UWI

ST. AUGUSTINE CAMPUS

2013/2014

UNDERGRADUATE

# FACULTY OF ENGINEERING

## REGULATIONS & SYLLABUSES

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# MISSION STATEMENT

The Mission of the Faculty of Engineering is to be the provider of a world class quality education in Engineering, Geoinformatics and Geosciences and research and development programmes 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 region.

# MESSAGE FROM THE DEAN

On behalf of all staff of the Faculty of Engineering of The University of the West Indies I welcome all new and returning students to the Faculty for the 2013/2014 Academic Year.

This booklet provides information that is key to your successful navigation of the Engineering programme you have chosen. In particular, you are advised to carefully read the regulations given here as they will determine how you progress through the programme.

The degree for which you are reading provides the educational basis for becoming a professional engineer, surveyor, land valuator or geoscientist. However, you will not be recognized as a professional until you have gained substantial work experience. As a professional you would be responsible for peoples' lives, properties and investments. It is a great responsibility. As such, it is incumbent upon you to strive for a truly deep understanding of the material that is presented in your course of study. The Faculty is very concerned that many students prefer to try to work their way around the system by spotting exam questions, not attending classes, even plagiarising and colluding. Some are satisfied with just barely passing to get the degree. I am sure that you would not like to know that your personal physician might have gotten his or her degree in this manner. If you need assistance in developing a workable approach to real understanding please do not hesitate to consult with your tutors and lecturers.

Apart from the skills represented by your present qualifications, there are two key requirements for success in your respective programmes: you need a sense of motivation and you need a plan. By and large, students who have really excelled in this programme and programmes elsewhere are those who were firm in their conviction that they needed an engineering degree – either for the sheer joy and reward of learning and/or because they were pretty sure that they wanted to start their careers as engineers.

If you are not happy with your current performance it is strongly recommended that you consider applying for leave of absence and spending some time, a year or so, working in an engineering environment. While there, explore other areas of work – legal, administrative, human resources, laboratory work, sales etc. If after that time you are convinced that engineering is the career for you, then you can re-enter the programme, hopefully with a higher level of motivation to succeed.

If you choose otherwise, be mindful of the fact that many have very successfully switched paths either during or even after a first degree. Indeed, Trinidad and Tobago has a Chief Justice who has a first degree in engineering. As in his case, you will find that the time spent here will not be lost time but will serve you well in your future endeavours.

However, once you are motivated to steer the course you should make every effort to plan your work. THEN you must work your plan. Manage your time well – as a rough guide you should spend the same amount of time you spend in class or in the labs in self-study. Be prepared to change your plan if it is not working. Moreover, use all the resources available to you – consult with lecturers and other course support staff. Resist the trap of allowing conflicts in personalities to block you from accessing the learning support that we have provided for you. "A" students are not so much those who have high IQs as those who accept full responsibility for their academic success.

The advice given above is all the more significant given the changes in the GPA system due in the 2014/2015 Academic Year that will see an increase in the pass mark from 40% to 50% and a consequent adjustment in course grades. Key aspects of these changes are included in this document.

We wish you the greatest success for the 2013/2014 Academic Year.

**Brian Copeland O.R.T.T., C.M.,**
**BSc (Eng), MSc (Toronto), PhD (USC)**
**PROFESSOR AND DEAN, FACULTY OF ENGINEERING**

# AN HISTORICAL NOTE

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

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

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

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

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

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

From a modest beginning of 28 students in the Academic Year 1961/62, the Faculty has produced, up to Semester 2 of the 2012/2013 Academic Year, 7820 graduates in the fields of Chemical (1197), Civil (1529), Civil with Environmental (97), Electrical and Computer (1833), Agricultural (79), Geomatics (128), Industrial (407), Land Management (Valuation) (24), Mechanical (1946), Mechanical with Biosystems (39), Petroleum (48), Petroleum Geoscience (136) and Surveying and Land Information (357).

# QUICK REFERENCE

| | |
|---|---|
| **REGISTRATION** | **REGISTRATION DEADLINES SET BY THE UNIVERSITY WILL BE STRICTLY ADHERED TO BY THE FACULTY. THERE WILL BE NO EXCEPTIONS. THESE DEADLINES ARE AS FOLLOWS:**<br><br>*On-line Registration Dates:*<br>**SEMESTER 1**: August 19, 2013 to September 13, 2013<br><br>**LATE REGISTRATION/LATE PAYMENT FEE**:<br>from September 09, 2013<br><br>**CHANGE OF REGISTRATION (ADD/DROP)**:<br>until September 13, 2013<br><br>**SEMESTER 2**: January 13, 2014 to February 07, 2014<br><br>**LATE REGISTRATION/LATE PAYMENT FEE**: from February 03, 2014<br><br>**CHANGE OF REGISTRATION (ADD/DROP)**: until February 07, 2014 |
| **REGULATIONS** | Pages 18-30 of the Faculty of Engineering Undergraduate Information Guide |
| **EXEMPTION & CREDIT** | Regulations 3.3-3.5 of the Faculty of Engineering Undergraduate Information Guide |
| **EXAMINATIONS**<br>**GENERAL EXAMINATION REGULATIONS** | Section II (17-32), pages 9-13 of the Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates, 2008-2009 |
| **CONDUCT OF WRITTEN EXAMINATIONS** | Section V (84-103), pages 28-34 of the Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates, 2008-2009 |
| **REVIEW OF EXAMINATION RESULTS** | Section VII (142-143), page 41 of the Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates, 2008-2009 |
| **REMARKING OF EXAMINATION SCRIPTS** | Section VII (144-152), pages 41-43 of the Examination Regulations for First Degrees, Associate Degrees, Diplomas and Certificates, 2008-2009 |
| **SCHEME OF EXAMINATION** | Regulations 3.6-3.11 and 3.25(c) of the Faculty of Engineering Undergraduate Information Guide |
| **WARNINGS / WITHDRAWAL** | Regulation 3.29-3.30 of the Faculty of Engineering Undergraduate Information Guide |
| **RE-ENTRY** | Regulation 3.30(d) of the Faculty of Engineering Undergraduate Information Guide |
| **PLAGIARISM** | Regulation 3.32(b) of the Faculty of Engineering Undergraduate Information Guide |

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## *DEPARTMENT OF GEOMATICS ENGINEERING & LAND MANAGEMENT*

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***Charles, Ainsley***
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(Land Surveying)

***Grant, Ian***
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(Engineering Surveying)

***Khan, Kameel***
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***Ramos, Ria***
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***Sultani-Maharaj, Shelly***
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(Planning)

***Thomas, Deborah Heather-Dawn***
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## *DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING*

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***Professor C.K. Sankat***

Industrial Engineering & Engineering Management
***Dr. B.V. Chowdary***
***Dr. R. Ellis***
***Dr. G. King***
***Dr. Terrence R. M. Lalla***
***Professor W.G. Lewis***
***Professor Kit-Fai Pun***
***Professor Chanan S. Syan***

Industrial Automation & AI Applications
***Dr. J. Bridge***
***Dr. B.V. Chowdary***
***Dr. G. King***
***Professor Chanan S. Syan***

Materials & Manufacturing (Technology & Systems)
***Dr. A. Bryan***
***Dr. B.V. Chowdary***
***Professor W.G. Lewis***
***Dr. C. Maharaj***
***Professor Chanan S. Syan***

Theoretical & Applied Mechanics
***Dr. S.Y. Keshavan***
***Dr. J. Bridge***

Thermodynamics, Heat Transfer & Renewable Energy Resources
***Professor G.S. Kochhar***
***Dr. S. Haldar***
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***Jhagroo, Kishore***
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Dip Mang Stud (UWI), EMBA (UWI)
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MSc (Eng. MST) (UWI), PhD (Eng) (UWI)

**INDUSTRY LIAISONS**
***Brown, Hayden***
PCS Nitrogen Trinidad Limited

***Carabon, Linford***
Industrial Gases Limited

***Matabadal, Sennen***
Thermal Power & Utilities Engineering
& Management Consultant

***Ng Chow, Michael***
Neal & Massy Motors

***Tiah, Eugene***
President
Phoenix Park Gas Processors Limited

# SECTION 1 - GENERAL INFORMATION

**1.1 PROGRAMMES OF STUDY**
The Faculty offers programmes of study leading to the degrees of BSc, MSc, MPhil and PhD in Agricultural and Biosystems Engineering, Chemical & Process Engineering, Civil Engineering, Civil with Environmental Engineering, Electrical & Computer Engineering, Industrial Engineering, Land Management (Valuation), Mechanical Engineering, Mechanical Engineering with a minor in Biosystems, Petroleum Engineering, Petroleum Geoscience, Surveying & Land Information, Urban and Regional Planning, Property Valuation, Geomatics and Geoinformatics.

**BSc Programmes**
The programmes are divided into Levels 1, 2 and 3 and are conducted over three (3) academic years of two (2) semesters each. These programmes are accredited by the respective British Professional Engineering Institutions.

**Cooperative Programme (COOP)**
A COOP was introduced in 1994 in which students who have completed Levels 1 and 2 may spend a full year in industry undergoing supervised practical engineering training and return to complete their programme at Level 3. The COOP is now administered by the Student Advisory Services (http://www.uwi.tt/sas/services/career.asp).

**Pre-Engineering Programme**
The aim of the Pre-Engineering Programme is to provide an alternative path for potential regional candidates to BSc programmes offered by the Faculty of Engineering at the UWI. In this regard, the programme seeks to effectively prepare and motivate students for success in the first year programmes in engineering.

Specifically, the Foundation Programme strives to achieve these aims by setting objectives that are realized through educational components that:
(a) Raise all students to the equivalent of CAPE Level 2, the benchmark entry qualification for entry into BSc Engineering programmes.
(b) Expose students to the breadth and depth of University life, allowing them to better choose their academic paths and to become better prepared for the rigours of student life.
(c) Facilitate the development of key skills required for the world of work.

The programme is delivered through a 1-year course of study that includes traditional theoretical components that includes Mathematics and a Practical Immersion Activity component that provides students with Caribbean Vocational Component (CVQ) certified skills in a variety of engineering related disciplines. The Programme is administered by Faculty but delivered through the Open Campus.

Students must apply through the UWI Open Campus, Pre-University Centre, St. John Road, St. Augustine using the prescribed application forms.

Entry Requirements:
1. CAPE UNITS I & II in Mathematics and Physics or Chemistry, (CSEC in Chemistry) OR
2. GPA 3.0 – 3.4 – COSTAAT/UTT/UTECH/BCC

**Certificate in Geographic and Land Information Systems Management (GLIS)**
The Certificate in GLIS was introduced to meet the increasing demand for GIS specialists in the job market as a result of advancements in information technology, and the development of spatial/geographic database management programmes. This Certificate therefore provides participants with the essential skills in GIS with the aim to develop a core of trained GIS persons who can lend support for GIS programmes in the Caribbean.

Entry Requirements:
1. A minimum of five (5) O' level GCE/CXC subjects including English Language and Mathematics or equivalent qualification.
2. Applicants must also be computer literate, as knowledge of the MS Windows operating system will be required.
3. Relevant experience in application areas will be an advantage.

**1.2 SPECIALISED BRANCHES OF ENGINEERING (UNDERGRADUATE PROGRAMMES)**
There are many specialised branches of Engineering, four of which may be regarded as the most important and universally known. These four branches which are well established in the Faculty are as follows:
- Chemical Engineering
- Civil Engineering
- Electrical & Computer Engineering
- Mechanical Engineering

Other disciplines which were subsequently offered in the Faculty at both the Undergraduate and Postgraduate Levels are as follows:
- Asset Management
- Biosystems (Agricultural Engineering)
- Civil with Environmental Engineering
- Construction Engineering & Management
- Environmental Engineering
- Geoinformatics
- Geomatics
- Industrial Engineering
- Land Administration
- Land Management (Valuation)
- Manufacturing Engineering
- Petroleum Geoscience
- Production Engineering & Management
- Project Management
- Urban and Regional Planning
- Water and Wastewater Services Management

# SECTION 2 - STUDENT PRIZES

**2.1 CHEMICAL ENGINEERING**
Petrotrin Prize ($1,000)
To the best student in Level 1 Chemical & Process Engineering

Petrotrin Prize ($1,000)
To the best student in Level 2 Chemical & Process Engineering

Petrotrin Prize ($1,000)
To the best student in Level 3 Chemical & Process Engineering

Petrotrin Prize ($1,000)
To the student in Level 3 Chemical and Process Engineering producing the best Chemical & Process Engineering Design Project

EOG Resources Prize ($2,500)
To the student in Level 3 Chemical & Process Engineering producing the best Chemical Engineering Research Project

GSTT Prize ($1,000)
To the Level 1 student with the best academic performance and continuing in Level 2 Petroleum Geoscience

GSTT Prize ($1,000)
To the Level 2 student with the best academic performance and continuing in Level 3 Petroleum Geoscience

GSTT Prize ($1,000)
To the Level 3 student with the best academic performance

Schlumberger Prize (TT$2,500)
To the best all-round Level 1 student currently in Level 2 Petroleum Geoscience

Schlumberger Prize (TT$2,500)
To the best all-round Level 2 student currently in Level 3 Petroleum Geoscience

Schlumberger Prize (TT$2,500)
To the best all-round student who graduated from Level 3

**2.2 CIVIL & ENVIRONMENTAL ENGINEERING**

Bill Massiah/Percy Phillips Memorial Prize ($1000)
To the best student in Level 1 Civil Engineering

