the student has undertaken for semester 1. A report of the results, analyses and discussions must be handed in at the end of each lab session. A *Design Project (70%):* An electronics design project based on the application of digital circuits and embedded systems will be assigned. In addition to working on their project during the assigned lab sessions, students are also expected to do the necessary background/ research work outside of classes. A complete project report and demonstration of prototype will be individually presented at the end of the semester.

SEMESTER: **2**
COURSE CODE: **ELET2410**
COURSE TITLE: **ANALYSIS AND DESIGN OF ANALOGUE CIRCUITS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**

Course Description: The purpose of this course is to introduce the student to the fundamentals of the analysis and design of analogue circuits. It continues on the basic concepts of operational amplifiers, diodes and DC transistor circuits that were explored in ELET1400. Topics to be covered include circuit application of solid state devices to the designs of various diode and transistor circuits. The differential amplifier and its use in the design of operational amplifiers are discussed. The students are also introduced to the functional operation of commonly used linear ICs along with the basic concepts of oscillations. The course ends with some examples of data conversion circuits that demonstrate the operational relationships between analog and digital circuits. The use of manufacturers' data sheets for the design of analog circuits is an integral part of this course. The learning experience is enhanced with computer-based exercises and assignments. SPICE simulation tools will be used throughout this course.



SEMESTER: **2**
COURSE CODE: **ELET2415**
COURSE TITLE: **PRACTICES IN ELECTRONICS DESIGNS II**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101, ELET1400 AND ELET1405**

Course Description: *Investigative labs (30%)*: Six lab exercises will be assigned that are consistent with the electronics courses that the student has undertaken for semester 2. A report of the results, analyses and discussions must be handed in at the end of each lab session. A *Design Project (70%):* An electronics design project based on the application of analogue circuits and communication systems will be assigned. In addition to working on their project during the assigned lab sessions, students are also expected to do the necessary background/ research work outside of classes. A complete project report and demonstration of prototype will be individually presented at the end of the semester.

SEMESTER: **2**
COURSE CODE: **ELET2420**
COURSE TITLE: **SEMICONDUCTOR DEVICES**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**

Course Description: This course provides the basic foundation for understanding electronic semiconductor devices and their circuit applications and limitations. It has introductory elements of quantum mechanics as a requirement for understanding the dynamics of the behaviour of charge carriers and energy distributions within a semiconductor lattice and across p-n junctions. As such, reasonably strong mathematical and electrical field theory backgrounds are required – as obtained from

the prerequisites. The three fundamental areas of semiconductor devices; semiconductor theory, p-n junction devices and field effect devices, are adequately covered in this course. The learning experience is enhanced with computer-based exercises and assignments. Math lab and SPICE simulation tools will be used throughout this course.

SEMESTER: **1**
COURSE CODE: **ELET2430**
COURSE TITLE: **DIGITAL CIRCUITS AND MICROPROCESSORS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**
Course Description: The main objective of this course is to familiarize students with digital circuits and systems and in particular, the internal designs and operations of microprocessors, including Reduced Instruction Set computers (RISC) and Complex Instruction Set Computers (CISC). The course starts with a review of Flip flops and its application to counters, shift registers, memory architectures and arrays, and state diagrams. Basic processor designs will be covered, including Sequential Logic and Memory Design. Having set a good foundation, advanced processing techniques such as Microprogramming, Cache Memory Management and an introduction to parallelism will be covered.

SEMESTER: **1**
COURSE CODE: **ELET2450**
COURSE TITLE: **EMBEDDED SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**
Course Description: The goal of this course is to provide students with an understanding of the inner workings of embedded system solutions and the underlining technology, which include the development of circuits and embedded software programs. It exposes students to the structure and component of embedded controllers and the tools necessary for the development of embedded systems solutions. Students will also be exposed to the design and implementation processes of embedded system solutions. In addition, students will develop the skills necessary to construct circuits and design algorithms to interface devices such as modem, GPS receivers, LCD and other input/output devices with a microcontroller based embedded system.

SEMESTER: **1**
COURSE CODE: **ELET2460**
COURSE TITLE: **SIGNALS AND SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**
Course Description: This course is concerned with predicting and analyzing the response of linear time invariant (LTI) systems when certain signals such as the unit impulse. The unit step and the sinusoid, are furnished as inputs. Transfer function models of LTI systems will be developed and analyzed using a number of powerful techniques based on the Laplace Transform and the Fourier Transform. These techniques will also be used extensively in other engineering courses, for example telecommunications, control systems and signal processing. To enhance the learning experience, MATLAB will be used to explore some of the concepts discussed and to verify some of the predictions.

SEMESTER: **2**
COURSE CODE: **ELET2480**
COURSE TITLE: **MODERN COMMUNICATION SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and ELET1400**
Course Description: This course seeks to familiarize students with the basic foundations of communications systems, covering the concepts from signal preparations, signal

transmission, and signal reception of both digital and analog systems. It specifically deals with analog and digital modulation techniques, transmission of the signal across a carrier, and the acquisition and demodulation of these signals. This leads to an introduction to modern technologies such as wireless transmission, GNSS systems, cellular technology and GSM.

SEMESTER: **1**
COURSE CODE: **ELET3405**
COURSE TITLE: **PRACTICAL ANALYSIS OF ADVANCED ELECTRONIC CIRCUIT AND SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2405 and ELET2415**
Course Description: This course is divided into three main sections. Section 1 will run for the first 5 weeks of the semester and will expose students to general troubleshooting and problem solving techniques for advanced electronics circuits and systems. Sections 2 and 3 will run concurrently for the remainder of semester and are strongly focused on problem solving and effective troubleshooting of circuits and systems for telecommunication and for instrumentation and control, respectively. Manufacturers' datasheets, schematic diagrams, systems design specifications and operation and service manuals will be provided. Students are required to use this information along with their knowledge of electronic circuits and systems designs to implement effective repairs or redesigns. Although fixed 4-hour sessions are timetabled each week students are encouraged to use the open lab hours to work on their assigned weekly task. Students will be normally required to complete two sections - Section 1 and either Section 2 or Section 3 depending of their area of specialization (telecommunication or industrial automation).

SEMESTER: **1**
COURSE CODE: **ELET3430**
COURSE TITLE: **INSTRUMENTATION AND MEASUREMENTS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2410 and ELET2430 or ELET2460**
Course Description: In modern measurement processes, the parameter to be measured is sensed and converted to an electrical signal for processing and display. The apparatus and methods used to perform this task include the use of a wide range of transducers and conditioning circuits that are usually interface to computers for final signal processing and display. This course highlights this measurement process and the design and operation of the electronic circuit and systems that enable it. In depth analyses of the physics of the operation of sensors and their interfaces to analogue and digital electronic circuits will be studied. Examples of Industrial measurement systems will be discussed with particular attention to their design details. Students will be exposed to the real world instrumentation and measurement system during their industrial case study sessions. This aspect of the course has proven to be very informative and eye-opening for the students creating high motivation levels and increased interest.

SEMESTER: **2**
COURSE CODE: **ELET3440**
COURSE TITLE: **INTRODUCTION TO ROBOTICS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2450 and ELET2430**
Course Description: This course introduces students to the field of robotics and its applications in today's technologically advanced society. In addition it covers the different components that constitute a robot, its operation and how it fits together to form a complete system. The course also investigates and discusses the use of robot technology in several areas of application. Specific topics covered include embedded controllers, sensors, actuators, wireless communication and mobile robots design and application.

SEMESTER: **2**
COURSE CODE: **ELET3450**
COURSE TITLE: **SATELLITE COMMUNICATION & GNSS SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2480**
Course Description: This course is made up of two Sections: Section I, "*Satellite Communication*," introduces students to the fundamental communications principles behind current state-of-the-art satellite communications systems. Section II, "*Global Navigational Satellite Systems (GNSS),*" provides an overview of the principles of operation of satellite navigation systems with primary emphasis on the U.S. Global Positioning System (GPS).