Bill Massiah/Percy Phillips Memorial Prize ($1000)
To the best student in Theory of Structures including Design Coursework at Level 2 Civil Engineering

Bill Massiah/Percy Phillips Memorial Prize ($1,100)
To the best student who is a National of Trinidad & Tobago in Level 2 and not on scholarship

Bill Massiah/Percy Phillips Memorial Prize ($1000)
To the best student in Level 3 Structural Analysis and Design Courses including coursework

Yorke Structures Prize ($1,000)
To the best student in Level 2 Civil Engineering

David Key Prize ($2,000)
To the best student in Level 3 Civil Engineering

Ali Meahjohn Ltd ($3000 TT)
To the most outstanding (highest GPA) Level 3 Civil with Environmental Engineering

Association of Professional Engineers of Trinidad & Tobago Prize ($1000)
To the student producing the best Civil Engineering Design Project

B.G. Singh Prize ($1000)
To the Level 3 Civil Engineering student obtaining the highest mark in Coursework including Design, over the three-year period

Airports Authority of Trinidad & Tobago Prize ($1000)
To the student obtaining the highest Level 3 mark in Transportation Engineering

Desmond Imbert Prize ($1,000)
To the student obtaining the highest mark in the Level 3 course in Civil Engineering Management

Lauriston Lewis Memorial Prize ($2,500)
To the best Level 3 Project in the area of Geotechnics

Thomas Chanona Prize ($1,000)
To the Level 2 student who has the most improved overall performance over his/her First Year

Thomas Chanona Prize ($1,000)
To the Level 3 student who has the most improved overall performance over his/her Second Year

KS& P Ltd ($3000 TT)
To the level 3 student with the highest average in CVNG1007, CVNG2008, CVNG2009 and CVNG3005

Thermal Impact Affordable Homes Co Ltd ($3000TT)
Highest mark in Environmental Engineering Design Project CVNG3020

Mootilal Moonan Engineering Prize ($1500TT) to graduating student with mark of 70% and above in CVNG2001

Lee Young & Partners Prize ($2000TT) to graduating student with 70% and above in CVNG3001

Coosals Construction Co Ltd Prize ($2000TT) to graduating student with a B+ or above in CVNG3011

CE Management and Services Ltd ($2000TT) to graduating student with the highest mark in CVNG3013

**2.3 ELECTRICAL & COMPUTER ENGINEERING**

Charles R. Massy Book Prize (worth $1000)
To the best student in Level 1 Electrical & Computer Engineering

Charles R. Massy Book Prize (worth $1000)
To the best student in Level 2 Electrical & Computer Engineering

Charles R. Massy Book Prize (worth $1000)
To the best student in Level 3 Electrical & Computer Engineering

Association of Professional Engineers of Trinidad & Tobago Prize ($1000)
To the student producing the best Electrical & Computer Engineering Laboratory Project

Trinidad & Tobago Electricity Commission Prize ($1,000)
To the student producing the highest mark in Industrial and Commercial Electrical Systems

Teleios Prize ($1,000)
To the student producing the highest mark in Communication Systems I

Teleios Prize ($1,000)
To the student producing the highest mark in Communication Systems II

Teleios Prize ($1,000)
To the student producing the highest average mark in Data Communication Systems and Telecommunication Networks

Trinidad & Tobago Electricity Commission Prize ($1,000)
To the student producing the best Level 3 Special Project in Energy Systems

Ixanos Limited ($2,000)
To the student with the most innovative Level 3 Special Project
Fluor Prize ($2,500)
To the student producing the highest mark in Control Systems

Telecommunication Services of Trinidad and Tobago Prize ($6,000)
To the best student in the Communication Systems Option

Honeywell Prize ($6,000)
To the best student in the Computer Systems Engineering Option

Illuminat Trinidad & Tobago Ltd. Prize ($6,000)
To the best student in the Electronic Systems Option

Trinidad and Tobago Electricity Commission Prize ($6,000)
To the best student in the Energy Systems Option including Industrial and Commercial Electrical Systems

Fluor Prize ($6,000)
To the best student in the Control Systems Option

## 2.4 GEOMATICS ENGINEERING AND LAND MANAGEMENT

Samuel Opadeyi Prize ($1,000)
To the best student in Level 1 Geomatics

Samuel Opadeyi Prize ($1,200)
To the best student in Level 2 Geomatics

Samuel Opadeyi Prize ($1,300)
To the best student in Level 3 Geomatics

Faculty Prize ($1000)
To the best student in Level 1 BSc Land Management (Valuation) Programme

Faculty Prize ($1000)
To the best student in Level 2 BSc Land Management (Valuation) Programme

Faculty Prize ($1000)
To the best student in Level 3 BSc Land Management (Valuation) Programme

Institute of Surveyors of Trinidad & Tobago Prize ($1000)
To the Level 1 student producing the best Project in Geomatics

Institute of Surveyors of Trinidad & Tobago Prize ($1500)
To the Level 2 student producing the best Project in Geomatics

Institute of Surveyors of Trinidad & Tobago Prize ($2500)
To the Level 3 student producing the best Special Investigative Project in Geomatics

Institute of Surveyors of Trinidad & Tobago Prize ($1000)
To the Level 1 student producing the best Project in Land Management (Valuation)

Institute of Surveyors of Trinidad and Tobago Prize ($1500)
To the Level 2 student producing the best Project in Land Management (Valuation)

Institute of Surveyors of Trinidad and Tobago Prize ($2500)
To the level 3 student producing the best project in Land Management (Valuation)

L&S Surveying Services Limited Prize ($1000)
To the most outstanding Level 2 student that entered the degree programme through the non-traditional route (i.e. technical institutions/work experience)

L&S Surveying Services Limited Prize ($2000)
To the graduating student averaging the highest in the combination of professional application courses (Cadastral Studies, Engineering Surveying, Hydrography and Professional Practice)

Royal Institution of chartered Surveyors (RICS) Prize (£40) Book Voucher
To an outstanding student nominated by UWI for its accredited degree in Geomatics

Peter Goodridge Prize ($1000)
For the best Level 2 student in Hydrographic Surveying

Peter Goodridge Prize ($1000)
For the best Level 3 student in Hydrography

## 2.5 MECHANICAL & MANUFACTURING ENGINEERING

Alvin Daniell Prize ($1000)
To the best student in Level 1 Mechanical Engineering

Schlumberger Prize (US$500)
To the best student in Level 2 Mechanical Engineering

Damus Ltd. Prize ($1,000)
To the best student in Level 3 Mechanical Engineering

Association of Professional Engineers of Trinidad & Tobago Prize ($1,000)
To the student producing the best Mechanical Engineering Special Project

Damus Ltd. Prize ($1000)
To the best student in Level 3 Industrial Engineering

ASME Prize ($1000)
To the best student who has completed Level 3 in Biosystems Engineering Minor

ASME Prize (1000)
To the best student in Level 2 Industrial Engineering

Powergen Prize ($2000)
To the student obtaining the highest mark in the course Power Plant Engineering Course

Powergen Prize ($2000)
To the student obtaining the highest mark in the course Energy Engineering

Alvin Daniell Prize ($1000)
To the best student in Level 1 Industrial Engineering

**2.6 SPECIAL PRIZES**

Fujitsu Transaction Solutions (Trinidad) Prize ($2,500)
To the most outstanding Level 1 student

Yorke Structures Prize ($1,000)
To the most outstanding Level 2 student

Charles R. Massy Prize ($1,000)
To the most outstanding Level 3 student

EOG Resources (Trinidad) Ltd. Prize ($2,500) To the most outstanding Level 2 student

EOG Resources (Trinidad) Ltd. Prize ($2,500)
To the Level 1 student obtaining the highest mark in the course Civil Engineer in Society or Communication and Ethics

Ministry of Energy Prize ($5,100)
To the most outstanding Level 3 student

British Gas Trinidad & Tobago Ltd. Prize ($5,000)
To the graduating student with the best weighted average

Engineering Students Society (ESS) Prize ($1000)
To the student who must have made a significant contribution to the ESS

PCS Nitrogen Trinidad Ltd. Prize ($5,000)
To the best student in Level 2 who is a National of Trinidad & Tobago

NP Prize ($2,500)
To the student producing the best Level 3 Special Project in the area of Environmental Engineering

The Barbados Association of Professional Engineers (BAPE) Prize ($1,000)
For the student in Level 1 who is a National of Barbados obtaining the highest mark in Engineering Mathematics I

The Barbados Association of Professional Engineers (BAPE) Prize ($1,000)
For the student in Level 2 who is a National of Barbados obtaining the highest mark in Engineering Mathematics II

RiteResumes Prize ($1,000)
To the student in Level 1 obtaining the highest mark in Engineering Mathematics I who is not a national of Barbados

RiteResumes Prize ($1,000)
To the student in Level 2 obtaining the highest mark in Engineering Mathematics II who is not a national of Barbados

# 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 the Faculty and the University Regulations, the University Regulations shall apply.

The Faculty of Engineering offers ten (10) of Bachelor of Science, Engineering (BSc (Eng.)) Degree Programmes as follows:

In the Department of Chemical Engineering
1. Chemical & Process Engineering
2. Petroleum Geoscience

In the Department of Civil and Environmental Engineering
3. Civil Engineering
4. Civil with Environmental Engineering

In the Department of Electrical and Computer Engineering
5. Electrical and Computer Engineering

In the Department of Geomatics Engineering and Land Management
6. Geomatics
7. Land Management (Valuation)

In the Department of Mechanical and Manufacturing Engineering
8. Industrial Engineering
9. Mechanical Engineering
10. Mechanical Engineering with a Minor in Biosystems

These programmes comprise a suite of courses governed by regulations described below. The satisfactory completion of these programmes, as determined by the prescribed regulations, make a candidate eligible for the award of a BSc degree. Degrees may be awarded in each programme with First Class Honours, Second Class Honours (Upper or Lower Division), Third Class Honours or Pass.

## *3.0 QUALIFICATIONS FOR ADMISSION TO THE FACULTY OF ENGINEERING*

3.1 Applications for entry into programmes offered by the Faculty of Engineering will only be considered if applicants have met the following criteria:

(a) Satisfied the University's Matriculation Requirements for entry to a Degree Programme

(b) Amassed qualification points as specified in Regulations 3.1.1 to 3.1.7. Qualification points are obtained by summing individual qualification scores as listed in Table 3.1.

Preference will be given to applicants with passes in Applied Mathematics at CAPE 2

The entry requirements for the Faculty of Engineering are listed below by programme of study. Qualification codes referenced are defined as follows:

| | |
|---|---|
| 'A' Level: | Advanced Level Examinations GCE (Cambridge or London) |
| 'O' Level: | Ordinary Level Examinations GCE (Cambridge or London) |
| CXC: | Caribbean Examinations Council |
| CAPE: | Caribbean Advanced Proficiency Examination |
| GCE | General Certificate of Education (Cambridge or London) |
| N1: | Preliminary Subjects at the Faculty of Science and Agriculture, UWI |
| N2: | Introductory Subjects at the Faculty of Science and Agriculture, UWI |
| BCC: | Barbados Community College |
| CAST: | College of Arts, Science & Technology |
| COSTAATT: | College of Science, Technology and Applied Arts of Trinidad and Tobago |
| EEET: | Electrical & Electronics Engineering Technician |
| MET: | Mechanical Engineering Technician |
| NEC: | National Examinations Council |
| TTIT: | Trinidad & Tobago Institute of Technology |
| UTech: | University of Technology, Jamaica |
| UTT: | University of Trinidad and Tobago |

**3.1.1 CHEMICAL & PROCESS ENGINEERING**

(a) A minimum total of 14 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics, Physics and Chemistry at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2, or

(b) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3.1 above.

**3.1.2 CIVIL ENGINEERING AND CIVIL WITH ENVIRONMENTAL ENGINEERING**

(a) A pass in Chemistry at GCE 'O' Level or CXC or equivalent, and

(b) A minimum total of 8 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics and Physics at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2, or

(c) Any of the following Diplomas, based on merit using the scores calculated in Table 3.1:
NEC Construction Engineering Technician (Trinidad & Tobago)
BCC Ordinary Technician Diploma, or
CAST or UTech Technician Diploma, Jamaica,

**OR**

(d) Any other equivalent qualification and experience as determined by the Department.

**3.1.3 ELECTRICAL & COMPUTER ENGINEERING**

(a) A pass in Chemistry at GCE 'O' Level or CXC or equivalent, and

(b) A minimum total of 8 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics and Physics at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2, or

(c) Any of the following Diplomas, based on merit using the scores calculated in Table 3.1:
NEC (CET, EEET, MET) Diplomas with a B+ grade (65%) in final year Mathematics,
TTIT/UTT Mechanical or Electrical Technician Diploma with a B+ grade in final year Mathematics,
COSTAATT Associate Degree with A grade in final year Mathematics
CAST or UTech Diplomas in Mechanical or Electrical Technology with a B+ grade in final year Mathematics,
BCC Ordinary Technician Diploma in Mechanical or Electrical Technology with a B+ grade in final year Mathematics,

**OR**

(d) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3.1 above.

**3.1.4 LAND MANAGEMENT**

(a) A minimum total of 6 qualification points as calculated from Table 3.1 based on passes at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2, in any two of the following: Pure Mathematics, Physics, Geography, Accounting, Economics and Management of Business, or

(b) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3,1 above.