SEMESTER: **1**
COURSE CODE: **ELET3460**
COURSE TITLE: **DIGITAL SIGNAL AND IMAGE PROCESSING**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2460**
Course Description: This course reviews the basics of DSP – building on the fundamentals taught in ELET2460 – before moving to more advanced concepts of signal processing. In the first part of the course the students will be taken through the processes required for digital filter design, starting with the basic methods and moving on to more sophisticated techniques. Digital imaging processing will be covered in the second module. The tools and techniques employed in basic image processing (compression and de-noising) will be addressed; this will provide the student with the capacity to grasp the more complex concepts and techniques employed in modern image processing applications. Given that DSP is essentially about the manipulation of real-world signals, the tools, techniques and approaches to problem-solving taught in this course can be applied in disparate fields, from telecommunications to medical imaging, video and audio processing for law enforcement, to investment banking.

SEMESTER: **1**
COURSE CODE: **ELET3470**
COURSE TITLE: **WAVE TRANSMISSION AND FIBER OPTICS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2480**
Course Description: This course starts with coverage of the basic background in electromagnetic theory that is required for understanding the behaviour of waves in various mediums. It continues with the fundamentals of wave propagation and waveguiding of all kinds; the essentials of propagation along optical fibers; and the concepts underlying integrated optics systems. It details the theoretical analyses of various transmission line including twisted wire pairs, coaxial cables, and traces on printed circuits boards. A study of antennas and their interfacing to transmission line is included. A thorough analysis is done on the theory of fiber optic and dielectric transmission medium with extended discussions on their practical application. Finally practical fiber optic communication system, its signals and its components are studied.

SEMESTER: **1**
COURSE CODE: **ELET3480**
COURSE TITLE: **WIRELESS COMMUNICATION**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2480**
Course Description: This course offers a definitive professional's overview of wireless communications technology and system design. Virtually every important new wireless standard and technological development, including W-CDMA, cdma2000, UMTS, and UMC 136/EDGE; IEEE 802.11 and HIPERLAN WLANs; Bluetooth, LMDS, and more, have been reviewed. The technologies and applications that drive the development of 2G, 2.5G, and 3G systems are explored. An overview of the 4G technologies is presented.

SEMESTER: **1 and 2**
COURSE CODE: **ELNG1101**
COURSE TITLE: **PHYSICS FOR ENGINEERS**
NUMBER OF CREDITS: **3**
Course Description: This is calculus-based course covering the basic laws and phenomena in electricity and magnetism, oscillation and waves, rotational mechanics and modern Physics. It revises and expands on selected areas of the CAPE Physics content so as to reinforce and expand the student understanding of the fundamental concepts and their application to solving engineering problems.

SEMESTER: **1**
COURSE CODE: **ELNG3030**
COURSE TITLE: **POWER ELECTRONICS AND PROTECTION CIRCUITS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET2410 and ELET2420**
Course Description: Power electronics refers to control and conversion of electrical power from one form to another by power semiconductor devices that are usually operate as switches. This course offers a comprehensive coverage of power electronic devices and circuits. It provides a basic knowledge of circuitry for the control and conversion of electrical power with high efficiency. It begins with the introduction of power semiconductor devices, their basic operations and characteristics. The required semiconductor physics background would have been covered in ELET2420 (semiconductor devices) which is a prerequisite for this course. The application of these devices to the design of controlled rectifiers, inverters, choppers,

cyclo-converters, and dual converter circuits are presented. Typical commercial and industrial applications along with their waveform analyses are also discussed. These converters can change and regulate the voltage, current, or power; dc-dc converters, ac-dc rectifiers, dc-ac inverters, and ac-ac cyclo-converters are in common use. Several low and high power applications are included. All high power circuits require some form of cooling and protection from over-current and/or over-voltages. The components, circuit design techniques and application of several cooling and protection circuits are presented.