**3.1.5 INDUSTRIAL, MECHANICAL AND MECHANICAL ENGINEERING WITH A MINOR IN BIOSYSTEMS**

(a) A pass in Chemistry at GCE 'O' Level or CXC, and

(b) A minimum total of 8 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics and Physics at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2. Note that preference will be given to passes in Applied Mathematics. Technical Drawing will also be an asset.

(c) Any of the following Diplomas, based on merit using the scores calculated in Table 3.1:
NEC Mechanical Engineering Technician Diploma,
COSTAATT Associate Degree,
TTIT/UTT Technician Diploma,
BCC Ordinary Mechanical Technician Diploma,

**OR**

**Table 3.1: Qualification Scores for Approved Certificates & Diplomas**

| Qualification by performance in approved individual examinations (e.g. CXC, GCE, UWI) | | | | Qualification by performance in approved programmes (e.g Diplomas, Associate Degrees etc)*2 | | | Qualification Score |
|---|---|---|---|---|---|---|---|
| 'A' Level | CAPE[1] (½ΣUnit scores) | N1*1 | N2*1 | NEC, (CET, EEET, MET) | TTIT/UTT, CAST/UTech Pre-Engineering Programme | BCC, COSTAATT | |
| A | I | A | A | A+ | > 3.8 | | 5 |
| | | | | A | | > 3.8 | 4.5 |
| B | II | B | B | A- | 3.8 | 3.5 | 4 |
| | | | | B+ | 3.5 | 3 | 3.5 |
| C | III | C | C | B | 3.4 | 3 | 3 |
| | | | | B- | 3.0 | 2.5 | 2.5 |
| D | IV | D | D | C+ | 2.9 | 2.5 | 2 |
| | | | | C | 2.5 | 2 | 1.5 |
| E | V | | | C- | 2.4 | 2 | 1 |
| | | | | D | 2.0 | 1.5 | ½ |

*1. For CAPE , N1 and N2 subjects, the final score for assessment of suitability for entry into Programmes is derived by adding the scores for each Unit of examination and dividing by 2. For other qualifications in this category the qualification points are obtained by adding qualifying scores for each subject.

*2. Qualifying points used for determination of suitability for entry for qualifications with a single letter grade are obtained by doubling the individual equivalent scores. Applicants with qualifications that are not listed will be assessed on a case by case basis.

(d) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3.1 above.

**3.1.6 PETROLEUM GEOSCIENCE**

(a) A minimum total of 14 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics, Physics and one other science subject, or Geography at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2.

(b) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3.1 above.

**3.1.7 GEOMATICS**

(a) A minimum total of 6 qualification points as calculated from Table 3.1 based on passes in Pure Mathematics and one other science related subject, at any combination of 'A' Level or CAPE (averaged over CAPE I and II) or N1 or N2, or

(b) Any other qualification that is considered by the Department, in addition to those listed in Regulation 3.1 above.

## *PROGRAMMES OF STUDY*

3.2. All students must:

(a) Not normally carry a load of more than 18 credits per semester.

(b) Pursue the approved Programme curriculum and obtain, within a maximum of 14 semesters, the credits as prescribed in the Programme's Schedule except as otherwise provided in Regulations 3.5 and 3.20. Students who CANNOT complete their programmes of study within 14 semesters of registration without exceeding the limit prescribed in Regulation 3.2(a) would be declared as having failed the programme.

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

(d) In any semester, pursue courses worth not less than nine (9) credits except where prerequisites, the timetable and/or the number of courses required for completion of the Degree programme dictate otherwise.

(e) 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.

(f) Not take more than the normal number of credits as stipulated in the Schedule of Courses (Section 4) for the registered Programme in a particular semester unless a single course is being trailed and a minimum GPA of at least 2.0 has been achieved in the Year preceding that semester. In this case, the student shall seek approval from the Department concerned for registering for a higher load.

(g) Complete the Programme as prescribed in the Schedule of Courses in not less than three (3) academic years except as otherwise provided in Regulation 3.2(b).

(h) 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(i).

(i) Request permission to register for "Examinations Only", i.e. to not attend classes but to write course examinations, in 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.

## *EXEMPTION & 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 Department.

### *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(b) 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 Departments on the matter.

(b) A minimum of 40% must be made in order to pass a course. As of Academic Year 2014/2015 the pass mark will be increased from 40% to 50%.

(c) A candidate may also be orally examined.

(d) Students who have not attended a minimum of 75% of classes would 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 write an examination once they have already passed the examination.

3.7. 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

### *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 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 Department 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.

(c) A PASS is required in all non-assessable coursework components before a student can be credited with a PASS in a course.

**PROJECTS**

3.11. Some Departments require that students pass their Research Projects at the first attempt in order to qualify for honours. Students are required to consult their respective Departments to determine whether this regulation applies to them.

## *SCHEDULE OF COURSES*

**COURSE LISTING**

3.12. The BSc Programmes in the Faculty are ordered into three (3) Levels, with each level typically corresponding to a year of study as prescribed in the Departmental Course Listing Sections. 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 Section 4.

## *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.

## AEGROTAT DEGREES

3.15. A student who has obtained at least three-quarters of the credits required for a Bachelor's Degree but 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 on complying with the Regulations for such Degrees.

## CLASSIFICATION OF DEGREE

3.19. (a) BSc degrees in the Faculty of Engineering are 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

Third Class Honours degrees will no longer be offered as of Academic Year 2014/2015

(b) 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), Third Class Honours 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 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.

(c) Students who have been granted permission to register for "Examinations Only", i.e. to write examinations without attending classes in up to two (2) courses, or who require up to seven (7) credits in one (1) semester to graduate shall have this period counted as one-half (½) of a semester.

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

i. **Credits**
Normally, 1 credit shall represent 1 hour per week per semester in face to face lectures, OR one 3-hour lab per week per semester. 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 [see Regulation 3.21(d)] and courses with designations as given in the Appendix to Regulations (page 87 ).

iv. **Weighted Grade Point Average**
The Weighted Grade Point Average is the 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 as set out in Regulation 3.20(b)(iii) above. Failed courses are also included in the determination of the GPA (see Faculty Webpage for online GPA calculator). Prior to any attempt at the final year project, the Weighted GPA is given by

$$W_{gpa} = \frac{\sum_1 Q_i C_i + 3\sum_2 Q_i C_i + 6\sum_3 Q_i C_i}{\sum_1 C_i + 3\sum_2 C_i + 6\sum_3 C_i}$$

where $W_{gpa}$ is the weighted GPA, $\sum_j Q_i C_i$ 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

$$W_{gpa} = 0.8\left(\frac{\sum_1 Q_i C_i + 3\sum_2 Q_i C_i + 6\sum_3 Q_i C_i}{\sum_1 C_i + 3\sum_2 C_i + 6\sum_3 C_i}\right) + 0.2Q_{project}$$

where $Q_{project}$ is the sum of the quality points earned in all attempts at the final year project.

(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.

| Degree Category | Final Weighted GPA |
|---|---|
| First Class Honours | ≥ 3.60 |
| Upper Second Class Honours | 3.00 – 3.59 |
| Lower Second Class Honours | 2.00 – 2.99 |
| Third Class Honours | 1.50 – 1.99 |
| Pass | 1.00 – 1.49 |

Students with final weighted averages below 1.00 will be recorded as having failed the programme.
**NOTE: As of Academic Year 2014/2015, a new GPA system will be in effect in which Third Class Honours Degrees will no longer be offered. The new system will also feature a pass mark of 50% (2.00 quality points) and revised Degree Categories in which a PASS will correspond to a 2.00 GPA. This will apply to all students.**

3.25. (a) In the determination of GPA, the defined grades and the matching range of marks with the corresponding quality points shall be:

| Grade | Quality Points | % Range |
|---|---|---|
| A+ | 4.30 | 80-100 |
| A | 4.00 | 70-79 |
| A- | 3.70 | 67-69 |
| B+ | 3.30 | 63-66 |
| B | 3.00 | 60-62 |
| B- | 2.70 | 57-59 |
| C+ | 2.30 | 53-56 |
| C | 2.00 | 50-52 |
| C- | 1.70 | 47-49 |
| D+ | 1.30 | 43-46 |
| D | 1.00 | 40-42 |
| F | 0.00 | <40 |

(b) Additional designations that are used on the student transcript are shown in the Appendix to the Regulations. These designations do not directly factor into the GPA calculation.

**NOTE**: As of academic year 2014/2015 the pass mark will be 50% and the determination of GPA, the defined grades and the matching range of marks with the corresponding quality points shall be:

| GRADE | QUALITY POINT | % RANGE |
|---|---|---|
| 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 |
| E | 1.30 | 35-49 |
| F | 0.00 | 0-34 |

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

(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 as described in SECTION 4.

(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) A student whose GPA for given semester is less than 1.00 shall be deemed to be performing unsatisfactorily and shall be placed on Warning.

(b) Except for students who require seven (7) credits or less to graduate, a student on Warning whose semester GPA for the succeeding semester is less than 1.00 will be required to withdraw.

(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/Department 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 because of failure to progress due to poor performance 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 his application by the Faculty.

(c) If a student has been readmitted as per Regulation 3.30(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 Regulation 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 AUDIT

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.

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

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

(c) 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 in the Appendix.

(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.

Additional designations are as indicated as an Appendix to the Regulations at the back of the booklet.

## 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, and as directed by the Department in which the student is registered.

(b) In consideration of Occupational Health and Safety issues in the laboratories, Departments would advise students on the appropriate attire to be worn in laboratories and other locations where practical work is conducted. PRESCRIBED LABORATORY ATTIRE WOULD 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.

(d) 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.

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

# SECTION 4 - UNDERGRADUATE SCHEDULE OF COURSES

**NOTE**: The letter 'E' or 'C' preceding the credit allocation indicates Examination by written papers or by coursework, respectively.

## 4.1 DEPARTMENT OF CHEMICAL ENGINEERING

### 4.1.1 BSc in Chemical & Process Engineering

Accredited by the Institution of Chemical Engineers (IChemE) of the UK to the BEng Level, en route to CEng.

Students are required to complete 95 credits for the award of the BSc in Chemical and Process Engineering.

#### *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1** **16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 1000 | Introduction to Chemical & Process Engineering | E3 |
| CHNG 1001 | Applied Chemistry I | E2 |
| CHNG 1003 | Science of Materials | E3 |
| CHNG 1008 | Communication/ Ethics | C2 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| ENGR 1180 | Engineering Mathematics I | E3 |

**LEVEL 1**
**SEMESTER 2** **17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 1002 | Applied Chemistry II | E3 |
| CHNG 1004 | Chemical Process Principles I | E3 |
| CHNG 1006 | Transport Phenomena I | E3 |
| CHNG 1007 | Chemical Engineering Laboratory I | C2 |
| ECNG 1007 | Electrical Engineering Technology | E3 |
| MENG 1001 | Engineering Thermodynamics I | E3 |

**LEVEL 2**
**SEMESTER** **17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 2000 | Transport Phenomena II (Prerequisite: CHNG 1006) | E3 |
| CHNG 2001 | Process Design & Economics I | E3 |
| CHNG 2002 | Chemical Process Principles II | E3 |
| CHNG 2004 | Separation Processes I | E3 |
| CHNG 2009 | Chemical Engineering Laboratory II | C2 |
| MATH 2230 | Engineering Mathematics II (Prerequisite: ENGR 1180) | E3 |

**LEVEL 2**
**SEMESTER 2** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 2003 | Computer-aided Engineering | C3 |
| CHNG 2006 | Process Dynamics & Control (Prerequisite: ENGR 1180) | E3 |
| CHNG 2007 | Particle Technology | E3 |
| CHNG 2008 | Chemical Engineering Practice | C2 |
| CHNG 2010 | Chemical Engineering Laboratory III | C2 |
| MATH 2240 | Statistics | E2 |

**LEVEL 3**
**YEAR-LONG** **6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG3012 | Chemical Engineering Design Project | C6 |

**LEVEL 3**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 3001 | Transport Phenomena III (Prerequisite: CHNG 1006) | E3 |
| CHNG 3004 | Chemical Reaction Engineering I | E3 |
| CHNG 3006 | Process Design & Economics II (Prerequisite: CHNG 2001) | E3 |
| CHNG 3007 | Separation Processes II (Prerequisite: CHNG 2004) | E3 |
| MENG 3000 | Engineering Management I | E3 |

**LEVEL 3**
**SEMESTER 2** **9 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 3002 | Biochemical Engineering | E3 |
| CHNG 3013 | Chemical Engineering Research Project | C3 |
| CHNG 3014 | Safety & Loss Prevention in Process Industries | E3 |

# 4.1.2 BSc in Petroleum Geoscience

Accredited by the Geological Society of London en route to CGeol.

Students are required to complete 100 credits for the award of the BSc in Petroleum Geoscience.