SEMESTER: **1**
COURSE CODE: **ELNG3040**
COURSE TITLE: **INDUSTRIAL AUTOMATION**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ECNG2009 and ELET2450**
Course Description: This course provides the student with basic skills useful in identifying the concepts of automated machines and equipment and describes the terms and phrases associated with industrial automation. A range of automated control systems will be studied in depth with special emphasis on the use of ladder Logic and F- Logic for PLC programming. The industry standards and protocols are covered. The design and operation of distributed control systems (DCS) is emphasized. The methods of programming for the various automated controllers are an integral part of this course. Examples of automation in selected industries are discussed to highlight the various applications of the automated systems. The practical component for this class will be covered in the advanced electronics lab course.

SEMESTER: **2**
COURSE CODE: **ELNG3050**
COURSE TITLE: **WIRELESS BROADBAND NETWORKS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET3480**
Course Description: This course starts with a description of the latest techniques in block based transmission with strong emphasis on Orthogonal Frequency Division Multiplexing (OFDM). Multiple input/output antennas systems with applications to ultra wideband systems are then analyzed. Access control and management to ensure quality data transmission is discussed. The introduction of WIMAX and LTE systems and standards are detailed as examples of 4G systems.

SEMESTER: **2**
COURSE CODE: **ELNG3060**
COURSE TITLE: **POWER PLANT INSTRUMENTATION**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELET3430, ELNG3030 and ELNG3040**
Course Description: This course provides a comprehensive study of the instruments that are used to measure and control the processes of electricity power generation. The student is first exposed to an in-depth analysis of the

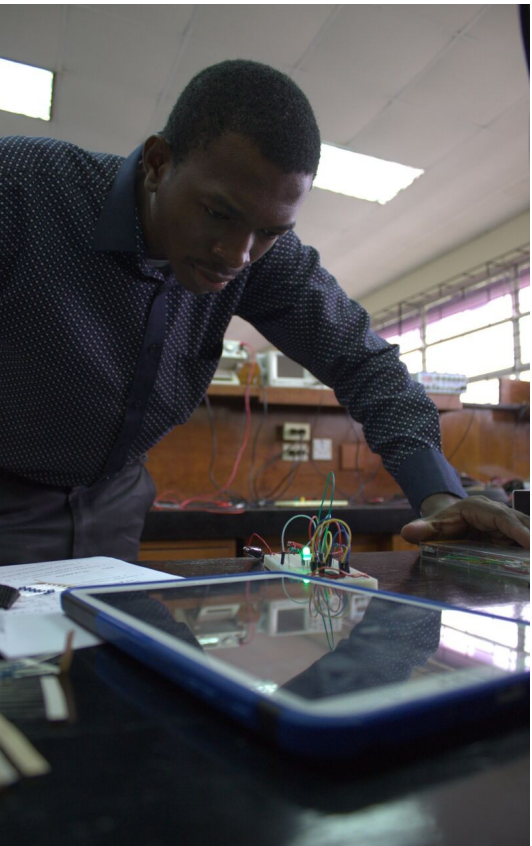
processes of controlling the generation of electricity from tradition fuel sources. This is followed by a study of the instrumentation and control aspects of alternative form of electricity generation. Special emphasis is made to sensitize students to the environmental impact of these systems. Design ethics and design for safety are embedded in this course. A Case study of specific application of instruments in the control processes of power plants is an integral part of this course.

SEMESTER: **1**
COURSE CODE: **ENGR0110**
COURSE TITLE: **PRE-ENGINEERING PHYSICS I**
NUMBER OF CREDITS: **3**
Course Description: This course is a pre-calculus-based physics course primarily intended for engineering students. It covers fundamental topics in mechanics, oscillations and heat, with emphasis on the study of forces, motion and the properties of matter and heat. This is the first of two introductory physics courses that revises and expands on selected areas of the high school physics and prepares the engineering student for more advanced topics in physics and engineering. Selected assignments and laboratory exercises are included and are designed to reinforce and expand the student understanding of the fundamental concepts and their application to solving engineering problems.