## *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1 — 17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CHNG 1001 | Applied Chemistry I | E2 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| ENGR 1180 | Engineering Mathematics I | E3 |
| PGSC 1000 | Introduction to Geology & Geological History | E3 |
| PGSC 1002 | Paleontology & Stratigraphy | E3 |
| PGSC 1003 | Engineering Graphics & Geodetics for Petroleum Geoscience | C3 |

**LEVEL 1**
**SEMESTER 2 — 16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 1001 | Mechanics of Fluids I | E3 |
| PGSC 1006 | Applied Chemistry II | E2 |
| MATH 2240 | Statistics | E2 |
| PGSC 1001 | Introduction to Earth Sciences, Processes & Caribbean Geology | E3 |
| PGSC 1004 | Field & Mapping Principles | C3 |
| PGSC 1005 | Geophysics Fundamentals | E3 |

Internship: 8 weeks with industry (optional)

**LEVEL 2**
**YEAR-LONG — 6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| PGSC2014 | Fundamental Petroleum Geology Petroleum Geophysics | E6 |

**LEVEL 2**
**SEMESTER 1 — 13 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MATH 2230 | Engineering Mathematics II | E3 |
| PGSC 2000 | Structural Geology | E3 |
| PGSC 2001 | Sedimentology | E3 |
| PGSC 2010 | Communication Skills | C2 |
| PGSC 2011 | Mineralogy | E2 |

**LEVEL 2**
**SEMESTER 2 — 16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| PGSC 2002 | Petrophysics | E3 |
| PGSC 2004 | Geochemistry of Petroleum | E2 |
| PGSC 2006 | Stratigraphy | E3 |
| PGSC 2008 | HSE for Upstream Petroleum Industry | E3 |
| PGSC 2009 | Field & Geologic Mapping | C3 |
| PGSC 2012 | Igneous & Metamorphic Petrology | E2 |

Two (2) weeks Geophysics workshop and one (1) week Field Geology at beginning of Summer.

Internship: Working for 10-12 weeks with industry.

**LEVEL 3**
**YEAR-LONG — 16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| PGSC 3013 | Advanced Petroleum Geology | E4 |
| PGSC 3014 | Advanced Petroleum Geophysics | E4 |
| PGSC 3015 | Geoscience Seminar | C2 |
| PGSC 3016 | Petroleum Geoscience Project | C6 |

**LEVEL 3**
**SEMESTER 1 — 10 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3000 | Engineering Management | E3 |
| PGSC 3001 | Petroleum Geology of the Southeast Caribbean | E2 |
| PGSC 3003 | Formation Evaluation | E2 |
| PGSC 3004 | Essential Petroleum Engineering | E3 |

**LEVEL 3**
**SEMESTER 2 — 6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| PGSC 3005 | Computational Petroleum Geology & Geophysics | C3 |
| PGSC 3008 | Prospect Assessment, Evaluation & Petroleum Economics | E3 |

N.B. There may be field work on a Saturday and/or on a Sunday

# Course Descriptions

## *DEPARTMENT OF CHEMICAL ENGINEERING*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CHNG 1000**
**COURSE TITLE: INTRODUCTION TO CHEMICAL & PROCESS ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** The structure of the process industries in the Caribbean. Role of the Chemical Engineer. Social and environmental impact of the process industries. Process equipment. Process flowsheets. Instrumentation and control. Introduction to mass and heat balances. Introduction to process economics. Separation processes - simple applications of stage and continuous contacting. Safety and loss prevention.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CHNG 1001**
**COURSE TITLE: APPLIED CHEMISTRY I**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Fundamental properties and behaviour of matter. Spectroscopy: UV, IR, AA and NMR. Applied physical chemistry: solid surface chemistry, surface and colloidal chemistry, solubility, ionic mobilities, physico-chemical methods of analysis. Applied organic chemistry: reaction mechanisms and reaction types.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CHNG 1002**
**COURSE TITLE: APPLIED CHEMISTRY II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Applied organic chemistry: building blocks for organic chemicals - natural gas, methanol, ammonia, ethylene. Characteristics of important organic and inorganic unit processes. Petroleum production, polymer chemistry. Applied Biochemistry: carbohydrates, proteins, enzymes, lipids. Metabolic pathways - chemistry and thermodynamics. Introduction to microbiology, biochemical processes. Introduction to geochemistry.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CHNG 1003**
**COURSE TITLE: SCIENCE OF MATERIALS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to materials science. Crystal structures. Thermal equilibrium diagrams. Iron and steels I. Non-ferrous alloys I. Joining processes. Corrosion. Properties of materials. Shaping of materials. Iron and steels II. Non-ferrous alloys II. Design and selection of materials. Polymers. Ceramics. Composite materials.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CHNG 1004**
**COURSE TITLE: CHEMICAL PROCESS PRINCIPLES I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Applications of material and energy balances to special processes: single phase systems, multiphase systems, combustion, recycle processes. Transient balances. Introduction to flowsheet development. Property estimation techniques. Chemical kinetics. Introduction to reactor design.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CHNG 1005**
**COURSE TITLE: SCIENCE OF MATERIALS A**
**NUMBER OF CREDITS: 1**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to materials science. Crystal structures. Thermal equilibrium diagrams. Iron and steels I. Non-ferrous alloys I. Joining processes. Corrosion.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CHNG 1006**
**COURSE TITLE: TRANSPORT PHENOMENA I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Properties of fluids, statics, pressure distribution, forces on plane and curved surfaces. Kinematics: ideal and real fluids, streamlines, flow in pipes, flow measurements, introduction to dimensional analysis. Steady and unsteady state heat conduction. Convection-film and overall heat transfer coefficient. Application of dimensional analysis to heat transfer. Combined mode heat transfer. Temperature measurement. Introduction to mass transfer by molecular and convective diffusion. Introduction to heat exchangers. Analogy between heat and momentum transfer. Molecular and convective diffusion.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CHNG 1007**
**COURSE TITLE: CHEMICAL ENGINEERING LABORATORY I**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:**
(Coursework)

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CHNG 1008**
**COURSE TITLE: COMMUNICATION/ETHICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Critical and creative thinking, elements of communication, written communication: technical reports, proposals, technical descriptions, technical instructions, oral communication: oral presentations, group dynamics and team building, visual aids, technology and communication: formatting reports, electronic documentation, visual aids, information retrieval and citations, ethics: Plagiarism, decision-making, rules of professional conduct.
(Coursework)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CHNG 2000**
**COURSE TITLE: TRANSPORT PHENOMENA II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: CHNG 1006**
**COURSE DESCRIPTION:** Basic transport mechanisms in fluid flow, heat and mass transfer. Conservation of momentum: application of linear momentum balance, Navier Stokes equation, generalised Bernoulli equation (rotational and irrotational flow), angular momentum balance. Introduction to boundary layer theory. Flow in ducts. Compressible flow. Pumps, compressors, turbines (specification of equipment) Introduction to radiant heat transfer, heat transfer equipment, multitube heat exchangers, evaporators, fluidised beds. Simultaneous heat and mass transfer, water cooling. Interphase mass transfer and 2 film theory.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CHNG 2001**
**COURSE TITLE: PROCESS DESIGN & ECONOMICS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Process synthesis. Development of a project. Selection and economic evaluation of the process. Design methodology and general design considerations, site selection, plant layout. Services. Provision, metering and distribution of steam, electricity, cooling water, inert gases. Capital equipment and utilities cost estimate. Project capital requirements - sources of finance, debt and equity elements, interest, cost of capital. Elements of cash flow: sales, operating cost, depreciation, taxes, scrap value etc. Assessment of economic feasibility. Payback time value of money. Discounted cash flow methods - net present value and DCF Rate of Return. Sensitivity analysis. Use of codes and standards. Pressure vessels: theoretical basis for design, design procedures from standards; selection of equipment and materials of construction.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CHNG 2002**
**COURSE TITLE: CHEMICAL PROCESS PRINCIPLES II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Thermodynamic properties of mixtures: chemical equilibria, physical equilibria. Thermodynamic analysis of processes: availability. Physico-mechanical processes: refrigeration, power generation, cogeneration.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CHNG 2003**
**COURSE TITLE: COMPUTER-AIDED ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to Computer-aided drafting. Numerical methods: Solution of systems of linear and non-linear algebraic equations. Solution of differential equations. Flowsheeting: introduction to methods of steady state simulation. Introduction to available packages. Material and energy balances. Economic analysis: Use of computer packages for plant evaluation. Safety and risk analysis: reliability, risk and safety analysis methods e.g., fault tree, event tree. Failure modes and effect analysis, hazard and operability studies. Introduction to the use of physical property packages.
(Coursework)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CHNG 2004**
**COURSE TITLE: SEPARATION PROCESSES I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Identification, use and characteristics of separation processes. Phase contacting in stage and continuous processes. Analysis of selected processes for the separation of binary mixtures - distillation, absorption, liquid/liquid and solid/liquid extraction. Stage efficiency determination.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CHNG 2006**
**COURSE TITLE: PROCESS DYNAMICS & CONTROL I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ENGR 1180**
**COURSE DESCRIPTION:** Mass and energy conservation for time varying systems. Lumped and distributed parameter models of simple systems. Linear analysis, Laplace transforms, transfer functions. Open loop responses to simple inputs. Bode plots. Computer simulation. Measurement of temperature, flow, Level, pressure, composition, etc. Elements of control systems. Controller algorithms. Concept of feedback. Closed loop responses. Analysis of degrees of freedom. Selection of variables for measurement and control. Performance specifications, dominant mode approximations. Stability criteria. Bode design. Root locus.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CHNG 2007**
**COURSE TITLE: PARTICLE TECHNOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Properties of particles. Interactions between particles and fluids: individual particles, beds of particles. Fluidisation. Processing of particulate materials; storage and transport, size reduction and enlargement, mixing and blending, separation of particles from liquids and gases, separation by size and species.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CHNG 2008**
**COURSE TITLE: CHEMICAL ENGINEERING PRACTICE**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Study of specific process industry. Industrial plant evaluation.
(Coursework)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CHNG 2009**
**COURSE TITLE: CHEMICAL ENGINEERING LABORATORY II**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:**
(Coursework)

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CHNG 2010**
**COURSE TITLE: CHEMICAL ENGINEERING LABORATORY III**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:**
(Coursework)

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CHNG 3001**
**COURSE TITLE: TRANSPORT PHENOMENA III**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: CHNG 2000**
**COURSE DESCRIPTION:** Integral momentum balance. Classification of fluids, steady and unsteady Newtonian and Non-Newtonian flows. (Low Reynolds number flows. Inviscid incompressible flow). Boundary layer theory. Turbulence in stirred vessels. Multiphase flows. Flows with surface tension effects. Numerical methods in fluid dynamics. Radiant heat transfer. Heat transfer in special systems. Free and forced convection heat transfer. Interphase mass transfer theories. Diffusion in solids. Simultaneous heat and mass transfer in systems other than air & water.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CHNG 3002**
**COURSE TITLE: BIOCHEMICAL ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Basic microbiology. Introduction to biochemistry. Enzyme technology. Kinetics of substrate utilisation. Product yield and biomass production in cell cultures. Reactor configuration. Transport phenomena in microbial systems. Design and analysis of biological reactors. Recovery of fermentation products.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CHNG 3004**
**COURSE TITLE: CHEMICAL REACTION ENGINEERING I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Review of kinetic rate expression and thermodynamic principles; complex kinetics homogeneous and heterogeneous catalysis. Theories of reaction rates. Classification and characterisation of reactor configurations. Conservation equations for batch, residence time distribution. Heat and mass transfer in reacting systems. Interpretation of kinetic data in laboratory, pilot and full-scaled plant operations. Commercial reactor systems. Optimisation control and stability, operating characteristics and safety; mechanical design considerations.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CHNG 3006**
**COURSE TITLE: PROCESS DESIGN & ECONOMICS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: CHNG 2001**
**COURSE DESCRIPTION:** Process synthesis: development of conceptual design and best flow sheet; synthesis of separation systems; heat integration and heat exchanger networks. Batch processes: design and scheduling, planning and operation. Process optimisation including the use of linear programming, dynamic programming, search techniques, etc. Process design and economic analysis in the presence of uncertainty.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CHNG 3007**
**COURSE TITLE: SEPARATION PROCESSES II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: CHNG 2004**
**COURSE DESCRIPTION:** Basic considerations in the separation of multi-component mixtures: equilibria. Analysis of multi-component distillation and absorption. Azeotropic and extractive distillation. Analysis of further selected processes for the separation of binary mixtures - drying, crystallisation, ion exchange, membrane processes. Energy requirements for separation processes. Selection of separation processes.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CHNG 3012**
**COURSE TITLE: CHEMICAL ENGINEERING DESIGN PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES:**
**COURSE DESCRIPTION:**
(Coursework)

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CHNG 3013**
**COURSE TITLE: CHEMICAL ENGINEERING RESEARCH PROJECT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:**
(Coursework)

## *PETROLEUM GEOSCIENCE COURSES*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: PGSC 1000**
**COURSE TITLE: INTRODUCTION TO GEOLOGY & GEOLOGICAL HISTORY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to central concepts of geology, history of geological thought. Origin and structure of the earth, geochronology, fossils and geologic time. Rock-forming minerals. The rock cycle. Igneous and metamorphic geology. Sedimentary geology/Stratigraphy. Geologic maps. Field geology trip to view outcrops of rock types of Northern Range, Laventille and Guaracara limestones, and reservoir sandstones.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: PGSC 1001**
**COURSE TITLE: INTRODUCTION TO EARTH SCIENCES, PROCESS & CARIBBEAN GEOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Paleontology and evolution. Plate tectonics. Volcanism/earthquakes. Structural geology. Geologic hazards. Surficial processes, erosion and deposition. Rivers, deltas and coastal processes, ocean floor. Earth resources/ground water. Sedimentary structures and textures. Wind action and desert landscapes. Caribbean geology overview. Overview of the geology of Trinidad.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: PGSC 1002**
**COURSE TITLE: PALEONTOLOGY & BIOSTRATIGRAPHY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Environmental variable and evolution theory. Biostratigraphy of ammonites and bivalves, ecology and history of reef communities, the Cretaceous/tertiary boundary. Introduction to paleoecology. Micropaleontology; details of the more important microfossil groups; plat spores, pollen grains, dinoflagellates, benthis and planktonic foraminifera, calcareous nannofossils, and ostracods; historical development; technology development; Applied Biostratigraphy; global biozonations, sequence stratigraphic applications and the role of biostratigraphy in hydrocarbon exploration.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: PGSC 1003**
**COURSE TITLE: ENGINEERING GRAPHICS & GEODETICS FOR PETROLEUM GEOSCIENCE**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to Engineering Graphics – Use of Instruments, Orthographic Drawing, Auxiliary Projection, Sectional Views, Isometric and Oblique Drawings, Free Hand Sketching. Overview of Geodetics, Coordinated Systems and Charting, Positioning Equipment, Seismic Binning and Position Checks, Well Planning and Collision Avoidance, GPS Practical Session.
(Coursework)

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: PGSC 1004**
**COURSE TITLE: FIELD & MAPPING PRINCIPLES**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Dip and strike, folds and fault nomenclature and symbols. Purpose and fundamentals of surface and subsurface mapping. Preparation and uses of surface maps, structure contour, isopach, paleogeographic and facies maps, cross sections block diagrams and fence diagrams. Outcrop descriptions and measured sections surface maps and aerial photographs. Field trips and lab exercises.
(Coursework)

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: PGSC 1005**
**COURSE TITLE: GEOPHYSICS FUNDAMENTALS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Physics of the earth. Vibration and waves, reflection and refraction, earthquake and earth structure, magnetism of the earth, variation with time of earth's magnetic field, magnetic prospecting, earth's gravity, principles of gravity prospecting, Geoelectrics.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: PGSC 1006**
**COURSE TITLE: APPLIED CHEMISTRY II**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Applied organic chemistry: building blocks for organic chemicals - natural gas, methanol, ammonia, ethylene. Characteristics of important organic and inorganic unit processes. Petroleum production, polymer chemistry. Introduction to geochemistry.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: PGSC 2000**
**COURSE TITLE: STRUCTURAL GEOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Description, classification, and origin of earth structures. Ways in which the continental crust can deform; link scales of structure from the field, outcrops, hand specimen, thin section by integrating analytical techniques with practical examples. Theoretical and meso to microscale analysis of structures developed through a linked series of lectures and practicals; practical 2D strain analysis; 3D strain concepts; incremental strain, kinematics and polyphase deformations; fold construction and classes; fault evolution and section balancing; fault rock microstructures; fault and fold mechanics, current concepts in plate tectonics, cross-section construction techniques, structural interpretation of seismic data, structural styles in different tectonic settings (thrust and fold belts, rifts, strike-slip, gravity tectonics, inversion), structural geology of reservoir units.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: PGSC 2001**
**COURSE TITLE: SEDIMENTOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Origin of sediments and sedimentary rocks; climate, weathering, and weathering products; transport, deposition, and depositional environments for sediments; field and laboratory studies in description and interpretation of genesis of sedimentary rocks; principles of stratigraphy and basin analysis; plate tectonics and the formation of sedimentary basins stratigraphic nomenclature; geologic time and correlation; sequence stratigraphy and basin architecture. Physical processes of sedimentation: basics of flow and sediment transport; bedforms generated in unidirectional, oscillatory and multidirectional flows; soft sediment deformation and erosional sedimentary structures; depositional environments and facies analysis; Depositional environments and facies models for clastic sedimentary systems including, braided and meandering rivers, deltas, coasts and continental shelves, deep marine basins, alluvial fans and lakes. Composition and classification of carbonate rocks.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2002**
**COURSE TITLE: PETROPHYSICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Scope of petroleum petrophysics. Rock properties; porosity and permeability. Core laboratory measurements of rock properties and their application to reservoir studies. Well logging vocabulary; fundamental physics of logging tools; SP, resistivity, density, sonic, nuclear. Well log interpretation, water saturation, shale effects, hydrocarbon in place.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2004**
**COURSE TITLE: GEOCHEMISTRY OF PETROLEUM**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Basic concepts and terminology of petroleum geochemistry; processes related to preservation of organic matter in sedimentary environments; composition and characterisation of kerogen, bitumen, and petroleum; conversion of kerogen to hydrocarbon; principles and interpretation of geochemical data; basic concepts of maturity modelling; integrating measured geochemical data with conceptual geologic models. Aspects of pure and applied inorganic and organic geochemistry; isotope geology.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2006**
**COURSE TITLE: STRATIGRAPHY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Mechanisms of basin formation and structure of basins; tectonic controls on sedimentation; origins and sedimentary and/or geomorphic impact of sea-level changes; sequence stratigraphic principles and concepts. Processes and products of near-surface and burial diagenesis in clastic and carbonate sediments. Principles of sequence stratigraphy, seismic expression of depositional systems; stratigraphic architecture; sequence boundaries and flooding surfaces. Nature and significance of high-resolution depositional sequences and their stacking patterns based on core, outcrop and wireline log data. Sequence stratigraphic interpretation and mapping of seismic data. Applied biostratigraphy; palynomorphs, spores and pollen, dinoflagellates, benthic and planktonic foraminifera, calcareous nannofossils, global biozonations, sequence stratigraphic applications and the role of biostratigraphy in hydrocarbon exploration.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2008**
**COURSE TITLE: HSE FOR THE UPSTREAM PETROLEUM INDUSTRY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** EIA for seismic, drilling and production locations; drilling hazards that affect safety and environment, blow outs, disposal of drilling fluids and drill cuttings; effluent gases and waters in production operations. Use and disposal of CO2 and H2S. Disposal of BS&W. Management of chemicals; oil spills on land and marine; legal framework for HSE in Trinidad, emissions trading, Kyoto protocol. Safety policies and procedures. Hazops.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2009**
**COURSE TITLE: FIELD & GEOLOGIC MAPPING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Field trips to observe, analyse and interpret the geology and geophysics of selected localities in Trinidad & Tobago and adjacent regions; complements classroom experience. Methods of geologic mapping with topographic maps and aerial photographs. Field studies include measuring sections, interpretation of stratigraphy, structure, environments of deposition of various sedimentary rocks. Construction of geologic cross sections; geological expression of structural styles and terrain histories; application of subsurface well and seismic data in the preparation of structural contours and facies maps. Use of remote sensing images to plan exploration strategies; Strengths and limitations of different remote sensing tools; assessment of relief, drainage, solid and drift lithologies, tectonic and sedimentary features from the appropriate images; comparison of data from images with geological map information; synthesis of data in the form of sketch maps and cross-sections; analysis of complex problem maps using structure contours; construct accurate cross-sections in areas of complex structure and stratigraphy.
(Coursework)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: PGSC 2010**
**COURSE TITLE: COMMUNICATION SKILLS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Review of personal and transferable skills and use of this information to compile careers documents, including CVs; word processing and use of spreadsheets. Improve oral presentation skills with practice and training in giving a talk; oral presentation of a selected topic relevant to petroleum geoscience. Library searches; collecting information. Enhance certain transferable skills such as team working and writing skills; improve written communication and scientific skills by undertaking literature reviews of scientific controversies and new developments.
(Coursework)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: PGSC 2011**
**COURSE TITLE: MINERALOGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to minerals, mineral study techniques. Rock classification; physical properties of minerals and rocks; Mineralogy; crystallography, crystal chemistry, mineral chemistry, optical crystallography, physical properties, and geologic occurrence of rock-forming and economic minerals. Weathering. Review of structure of silicate materials, mineral chemistry and solid solutions of major rock-forming minerals, introduction to thermodynamics, real crystals, defects, grain boundaries and diffusion.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: PGSC 2012**
**COURSE TITLE: IGNEOUS & METAMORPHIC PETROLOGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to the origin and evolution of igneous, sedimentary, and metamorphic rocks; classification and petrographic analysis of major rock types; relationships to tectonic settings. Identification in field, hand specimen and under the microscope.
Igneous Petrology: Melting processes in the earth. Phase diagrams for binary and ternary systems, eutectics. Processes in magma chambers and their crystallisation history. Physical properties of magmas. Magmatism in extensional settings and in collision zones.
Metamorphic Petrology: Metamorphic rocks as equilibrium systems; petrogenetic grids, phase diagrams and projections. Progressive metamorphism of major rock types, metamorphic facies. Metamorphic processes and the role of fluids; deformation accompanying metamorphism. Geodynamic settings of metamorphism.
Sedimentary Petrology: weathering, petrologic provinces, introduction to sedimentary facies.

**LEVEL: 2**
**SEMESTER: YEAR-LONG**
**COURSE CODE: PGSC 2014**
**COURSE TITLE: FUNDAMENTAL PETROLEUM GEOLOGY AND PETROLEUM GEOPHYSICS**
**NUMBER OF CREDITS: 6**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Nature, generation, migration and entrapment of petroleum and their relationships to source, reservoir and seal rocks. Introduction to the habitat of petroleum in the Caribbean and South American region, particularly the main controls of oil and gas distribution in the Orinoco basin.
The scope of geophysics in petroleum exploration with emphasis on the acquisition, processing and interpretation of seismic reflection data.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: PGSC 3001**
**COURSE TITLE: PETROLEUM GEOLOGY OF THE SOUTH-EAST CARIBBEAN**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Geological evolution of the Caribbean; Geology of the South-east Caribbean from Suriname to Barbados with emphasis on hydrocarbon basins in the region.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: PGSC 3003**
**COURSE TITLE: FORMATION EVALUATION**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Reservoir Petrophysics. Data acquisition, the geophysical logs and logging tools that measure the electrical, radioactive, acoustic and dielectric properties of the rocks penetrated in boreholes. Qualitative interpretation. Techniques of quantitative log interpretation. Assessment of commercial viability - porosity, water and hydrocarbon saturation, shale volume fraction. Integrated petrophysical interpretation. Field assessment - fence diagrams. Structural and sedimentological interpretation. Integrated facies analysis. Reservoir zonation. Case studies including shaly formations. Applications of dipmeter data, borehole imaging, recent advances. NMR logs. LWD. Horizontal well-logging. Computer methods.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: PGSC 3004**
**COURSE TITLE: ESSENTIAL PETROLEUM ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Overview of petroleum industry; petroleum operations and the total production system. The reservoir, the wellbore, vertical flow, well head, gathering, primary facilities and delivery system. Petroleum engineering vocabulary and units. Reservoir fluids: gases, oils and water. Petroleum reservoir types; hydrocarbon fluid recovery methods and recovery factors. Reserves determination. Principles of primary, secondary and tertiary reservoir performance and recovery. Reservoir mechanics, improved oil recovery. Well-testing. Reservoir modelling and simulation. Reservoir performance monitoring. Gas reservoirs: gas in place and depletion, water influx problems. Gas production performance; gas-processing. Drilling principles and environmental effects. Benefits of horizontal well-drilling. Completions. Production and surface facilities. Production operations.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: PGSC 3005**
**COURSE TITLE: COMPUTATIONAL PETROLEUM GEOLOGY & GEOPHYSICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to a variety of computational tools for solving common quantitative problems in geology and geophysics; statistical description and modelling of data sets; statistical methods – palaeontology and reserves determination, overview and comparison of various techniques applied to modelling of geophysical processes, including mapping and graphics; use of UNIX and modern commercial software (Landmark and Geoquest).
(Coursework)

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: PGSC 3008**
**COURSE TITLE: PROSPECT ASSESSMENT, EVALUATION & PETROLEUM ECONOMICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Introduction to the geography and international politics of oil and gas, exploration/production licensing, taxation and development planning. Hydrocarbon history of Trinidad & Tobago. Differences in oil economy and gas economy. Prospect evaluation, risk analysis and volumetric reserves estimates. Reserve estimation, production profiles, parameterisation of risk factors, net present value, rate of return, profit to investment ratios, tax and royalties. Geostatistics; introduction to the software and techniques of geostatistics and their applications to quantifying risk and uncertainty in petroleum geoscience.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: PGSC 3013**
**COURSE TITLE: ADVANCED PETROLEUM GEOLOGY**
**NUMBER OF CREDITS: 4**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Development geology, including the geological controls on hydrocarbon distribution, recovery and fluid flow. Effects of Plate Tectonics on reservoir formation; structural geology, palaeontology, petrology and stratigraphy of plate margins. Sedimentological characteristics of clastic and carbonate depositional systems in relation to the distribution of reservoir, source and seal facies. Evaluation of the nature and distribution of reservoir quality patterns in clastic and carbonate deposits. Use of physical and geophysical data to define mechanisms responsible for basin formation.

Modern geological techniques of structure, basin evolution, sequence stratigraphy, facies analysis, geochemistry and mapping techniques to predict trap configuration, integrity and timing; reservoir quality; source and hydrocarbon volume generation, timing and migration; and seal integrity. Diagenesis; effects on reservoir properties, compaction, cementation and dissolution in siliciclastic and carbonates. Local case histories.