SEMESTER: **1**
COURSE CODE: **ENGR0120**
COURSE TITLE: **PRE-ENGINEERING MATHEMATICS I**
NUMBER OF CREDITS: **4**
Course Description: A practical introduction to the core mathematics required for engineering study and practice. Students will be led through basic geometry, algebra and pre-calculus to an introduction to calculus, and will cover topics in algebra ranging from polynomial, rational, and exponential functions to conic sections. Trigonometry concepts such as Law of Sines and Cosines will be introduced. An introduction to probability and statistics is also be included. The mathematical theories will be explained in a straightforward manner, being supported by practical engineering examples and applications.

SEMESTER: **1**
COURSE CODE: **ENGR0130**
COURSE TITLE: **CHEMISTRY FOR ENGINEERS**
NUMBER OF CREDITS: **3**
Course Description: This course provides an introduction to chemistry that prepares students for further study in any engineering field. It offers a balance of conciseness, rigor, and depth needed to prepare students for more advanced coursework and careers in various engineering specialties, such as civil, environmental, electrical, computer, mechanical, and biomedical engineering. It elucidates the key concepts and skills important for entering engineering students, including problem solving, qualitative and quantitative thinking, and importance of units. It emphasizes the connection between molecular properties and observable physical properties and the connections between chemistry and other subjects studied by engineering students, such as mathematics and physics. Examples are drawn from problems of interest to modern engineers, including alternative energy, advanced materials, and the environment. Selected assignments and laboratory exercises are included and are designed to reinforce and expand the student understanding of the fundamental concepts and their application to solving engineering problems.

SEMESTER: **2**
COURSE CODE: **ENGR0210**
COURSE TITLE: **PRE-ENGINEERING PHYSICS II**
NUMBER OF CREDITS: **3**
Course Description: This course continues from the introduction of fundamental physics concepts in ENGR0110 to explore topics in electricity and magnetism, nuclear physics and optics. The fundamental theories of electromagnetism are used to describe the operation of electrical circuit components and measurements, and encompass the description and application of Coulomb's law, Faraday's law, Ohm's law, Kirchhoff's laws, Lenz's law to the electric and magnetic fields. The concept of light as an electromagnetic wave and its various manipulations are also studied. The course closes of with a basic introduction of nuclear model of the atom and the phenomenon of radioactivity. Selected assignments and laboratory exercises are included and are designed to reinforce and expand the student understanding of the fundamental concepts and their application to solving engineering problems.



SEMESTER: **2**
COURSE CODE: **ENGR0220**
COURSE TITLE: **PRE-ENGINEERING MATHEMATICS II**
NUMBER OF CREDITS: **4**
Course Description: This course will introduce students to the topics of differential and integral calculus. Emphasis is placed on concepts of limits and continuity, differentiation and integration and their applications to solving problems. Concepts in probability and statistics will be explored. The theoretical concepts will be supported by practical engineering examples and applications .

SEMESTER: **1**
COURSE CODE: **ENGR0230**
COURSE TITLE: **BIOLOGY FOR ENGINEERS**
NUMBER OF CREDITS: **3**
Course Description: This is an introductory course of biology for a student in the engineering discipline to develop their engineering career in a bio-related field. The contents of the course include the basic knowledge of biological functions at the organ, tissue, cellular, and molecular level. It introduces students to modern biology with an emphasis on the evolution of biology as a multi-disciplinary field, to make them aware of the application of engineering principles in biology, and engineering robust solutions inspired by biological examples. This course is designed to convey the essentials of cell and molecular biology to provide a framework for more advanced courses.