Subsurface diagnosis of sedimentary environments from cores, ditch cuttings and wireline logs. Reservoir geological modelling, reservoir mapping and reservoir simulation. Prediction of the distribution, geometry and orientation of reservoir bodies. engineering analysis of reservoirs; measuring and monitoring reservoir pressures and reservoir formation evaluation; predicting reservoir history. Determining well locations for infill drilling; principles of primary, secondary, and tertiary reservoir performance and recovery.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: PGSC 3014**
**COURSE TITLE: ADVANCED PETROLEUM GEOPHYSICS**
**NUMBER OF CREDITS: 4**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Seismic sources and receiver arrays from positioning of cables and streamers to recording instruments. 2D, 3D, 3C and 4D field and marine seismic acquisition and processing of seismic data with emphasis on the applications of modern methodology using software packages to include velocity impedance, amplitude and phase effects to geologic parameters of lithology.

Seismic stratigraphy and structural interpretation of seismic data.

Acoustic wave propagation in boreholes and the acquisition and analysis of full waveform acoustic logs and crosswell and VSP data.
Use of modern geophysical techniques including gravity, magnetics and 2D, 3D, and 4D seismic in petroleum exploration and development. Case histories.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: PGSC 3015**
**COURSE TITLE: GEOSCIENCE SEMINAR**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Each student is assigned topics on aspects of petroleum geoscience of a selected geographic region or discussion of a subject of current importance and presents it to tutors and prepares an abstract/executive summary on each topic.
(Coursework)

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: PGSC 3016**
**COURSE TITLE: PETROLEUM GEOSCIENCE PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES:**
**COURSE DESCRIPTION:** The course is an extended practical exercise where well, outcrop, cores, seismic well logs and other geophysical data are interpreted in order to evaluate the exploration or development potential of an area, or an individual study to solve a particular geological/ geophysical problem in a field or area. The course integrates all the petroleum geology, geophysics and engineering of earlier and current coursework and practically prepares the students for the job as a petroleum geoscientist.
(Coursework)

# 4.2 DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Accredited by the Joint Board of Moderators (JBM) of the UK: BEng (Hons) Accredited CEng (Partial)

This degree is accredited as:
1. Fully satisfying the educational base for an Incorporated Engineer (IEng).
2. Partially satisfying the educational base for a Chartered Engineer (CEng).A programme of accredited Further Learning will be required to complete the educational base for CEng.

See **www.jbm.org.uk** for further information and details of Further Learning programmes for CEng.

Accredited IEng degree Accredited IEng (Full)
This degree is accredited as fully satisfying the educational base for an Incorporated Engineer (IEng). See **www.jbm.org.uk** for further information.

## 4.2.1 BSc (Hons) Civil Engineering

### *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1** **16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 1000 | Mechanics of Solids | E3 |
| CVNG 1005 | Science of Materials | E3 |
| ENGR 1000 | Introduction to Engineering | E2 |
| CVNG 1007 | Introduction to Geotechnical Engineering | C2 |
| ENGR 1180 | Engineering Mathematics I | E3 |
| CVNG 1009 | Engineering Graphics | C3 |

**LEVEL 1**
**SEMESTER 2** **17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 1001 | Mechanics of Fluids I | E3 |
| CVNG 1002 | Civil Engineering Design I | C3 |
| CVNG 1010 | Information Technology for Engineers | E2 |
| CVNG 1011 | Geology | E3 |
| CVNG 1012 | Civil Engineering Law | E2 |
| CVNG 1008 | Building Services Engineering | E4 |

**LEVEL 2 - SEMESTER 1 & 2**
**YEAR-LONG** **7 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 2003 | Civil Engineering Design II (Prerequisite: CVNG 1002) | C3 |
| CVNG 2006 | Structural Design 1 (Prerequisite: CVNG1000) | C4 |

**LEVEL 2**
**SEMESTER 1** **CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 2005 | Mechanics of Fluids II (Prerequisite: CVNG 1001) | E3 |
| CVNG 2001 | Structural Mechanics (Prerequisite: CVNG 1000) | E3 |
| CVNG 2008 | Soil Mechanics I (Prerequisite: CVNG 1007) | E2 |
| MATH 2230 | Engineering Mathematics II (Prerequisite: ENGR 1180) | E3 |
| GEOM 2015 | Geomatics for Civil & Environmental Engineers | E2 |

**LEVEL 2**
**SEMESTER 2** **(16 CREDITS INCL. YEAR-LONG)**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 2010 | Civil Engineering Management | E3 |
| CVNG 2011 | Engineering Hydrology (Prerequisite: CVNG2005) | E3 |
| CVNG 2009 | Soil Mechanics II (Prerequisite: CVNG 2008) | E2 |
| MATH 2240 | Statistics | E2 |
| GEOM 2017 | Geoinformatics for Civil & Environmental Engineers | E2 |

**LEVEL 3**
**YEAR-LONG (SEMESTER 1 & 2)**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3014 | Civil Engineering Design Project (Prerequisites: Normally all Level 1 and Level 2 Courses) | C6 |
| CVNG 3015 | Special Investigative Project (Prerequisites: Normally all Level 1 and Level 2 Courses) | C6 |

**LEVEL 3**
**SEMESTER 1** **(18 CREDITS INCL. YEAR-LONG)**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3002 | Structural Analysis (Prerequisites: CVNG 2001, CVNG 2006) | E3 |
| CVNG 3005 | Foundation Engineering (Prerequisites: CVNG 2008, CVNG 2009) | E3 |
| CVNG 3007 | Environmental Engineering I | E3 |
| CVNG 3009 | Highway Engineering (Prerequisite: MATH 2230, MATH 2240, CVNG 2003, CVNG 2009) | E3 |
| CVNG 3003 | Structural Design II (Prerequisite: CVNG 2001, CVNG 2006) | C2 |

**LEVEL 3**
**SEMESTER 2**
**(14 CREDITS INCL. YEAR-LONG AND OPTIONS)**
Two (2) options, subject to the approval of the Head of Dept:

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3001 | Structural Engineering (Prerequisites: CVNG 2001, CVNG 2006) | E3 |
| CVNG 3004 | Structural Dynamics (Prerequisite: CVNG 3002) | E3 |
| CVNG 3006 | Environmental Geotechnics (Prerequisite: CVNG 3005) | E3 |
| CVNG 3008 | Environmental Engineering II (Prerequisites: CVNG 2005, CVNG 3007) | E3 |
| CVNG 3010 | Transportation Engineering (Prerequisite: CVNG 3009) | E3 |
| CVNG 3011 | Pavement Design & Management (Prerequisite: CVNG 3009) | E3 |
| CVNG 3013 | Coastal Engineering (Prerequisite: CVNG 2005) | E3 |
| ENGR 3001 | Natural Hazards & Disaster Management in the Caribbean | E3 |
| CVNG 3017 | Offshore Geotechnical Engineering (Prerequisites: CVNG 2008; CVNG 2009) | E3 |

## 4.2.2 BSc (Hons) Civil with Environmental Engineering

(Levels 1 and 2 are common with BSc (Hons) Civil Engineering)

### *COURSE LISTING*

**LEVEL 3**
**YEAR-LONG**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3020 | Design Project Environmental (Prerequisites: Normally all Level 1 and Level 2 Courses) | C6 |
| CVNG 3021 | Special Investigative Project Environmental (Prerequisites: Normally all Level 1 and Level 2 Courses) | C6 |

**LEVEL 3**
**SEMESTER 1** **(18 CREDITS INCL. YEAR-LONG)**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3002 | Structural Analysis (Prerequisites: CVNG 2001, CVNG 2006) | E3 |
| CVNG 3005 | Foundation Engineering (Prerequisites: CVNG 2008, CVNG 2009) | E3 |
| CVNG 3007 | Environmental Engineering I | E3 |
| CVNG 3009 | Highway Engineering (Prerequisite: MATH 2230, MATH 2240, CVNG 2003, CVNG 2009) | E3 |
| CVNG 3016 | Design of Environmental Systems (Prerequisites: CVNG 3002, CVNG 3007) | C2 |

**LEVEL 3**
**SEMESTER 2**
**(14 CREDITS INCL. YEAR-LONG AND OPTIONS)**
Two (2) options, subject to the approval of the Head of Department:

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3006 | Environmental Geotechnics (Prerequisite: CVNG 3005) | E3 |
| CVNG 3008 | Environmental Engineering II (Prerequisites: CVNG 2005, CVNG 3007) | E3 |
| CVNG 3013 | Coastal Engineering (Prerequisite: CVNG 2005) | E3 |
| ENGR 3001 | Natural Hazards Management | E3 |
| CVNG 3017 | Offshore Geotechnical Engineering (Prerequisites: CVNG 2008; CVNG 2009) | E3 |

**NOTE: THE LETTER 'E' OR 'C' PRECEDING THE CREDIT ALLOCATION INDICATES EXAMINATION BY WRITTEN PAPERS OR BY COURSEWORK, RESPECTIVELY.**

1. Course loadings in any semester shall not exceed the credits as stated above, unless approved by the University.
2. A minimum of 97 credits is required for graduation.
3. Successful completion of the Seminar programme is a compulsory requirement for the award of the BSc Degree.

# Course Descriptions

## *DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CVNG 1000**
**COURSE TITLE: MECHANICS OF SOLIDS**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CVNG 1001**
**COURSE TITLE: MECHANICS OF FLUIDS I**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CVNG 1002**
**COURSE TITLE: CIVIL ENGINEERING DESIGN I**
**NUMBER OF CREDITS: C3**
**PREREQUISITES: NONE**
**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)

**LEVEL: 1**
**SEMESTER 1**
**COURSE CODE: CVNG 1005**
**COURSE TITLE: SCIENCE OF MATERIALS**
**NUMBER OF CREDITS: NUMBER OF CREDITS: E3**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CVNG 1007**
**COURSE TITLE: INTRODUCTION TO GEOTECHNICAL ENGINEERING**
**NUMBER OF CREDITS: C2**
**PREREQUISITES: NONE**
**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 characterisation 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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CVNG 1008**
**COURSE TITLE: BUILDING SERVICES ENGINEERING**
**NUMBER OF CREDITS: E4**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CVNG 1009**
**COURSE TITLE: ENGINEERING GRAPHICS**
**NUMBER OF CREDITS: C3**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CVNG 1010**
**COURSE TITLE: INFORMATION TECHNOLOGY FOR ENGINEERS**
**NUMBER OF CREDITS: E2**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: CVNG 1011**
**COURSE TITLE: GEOLOGY**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: NONE**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: CVNG 1012**
**COURSE TITLE: CIVIL ENGINEERING LAW**
**NUMBER OF CREDITS: E2**
**PREREQUISITES: NONE**
**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.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CVNG 2001**
**COURSE TITLE: STRUCTURAL MECHANICS**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 1000 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.

**LEVEL: 2**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 2003**
**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)

**LEVEL: 2**
**SEMESTER 1**
**COURSE CODE: CVNG 2005**
**COURSE TITLE: MECHANICS OF FLUIDS II**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 1001 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, sediment transport.

**LEVEL: 2**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 2006**
**COURSE TITLE: STRUCTURAL DESIGN I**
**NUMBER OF CREDITS: C4**
**PREREQUISITES: CVNG 1000 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)

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: CVNG 2008**
**COURSE TITLE: SOIL MECHANICS I**
**NUMBER OF CREDITS: E2**
**PREREQUISITE: CVNG 1007 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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CVNG 2009**
**COURSE TITLE: SOIL MECHANICS II**
**NUMBER OF CREDITS: E2**
**PREREQUISITES: CVNG 2008 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 analyse the stability of slopes. Some aspects of landslide stabilisation and avoidance are also covered.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CVNG 2010**
**COURSE TITLE: CIVIL ENGINEERING MANAGEMENT**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: 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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: CVNG 2011**
**COURSE TITLE: ENGINEERING HYDROLOGY**
**NUMBER OF CREDITS: E3**
**PREREQUISITE: CVNG 2005 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.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3001**
**COURSE TITLE: STRUCTURAL ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 2001 STRUCTURAL MECHANICS; CVNG 2006 STRUCTURAL DESIGN I**
**COURSE DESCRIPTION:** Introduction to matrix stiffness and flexibility methods, plate bending theory, introduction to finite element analysis, seismic loads II, plastic collapse analysis of framed structures, yield line analysis.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3002**
**COURSE TITLE: STRUCTURAL ANALYSIS**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 2001 STRUCTURAL MECHANICS; CVNG 2006 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.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3003**
**COURSE TITLE: STRUCTURAL DESIGN II**
**NUMBER OF CREDITS: C2**
**PREREQUISITE**: **PREREQUISITE: CVNG 2001 STRUCTURAL MECHANICS; CVNG 2006 STRUCTURAL DESIGN I**
**COURSE DESCRIPTION:** Computer modelling, hurricane resistant design, earthquake resistant design of concrete and steel moment frames, pre-stressed concrete.(Coursework)