SEMESTER: **2**
COURSE CODE: **ENGR0240**
COURSE TITLE: **COMPUTER APPLICATIONS FOR BEGINNER ENGINEERS**
NUMBER OF CREDITS: **2**
Course Description: This course introduces students to the fundamentals for computational analyses using Matlab and Excel. The focus of this course is on the fundamentals of engineering computing and involves algorithm development, selection of appropriate tools, documentation of solutions, and verification and interpretation of results. Students will be exposed to the characteristics of a procedure-oriented language, the representation of information, and an introduction to algorithms. Emphasis will be placed on the solution of

characteristic problems arising in engineering. Selected assignments and laboratory exercises are included and are designed to reinforce and expand the student understanding of the fundamental concepts and their application to solving engineering problems.

SEMESTER: **1**
COURSE CODE: **ENGR1000**
COURSE TITLE: **INTRODUCTION TO ENGINEERING**
NUMBER OF CREDITS: **3**
Course Description: An introduction to the following: historical development of engineering; formation of the engineer; roles and functions of engineers and professional organizations; creative and critical thinking; technical communication; Ethics; liability; safety; legal forms of association; contracts, company law; intellectual property; engineering economics and business operations; infrastructure; energy systems and economics, environment and sustainable development; approaches to design. Field trips to local industries are an integral part of the course.

SEMESTER: **1**
COURSE CODE: **ENGR1105**
COURSE TITLE: **ENGINEERING LABORATORY AND DESIGN I**
NUMBER OF CREDITS: **C1**
CO-REQUISITES: **ELET1400 and ECNG1000**
Course Description: This is the first of four engineering laboratory and design courses and will provide hands-on design experience for the contents of the electronics and electrical engineering courses taught in semester 1. The course is divided into three modules. Lab orientation will be completed by all students in the first week of the semester. Four weeks are successively assigned for each module. Students will be guided in performing various explorations of the practical aspects of electronics and their skills will be tested in a design test at the end of each module .

SEMESTER: **1**
COURSE CODE: **ENGR1180**
COURSE TITLE: **ENGINEERING MATHEMATICS I**
NUMBER OF CREDITS: **3**
Course Description: Vectors: plane and space vectors, dot and cross product, vector equations of lines and planes. Elementary linear algebra: geometric interpretation of linear equations, Gaussian elimination, definition of a vector space, span and subspace, basis, dimension. Matrices: transpose, determinants, rank and its application to linear systems, matrix inversion by cofactors. Series: partial sums, comparison and ratio tests, Maclaurin and Taylor series. Complex numbers: definition and properties, complex roots of a quadratic equation, complex numbers as vectors, modulus and argument, products and quotients, De Moivre's theorem, exponential form, hyperbolic functions, loci in the Argand diagram. Ordinary differential equations: definitions, direction fields, linear first order differential equations, separable differential equations, modeling with first order equations, exact equations, numerical approximations, homogeneous second order equations with constant coefficients, fundamental solutions, complex and repeated roots of the characteristic equation, reduction of order, method of undetermined coefficients.

SEMESTER: **2**
COURSE CODE: **ENGR1200**
COURSE TITLE: ENGINEERING TOOLS AND PRACTICE
NUMBER OF CREDITS: **3**
PREREQUISITE: **ENGR1105**
CO-REQUISITE: **ECNG1015 or BMNG1210**
Course Description: This course is specially designed to train incoming engineering students to operate and apply various software and hardware tools for engineering practice. It's divided into four modules to cover the range of software and hardware tools that are normally used by a practicing engineer. *Module 1:* Tools and techniques for circuit design will provide hands on training with various software CAD tools used for design, simulation and fabrication of electronics and electrical circuits and systems. MatLab will be introduced and its application to simulations for various theoretical models. This module will also expose students to tools used in industry to develop and test various software and hardware designs, such as LabVIEW which offers a graphical programming approach that facilitate visualization of every aspect of design and application, including hardware configuration, measurement data, and debugging.