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3004**
**COURSE TITLE: STRUCTURAL DYNAMICS**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 3002 STRUCTURAL ANALYSIS**
**COURSE DESCRIPTION:** Fourier Series and Integral, SDOF solutions in the time and frequency domains under several types of dynamic loads, numerical integration of the governing equations, MDOF solutions by modal analysis, approximate solutions for natural frequency of MDOF and continuous systems.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3005**
**COURSE TITLE: FOUNDATION ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 2008 SOIL MECHANICS; CVNG 2009 SOIL MECHANICS II**
**COURSE DESCRIPTION:** Site investigations, bearing capacity and settlement, design of spread footings and rafts, pile foundations, sheet pile walls.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3006**
**COURSE TITLE: ENVIRONMENTAL GEOTECHNICS**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 3005 FOUNDATION ENGINEERING**
**COURSE DESCRIPTION:** Geotechnical aspects of environmental control - Expansive soils, identification and classification, design of buildings and pavements. Landslides, geotech investigations, stability analysis, stabilisation techniques. Earthquakes, liquefaction of sands, effect on retaining structures and earthdams. Land-use planning.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3007**
**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 faecal wastes, control of leachates, recycling, environmental impact assessment, soil conservation systems and mitigation of forest destruction.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3008**
**COURSE TITLE: ENVIRONMENTAL ENGINEERING II**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 2005 MECHANICS OF FLUIDS II; CVNG 3007 ENVIRONMENTAL ENGINEERING I**
**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.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3009**
**COURSE TITLE: HIGHWAY ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: MATH 2230, MATH 2240, CVNG 2003, CVNG 2009)**
**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.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3010**
**COURSE TITLE: TRANSPORTATION ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITE: CVNG 3009 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.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3011**
**COURSE TITLE: PAVEMENT DESIGN & MANAGEMENT**
**NUMBER OF CREDITS: E3**
**PREREQUISITE: CVNG 3009 HIGHWAY ENGINEERING**
**COURSE DESCRIPTION:** Roads and highways pavement design, airport runway design, seaports and special pavements, pavement management systems, road rehabilitation and maintenance.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3013**
**COURSE TITLE: COASTAL ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITE: CVNG 2005 MECHANICS 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.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 3014**
**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 judgement 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.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 3015**
**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.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: CVNG 3016**
**COURSE TITLE: DESIGN OF ENVIRONMENTAL SYSTEMS**
**NUMBER OF CREDITS: C2**
**PREREQUISITES: CVNG 2001 STRUCTURAL MECHANICS; CVNG 2006 STRUCTURAL DESIGN 1**
**COURSE DESCRIPTION:** Environmental and hydraulic design of water treatment systems; design of domestic wastewater collection and treatment systems; functional design of advanced wastewater treatment systems: design of industrial water and wastewater treatment systems; structural design of water and wastewater treatment systems and vessels; structural design of conduits, and supports; earthquake, hurricane and hazard-resistant design procedures and typical details for hydraulic structures, conduits and supports.
(Coursework)

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: CVNG 3017**
**COURSE TITLE: OFFSHORE GEOTECHNICAL ENGINEERING**
**NUMBER OF CREDITS: E3**
**PREREQUISITES: CVNG 2008 SOIL MECHANICS I; CVNG 2009 SOIL MECHANICS II**
**COURSE DESCRIPTION:** Introduction to offshore structures, codes of practice, companies, geohazards, risk analysis, health and safety, quality assurance and control, installation; offshore project management, deep water, offshore site investigations, geophysical methods; offshore soils, in-situ testing, geological aspects; development of design stratigraphies, assignment of engineering parameters, shallow gas, soil behaviour under cyclic loading; pile capacity, pile axial and lateral response, tension piles, pile driving, jackups, gravity platforms; seabed bearing structures, seafloor stability, scour, liquefaction, suction caissons, pipelines, cables, trenching, anchor piles, seismic analysis, model testing; awareness of FE, research, de-commissioning.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 3020**
**COURSE TITLE: DESIGN PROJECT ENVIRONMENTAL**
**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 Environmental 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 judgement 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 & Environmental Engineering works and projects in the provision of buildings, lifeline facilities and Environmental 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.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: CVNG 3021**
**COURSE TITLE: SPECIAL INVESTIGATIVE PROJECT ENVIRONMENTAL**
**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.

# 4.3 DEPARTMENTOF ELECTRICAL & COMPUTER ENGINEERING

## 4.3.1 BSc in Electrical & Computer Engineering

Students are required to complete 93 credits for the award of the BSc in Electrical and Computer Engineering

### *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 1000 | Electrical Circuits | E3 |
| ECNG 1010 | Communication Skills for Engineers | C2 |
| ECNG 1011 | Electronics | E3 |
| ECNG 1012 | Engineering Science & Technology | C4 |
| ENGR 1180 | Engineering Mathematics I | E3 |

**LEVEL 1**
**SEMESTER 2** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 1006 | Laboratory & Project Design I | C3 |
| ECNG 1009 | Introduction to Programming | C3 |
| ECNG 1013 | Introduction to Thermodynamics | E2 |
| ECNG 1014 | Digital Electronics | E3 |
| ECNG 1015 | Introduction to Electrical Energy Systems | E3 |
| ECNG 1016 | Mathematics for Electrical Engineers I | E1 |

**LEVEL 2**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 2004 | Laboratory & Project Design II | C3 |
| ECNG 2007 | Computer Systems & Software Design (Prerequisite: ECNG 1009) | C3 |
| ECNG 2011 | Signals & Systems (Prerequisite: ECNG 1016) | E3 |
| ECNG 2012 | Electronics & Instrumentation | E3 |
| ECNG 2013 | Mathematics for Electrical Engineers II (Prerequisite: ENGR 1180) | E3 |

**LEVEL 2**
**SEMESTER 2** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 2000 | Electromechanical Energy Conversion Systems (Prerequisites: ECNG 1000 and ECNG 1015) (For Electrical and Computer Engineering students only) | E3 |
| ECNG 2001 | Communication Systems I (Prerequisites: ECNG 2011 and ECNG 2013) | E3 |
| ECNG 2005 | Laboratory & Project Design III | C3 |
| ECNG 2006 | Introduction to Microprocessors (Prerequisites: ECNG 1009 and ECNG 1014) | E3 |
| ECNG 2009 | Control Systems (Prerequisite: ECNG 2011) | E3 |

**LEVEL 3**
Students doing Level 3 courses must:

1. Register for all courses listed as compulsory.
2. Select at least one (1) of the following options: Communication Systems, Computer Systems Engineering, Control Systems, Electronic Systems, Energy Systems.

This is achieved by registering for electives that are mandatory for these options as listed in the Department's Registration Guide.

### *COMPULSORY COURSES*

**YEAR-LONG** **6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 3020 | Special Project | C6 |

**LEVEL 3**
**SEMESTER 1** **7 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 3021 | Introduction to Engineering Management & Accounting Systems | E3 |

**LEVEL 3**
**SEMESTER 2** **3 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 3022 | Electromagnetic Field Theory (Prerequisite: ECNG 2013) | E3 |

**PLUS** 21 credits to be obtained from:

## *ELECTIVES*

**SEMESTER 1**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 3001 | Communication Systems II (Prerequisite: ECNG 2001) | E3 |
| ECNG 3002 | Data Communication Systems | E3 |
| ECNG 3006 | Microprocessor Systems - Design & Applications (Prerequisite: ECNG 2006) | E3 |
| ECNG 3015 | Industrial & Commercial Electrical Systems (Prerequisite: ECNG 2000) | E3 |
| ECNG 3008 | Power Electronics Circuits (Prerequisite: ECNG 2000) | E3 |
| ECNG 3023 | Introduction to Software Engineering (Prerequisite: ECNG 2007) | E3 |
| ECNG 3031 | Engineering & Technology for Acoustics & Music | E3 |
| ECNG 3032 | Control & Instrumentation I (Prerequisite: ECNG 2009) | E4 |
| ECNG 3033 | Communication Skills for Engineers II (Prerequisite: ECNG 1010) | C3 |
| MATH 3530 | Engineering Mathematics III (Prerequisite: MATH 2230/ ECNG 2013) | E3 |
| MENG 3006 | Production Management Distribution Systems | E3 |

**SEMESTER 2**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 3003 | Telecommunications Networks | E3 |
| ECNG 3004 | Control & Instrumentation II (Prerequisite: ECNG 3032) | E3 |
| ECNG 3010 | Electrical Machines & Drive Systems (Prerequisite: ECNG 2000) | E3 |
| ECNG 3012 | Power Systems Analysis (Prerequisite: ECNG 3015) | E3 |
| ECNG 3013 | Electrical Transmission & Distribution Systems (Prerequisite: ECNG 3015) | E3 |
| ECNG 3016 | Advanced Digital Electronics | E3 |
| ECNG 3019 | Advanced Control Systems Design (Prerequisite: ECNG 2009) | E3 |
| ECNG 3024 | Network Synthesis | E3 |
| ECNG 3025 | Discrete Signal Processing | E3 |
| ECNG 3030 | Electromechanical Energy Conversion (Prerequisite: ECNG 1007) *(Not for Electrical and Computer* Engineering Students) | E3 |
| ECNG 3034 | Embedded System Product Development | C3 |
| IENG 3009 | Industrial Database Systems & Design | E3 |
| MENG 3001 | Engineering Management II | E2 |

**NOTE: THE LETTER 'E' OR 'C' PRECEDING THE CREDIT ALLOCATION INDICATES EXAMINATION BY WRITTEN PAPERS OR BY COURSEWORK, RESPECTIVELY.**

Students are asked to note the following:

i. **A MINIMUM OF 93 CREDITS IS REQUIRED TO GRADUATE FROM THE ELECTRICAL AND COMPUTER ENGINEERING B.SC. PROGRAMME.**
ii. The minimum requirement at Level 3 is 33 credits over the two semesters.
iii. The maximum course load normally allowed by the University is 18 credits per semester.
iv. **REGISTRATION FOR LEVEL 3 COURSES WILL NOT *NORMALLY* BE APPROVED UNTIL CREDITS FOR ALL REQUIRED LEVEL 1 COURSES HAVE BEEN ATTAINED.**
vi. Selection of a particular option does not exclude the possibility of registering for courses in other subject areas.
vi. The Department is only responsible for courses with the 'ECNG' code. Students should therefore, consult respective Departments for further information on other courses listed.
vii. The above lists the full complement of courses which the Department is authorised to teach at the Undergraduate level. Level 3 students should consult the Registration Guide for the list of electives which the Department will actually offer.
viii. The Registration Guide may be obtained from the Department's website at**:** http://sta.uwi.edu/eng/electrical or the Department's office.
xi. As of 2007/2008, students failing ECNG 3020 are not eligible for an Honours Degree.