Module 2: Introduction to mechatronics introduces students to the various elements of a mechatronic system, how they relate to each

other and how to design, build and troubleshoot such systems. The practical aspect of the course utilizes microcontrollers in the form of Arduino, various sensors, circuits, motor drivers, motors and 3D printed designs to enable students to develop a familiarity with the various processes and mechatronic systems. The techniques involved in the production of engineering drawings and prototypes, and the function and utilization of basic mechanical workshop tools and equipment, are covered in modules 3 and 4, respectively. The workshop technology module introduces students to workshop equipment and provides students with basic workshop skills, which they will apply in the design and construction of a flat blade screw driver at the end of the module.

SEMESTER: **2**
COURSE CODE: **ENGR1205**
COURSE TITLE: **ENGINEERING LABORATORY AND DESIGN II**
NUMBER OF CREDITS: **C1**
CO-REQUISITE: **ENGR1105**
Course Description: This is the second of four engineering laboratory and designs courses and will provide hands-on design and application experience using the contents of the electronics, biomedical and electrical power engineering courses taught at level 1. The course is divided into two sections. Section 1 contains three modules, each having six laboratory exercises for biomedical, electrical power and electronics engineering, respectively, and is offered during the first 6 weeks of the semester. Section 2 consists of a design project that will be assigned to groups of three to four students representing a mixture of the engineering disciplines. The design aspect of this course focuses on holistic design processes applied to an engineering design problem.

SEMESTER: **1**
COURSE CODE: **EPNG1201**
COURSE TITLE: **INTRODUCTION TO THERMODYNAMICS AND FLUID MECHANICS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ENGR1180**
Course Description: This course introduces electrical power engineering students to basic thermodynamic and fluid mechanics principles. It introduces the important concepts of mass, energy, and entropy in thermodynamics and melds traditional content with the web-based resources and learning tools such as the "The Expert System for Thermodynamics" - an interactive platform that offers smart thermodynamic tables for property evaluation and analysis tools for mass, energy, entropy, and energy analysis of open and closed systems. The second section of the course introduces engineering students to the principles of fluid mechanics with a focus on the most essential topics in the field, and includes practical applications for several engineering disciplines.

SEMESTER: **2**
COURSE CODE: **EPNG2010**
COURSE TITLE: **NUCLEAR PHYSICS AND REACTOR THEORY**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101**
Course Description: This course introduces the basic concepts of atomic and nuclear physics, subatomic particles and the mechanisms involved in nuclear reactions. It establishes

basic radiation safety principles and highlights the effects of radiation on the human body as well as introduces students to fundamental principles of nuclear reactor theory and operation.

SEMESTER: **2**
COURSE CODE: **EPNG2020**
COURSE TITLE: **RENEWABLE ENERGY SYSTEMS**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ECNG1000 and ELNG1101**
Course Description: This course covers all the technologies available to produce electrical energy from renewable sources, including solar, wind, hydro, geothermal and biomass. The physics governing the operation of these devices will presented combined with the engineering application of monitoring, controlling and connecting to the electrical grid. Students will do engineering calculations of power and energy availability of renewable energy sources and learn about requirements for integrating renewable energy sources into production, distribution and end-use systems.

SEMESTER: **1**
COURSE CODE: **GEOM2015**
COURSE TITLE: **GEOMATICS FOR CIVIL AND ENVIRONMENTAL ENGINEERS**
NUMBER OF CREDITS: **3**
PREREQUISITE: **NONE**
Course Description: Principles and field practice of Geomatics as applied to tasks in Civil and Environmental Engineering. Introduction to Geomatics; Measurement Basics. Leveling Techniques. Procedures and Applications. Distance and Angle Measurements. Adjustment of measurements. Traversing and Control Surveying; Volumetric Applications; Earthwork Applications; Profiles and Cross Sections; Construction Applications; Transportation Applications. Global navigation satellite systems (GNSS).

SEMESTER: **2**
COURSE CODE: **GEOM 2017**
COURSE TITLE: **GEOINFORMATICS FOR CIVIL & ENVIRONMENTAL ENGINEERS**
NUMBER OF CREDITS: **3**
PREREQUISITE: **NONE**
Course Description: The principles of Geoinformatics techniques and their applications for typical problems in Civil and Environmental Engineering. Basics of aerial and satellite imageries; extraction of graphical and numerical data. Integrated approach for addressing Civil and Environmental Engineering problems using Geoinformatics.

SEMESTER: **2**
COURSE CODE: **MGMT3058**
COURSE TITLE: **NEW VENTURE MANAGEMENT**
NUMBER OF CREDITS: **3**
PREREQUISITES: **at LELVEL 3**
Course Description: This course is designed to provide participants with the requisite skills to engage in entrepreneurship. Students will learn the fundamental skills necessary for the development of a successful business plan and new venture, as well as metrics to determine its feasibility for implementation. Students will be exposed to a multi-step approach for creating a business plan, which will include financial, operational, and marketing aspects. Students will be required to work effectively with group members on their selected project of choice. As such, class attendance and group participation are essential elements for success in the creation of your project. By the end of the course, students should be confident in their abilities to understand the process, execution, and feasibility of a business plan.

SEMESTER: **1**
COURSE CODE: **MATH2230**
COURSE TITLE: **ENGINEERING MATHEMATICS II**
NUMBER OF CREDITS: **3**
PREREQUISITE: **ENGR1180**
Course Description: Vector calculus: parametric curves and arc length, review of partial differentiation, vector fields, line integrals and double integrals, Green's theorem, surface integrals, triple integrals and Divergence theorem. Laplace transforms: definition and existence of Laplace transforms, properties of Laplace transforms (linearity, inverse transform, shift formulae, Laplace transform of derivatives), applications and further properties of Laplace transforms (solving differential equations, convolution and integral equations, Dirac's delta function, differentiation of transforms, Gamma function). Fourier series: definitions, convergence, even and odd functions, half range expansions. Partial differential equations: definitions, heat equation (derivation, solution by separation of variables,

insulated ends as boundary conditions, nonhomogeneous boundary conditions), wave equation (derivation, solution by separation of variables), Laplace's equation in Cartesian and polar coordinates.

SEMESTER: **2**
COURSE CODE: **MATH2240**
COURSE TITLE: **PROBABILITY AND STATISTICS**
NUMBER OF CREDITS: **2**
PREREQUISITE: **ENGR1180**
Course Description: Statistics and probability; frequency distribution, frequency polygons and histograms; introduction to probability; basic axioms; conditional probability, Bayes theorem, mutual independence; introduction to random variables; probability distribution, Bernoulli trials, the binomial distribution and the Poisson distribution; probability density and mass functions of a continuous random variable; expectation and variance; the exponential and normal distributions; distributions of sample means; point estimates; confidence intervals; statistical inference - tests of significance; linear regression.

SEMESTER: **2**
COURSE CODE: **PHYS3385**
COURSE TITLE: **ELECTROMAGNETISM**
NUMBER OF CREDITS: **3**
PREREQUISITES: **ELNG1101 and MATH2230**
Course Description: Derivation of Maxwell's equations in differential form. Equation of continuity. Poisson's equation. Derivation of the electro-magnetic wave equation. Solution for plane waves in dielectrics. Electro-magnetic nature of light. Energy flow and the Poynting vector. Boundary conditions. Reflection and refraction of electro-magnetic waves at dielectric boundaries. Derivation of Snell's law. Fresnel's equations. Total reflection. Brewster's angle. Transmission and reflection co-efficients. Propagation of electro-magnetic waves in conducting media. Skin depth. Energy flow in conductors. Reflection of Electro-magnetic waves by a conductor. Dispersion of electro-magnetic waves in various media. Sources of Electromagnetic waves.

NOTES

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