# Course Descriptions

## *DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ECNG 1000**
**COURSE TITLE: ELECTRICAL CIRCUITS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**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 Thevenin'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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1006**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1007**
**COURSE TITLE: ELECTRICAL ENGINEERING TECHNOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This course targets students in engineering disciplines other than electrical engineering. It seeks to make the student competent in the fundamental theory of electric circuit analysis and to introduce them to the design and operation of electrical equipment such as transformers and motors. At the end of the course, the student should be able to perform analysis using fundamental electrical theorems, model simple electrical systems and calculate kW and kVA requirements of loads, understand the fundamentals of generation and distribution of electrical power, analyse and design simple signal phase and three-phase distribution systems and perform basic performance calculations on the transformer and the induction motor.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1009**
**COURSE TITLE: INTRODUCTION TO PROGRAMMING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**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 compliers and interpreters. Students will be able to describe and analyse data structures, such as those created using arrays, lists, and pointers. This course also involves knowledge of the concepts of loops and iterative techniques, and recursion, in algorithms which include character codes and mathematical operations such as base conversions, 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/C++ and the visual studio environment and would also be introduced to the concept of database systems.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ECNG 1010**
**COURSE TITLE: COMMUNICATION SKILLS FOR ENGINEERS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Course participants will explore a range of communication principles and conventions and their application to a variety of communicative situations as they may arise in the praxis of engineering. These situations include written and oral communication for industry and research and development. ECNG 1010 responds to the needs of industry by providing learning opportunities for students to hone their writing and oral communication skills, specific to the demands of the engineering profession. The course aims to develop two broad sets of communication competencies - technical writing and oral presentation skills.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ECNG 1011**
**COURSE TITLE: ELECTRONICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This course provides an introduction to analog electronics. It begins with the semiconductor diode, the simplest electronic device, and continues with the operational amplifier, a powerful device with which designs are easily executed. The course advances through binary junction transistors and field effect transistors. Simple transistor circuits using these current elements are designed.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ECNG 1012**
**COURSE TITLE: ENGINEERING SCIENCE & TECHNOLOGY**
**NUMBER OF CREDITS: 4**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This is an introductory course in Engineering Science and consists of 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 utilisation 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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1013**
**COURSE TITLE: INTRODUCTION TO THERMODYNAMICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Thermodynamics is the study of energy and its transformation from one form to another. This is a common phenomenon in many engineering systems as well as in everyday life, rendering thermodynamics as the underlying science of most engineering fields. Students will learn the different forms of energy and their qualitative nature as well as the laws governing energy transformation. Students will apply this knowledge to solve problems such as relate to internal combustion engines, steam turbine power plants and refrigeration. They will also explore performance matters.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1014**
**COURSE TITLE: DIGITAL ELECTRONICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The present century is the century of information technology. So what is really the backbone of this technology? The development of this technology was made possible because of tremendous achievements in semiconductor devices. Information (audio, image, and data) are processed by complex digital systems and presented in a suitable way to users. In order to understand how these complex digital systems are designed, we must go back to digital logic, which is the branch of electronics dealing with the transformation and processing of discrete values (0 or 1). It started fifty years ago with Boolean's Algebra, which fostered later the development of combinational and sequential logic. From these concepts semiconductor manufacturers have designed different integrated circuits characterised by the type of technology (Bipolar, MOS, ECL, …) and the level of integration that ranges from SSI (small-scale integration, 10 transistor/cm2) to ULSI (ultra large-scale integration, 1 billion transistors/$cm^2$). This course covers the fundamental concepts of digital logic and their applications.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1015**
**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.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: ECNG 1016**
**COURSE TITLE: MATHEMATICS FOR ELECTRICAL ENGINEERS I**
**NUMBER OF CREDITS: 1**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** ECNG 1016 introduces students to the theory and application of the Laplace Transform. The Laplace transform is an essential mathematical tool of an electrical engineer used for analysing certain systems of differential equations which, because of the nature of their forcing functions, cannot always be resolved by methods previously considered in ENGR 1180. Laplace transforms are used extensively in ECNG 2011 Signals and Systems to model linear systems. Students are therefore required to pass ECNG 1016 before they can attempt ECNG 2011.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: ECNG 2000**
**COURSE TITLE: ELECTROMECHANICAL ENERGY CONVERSION SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ECNG 1000 ELECTRICAL CIRCUITS AND ECNG 1015 INTRODUCTION TO ELECTRICAL ENERGY SYSTEMS**
**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. Great emphasis will be placed on problem solving and students are strongly advised to budget adequate time for this activity, throughout the semester.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: ECNG 2001**
**COURSE TITLE: COMMUNICATION SYSTEMS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ECNG 2011 SIGNALS AND SYSTEMS & ECNG 2013 MATHEMATICS FOR ELECTRICAL ENGINEERS II**
**COURSE DESCRIPTION:** This is the introductory course in Communications in the Department. It establishes the technical foundation for the topic by introducing the fundamentals of communications and exploring the common principles that underpin communications systems. The course provides a detailed treatment of amplitude modulation (AM) techniques (such as conventional AM, double-sideband suppressed carrier AM, and single-sideband AM) as well as that of angle modulation techniques (i.e., frequency modulation and phase modulation) in the presence of additive white Gaussian noise. Once these communication principles are well established, the course illustrates their application to a representative set of analog communication systems.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: ECNG 2004**
**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 ECNG 1014 Digital Electronics and ECNG 2012 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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: ECNG 2005**
**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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: ECNG 2006**
**COURSE TITLE: INTRODUCTION TO MICROPROCESSORS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ECNG 1009 INTRODUCTION TO PROGRAMMING & ECNG 1014 DIGITAL ELECTRONICS**
**COURSE DESCRIPTION:** Microprocessors have been one of the most widely used tools for incorporating flexibility and intelligence into automated devices. Their general-purpose nature, speed and size have made them one of the most common components in Electrical Engineering. It is therefore necessary to develop a good understanding of their operation and how they can be used as building blocks for automated systems and control applications. This course explores the inner workings of a microprocessor from the programmer's perspective, as well as treating with external hardware issues such as interfacing, and selection criteria for microprocessors. Exercises and examples are based on the PIC 16F877 microcontroller. The syllabus follows: Microprocessor architecture (PIC16F877); Microprocessor development and support systems (MPLAB); Binary, integer and floating point arithmetic operations; (PIC16Cxxx) assembly language programming; Interfacing (PIC16F877): I/O ports, Timers, Interrupts, A/D conversion, PWM; System Issues; Serial/Parallel Communication.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: ECNG 2007**
**COURSE TITLE: COMPUTER SYSTEMS & SOFTWARE DESIGN**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 1009 INTRODUCTION TO PROGRAMMING**
**COURSE DESCRIPTION:** This course emphasises both computer systems as well as software design. For the computer systems component, there will be theoretical sessions within the classroom environment. The Software design component of the course would be delivered by short theory based sessions that would be supplemented by practical laboratory sessions and group project. The software design component aims to instill rudimentary skills that are necessary by any software developer. These practical sessions will show how to use the IDE and debugger and give the student practical skills in writing a programme. These skills would be developed around the C/C++ programming languages as they give the student an understanding of algorithmic processes which are a fundamental building block for any programming language.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: ECNG 2009**
**COURSE TITLE: CONTROL SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2011 SIGNALS & SYSTEMS**
**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.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: ECNG 2011**
**COURSE TITLE: SIGNALS & SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 1016 MATHEMATICS FOR ELECTRICAL ENGINEERS I**
**COURSE DESCRIPTION**: ECNG 2011 is concerned with predicting and analysing 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 analysed 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.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: ECNG 2012**
**COURSE TITLE: ELECTRONICS & INSTRUMENTATION**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The course treats with analog electronics at an intermediate level. An increased emphasis is placed in design using discrete and integrated circuits and the concept of feedback is introduced. The main topics considered are feedback amplifiers, power supplies, active filters, oscillators, waveform generators and non-linear systems and A/D-D/A converters and instrumentation systems.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: ECNG 2013**
**COURSE TITLE: MATHEMATICS FOR ELECTRICAL ENGINEERING II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ENGR 1180 ENGINEERING MATHEMATICS I**
**COURSE DESCRIPTION:** ECNG 2013 is the third part of a required three-part sequence of mathematics courses offered to students of the Department of Electrical and Computer Engineering. The other courses, offered in the first year are ENGR 1180 – Engineering Mathematics I and ECNG 1016 – Mathematics for Electrical Engineering I. This course, ECNG 2013, introduces students to the techniques of multivariable/vector calculus and partial differential equations that are required by engineers to model physical situations such as electrostatic field theory and acoustics. The techniques of the Fourier series are also considered as they are necessary tools of an engineer for analyzing certain systems of differential equations which, because of the nature of their forcing functions, cannot always be resolved by methods previously considered in ENGR 1180. Methods from the theory of probability and statistics are introduced as these are required to model phenomena such as noise and other stochastic processes. Students will also be introduced to the fundamentals of discrete mathematics.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3001**
**COURSE TITLE: COMMUNICATION SYSTEMS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2001 COMMUNICATION SYSTEMS I**
**COURSE DESCRIPTION:** Digital communications is the primary means of electronic communications today, enjoying tremendous levels of reach around the world. ECNG 3001 Communications II provides students with the basic theoretical tools required for the modeling, analysis and design of digital communication systems. It begins with a brief review of analog communication systems and an overview of digital communication systems. The course then explores the key principles which underlie the characterisation of information sources and the basic techniques employed in processing analog and digital information signals for transmission. Considerations for the digital transmission of information over various media are explored. Digital signal reception and detection techniques are introduced. The course closes with a concise treatment of the overall design of a basic digital communication system.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3002**
**COURSE TITLE: DATA COMMUNICATION SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** ECNG 3002 explores the organisation and operation of contemporary data networks by presenting fundamental principles and applying these to the architecture of the global Internet. It begins by identifying applications and requirements of data communication and exploring network structure and architecture. It distinguishes between the communication of data between a pair of computers and across a network of computers. Current standards, including the OSI and TCP/IP reference models are investigated. Once layered network architecture is established a top down approach is employed, investigating the functions, implementation and performance of the Application, Transport, Network, Data Link and Physical Layers.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3003**
**COURSE TITLE: TELECOMMUNICATION NETWORKS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** ECNG 3003 is a capstone course in contemporary telecommunications networks and technologies. Assuming prior understanding of fundamental communications including coding, modulation and error analysis, the course starts by dismantling the telecommunications network into its transmission, switching/routing, access and signaling network subsystems. Key technologies used in each sub-network are explored, paying particular attention to those that facilitate the delivery of voice service over circuit switched networks. The course identifies the benefits, requirements, and challenges of transporting various traffic types on a single, converged network. The example of Voice over Internet Protocol (VoIP) is explored in detail and its implementation and performance compared to that of traditional circuit switched voice service.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3004**
**COURSE TITLE: CONTROL & INSTRUMENTATION II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 3032 CONTROL & INSTRUMENTATION I**
**COURSE DESCRIPTION:** This course seeks to equip the student with the knowledge and basic skills required for an engineer in the area of control and instrumentation. Particular emphasis is paid to developing skills necessary to design and implement computer systems for automation and control and, in particular, programmable logic controllers or PLCs. The course is significant because of the importance of automation, control and instrumentation (collectively called instrumentation in the region) to the industrial processes which are the flagships of the Caribbean economies and to the burgeoning group of small manufacturing concerns. The course introduces the student to common process and manufacturing subsystems and control components; it also looks at new trends which include, for example, Distributed Control Systems in manufacturing and process plants.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3006**
**COURSE TITLE: MICROPROCESSOR SYSTEMS - DESIGN & APPLICATIONS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2006 INTRODUCTION TO MICROPROCESSORS**
**COURSE DESCRIPTION:** This elective course builds upon the knowledge acquired in ECNG 2006. Currently, it specifically treats microprocessor systems design and application with respect to real-time operating systems and its principles. It discusses microC/OS RTOS and its functions in detail. The laboratory exercises are based on the examples for microC/OS. Relevant discussion is carried out for interfacing devices like keypads, LCDs, seven-segment displays and ADC/DACs.

The course includes a project requiring students to build and test a microprocessor application based on RTOS. Students will be required to describe scheduling algorithms as well as analyse some issues and the performance of schedules. They will also be required to define and classify the different classifications of real-time systems according to their timing attributes.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3008**
**COURSE TITLE: POWER ELECTRONICS CIRCUITS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2000 ELECTROMECHANICAL ENERGY CONVERSION SYSTEMS**
**COURSE DESCRIPTION:** This course applies solid-state electronics, for the control and conversion of electric power, utilising techniques for switching on and off of power semiconductor devices. It is divided into four sections; ac to dc converters, ac to ac controllers, dc to dc converters and dc to ac converters. Students will perform circuit analysis on the standard topologies for ac to dc converters, ac to ac controllers, dc to dc converters and dc to ac converters, and utilise the results from these analyses to produce the corresponding output voltage and current waveforms based on the supplied input. Analyses would then be performed on these waveforms to determine the performance parameters of these systems.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3010**
**COURSE TITLE: ELECTRICAL MACHINES & DRIVE SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2000 ELECTROMECHANICAL ENERGY CONVERSION SYSTEMS**
**COURSE DESCRIPTION:** A modern electric drive system consists of a motor, an electric converter, and a controller that are integrated to perform a mechanical maneuver for a given load. This course covers the basic theory of control of the DC motor, the induction motor and the synchronous motor. Additionally, the course expands on the analysis and study of the synchronous generators. Power electronic converters are discussed in some detail and their performances and applications with different motors are studied. This course is designed for engineers intending to work in any area of engineering where electrical motors and machinery are operated, maintained or specified. This course is an elective 3-credit course intended for students in the third year of the B. Sc. Degree programme in Electrical and Computer Engineering. The course comprises of 30 one-hour lectures and 6 hours of tutorials. Great emphasis will be placed on problem solving and students are strongly advised to budget adequate time for this activity, throughout the semester.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3012**
**COURSE TITLE: POWER SYSTEMS ANALYSIS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ECNG 3015 INDUSTRIAL & COMMERCIAL ELECTRICAL SYSTEMS**
**COURSE DESCRIPTION:** This course is an elective 3-credit course intended for students in the third year of the B. Sc. Degree programme in Electrical and Computer Engineering. The course provides students with comprehensive material about the operation and analysis of electric power systems. It covers the major topics likely to be encountered by the transmission and distribution power systems engineer. Students will become familiar with the most common practices and technology through the classes, computer exercises and reading material. The course comprises of 30 one-hour lectures, 6 hours of tutorials and 4 computer exercises. Great emphasis will be placed on problem solving and students are strongly advised to budget adequate time for this activity, throughout the semester.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3013**
**COURSE TITLE: ELECTRICAL TRANSMISSION & DISTRIBUTION SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: ECNG 3015 INDUSTRIAL & COMMERCIAL ELECTRICAL SYSTEMS**
**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.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3015**
**COURSE TITLE: INDUSTRIAL & COMMERCIAL ELECTRICAL SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2000 ELECTROMECHANICAL ENERGY CONVERSION SYSTEMS**
**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.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3016**
**COURSE TITLE: ADVANCED DIGITAL ELECTRONICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This course is designed for final year BSc Electrical and Computer Engineering students. Our aim is to present methods and design considerations of digital systems and their implementation on FPGAs. There are many different types of digital ICs, including "jelly-bean logic" (small components containing a few simple, fixed logical functions), memory devices, and microprocessors (uPs). Of particular interest are FPGAs, because their functionality can be customised in the field, they can contain millions of logic gates and can be used to implement extremely large and complex functions that previously could be realised only using ASICs (application-specific integrated circuits). FPGAs are the target ICs Technology for this course. We will analyse some major design issues and applications targeting FPGAs.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3019**
**COURSE TITLE: ADVANCED CONTROL SYSTEMS DESIGN**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2009 CONTROL SYSTEMS**
**COURSE DESCRIPTION:** This course delivers an overview of the control problem and discrete time. It includes treatment of system modelling, state space methods; feedback designs, performance criteria, stability considerations; optimal discrete time control, microprocessor implementation of digital controllers; real time control systems; computers in industrial control; distributed data processing and control.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: ECNG 3020**
**COURSE TITLE: SPECIAL PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The ECNG 3020-Special Project is regarded as the capstone course of the entire BSc Electrical and Computer Engineering Programme. ECNG 3020 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. ECNG 3020 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
- Communication

ECNG 3020 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.

**LEVEL: 3**
**SEMESTER: I**
**COURSE CODE: ECNG 3021**
**COURSE TITLE: INTRODUCTION TO ENGINEERING MANAGEMENT & ACCOUNTING SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This course provides final year Electrical and Computer Engineering students with a background in management and accounting skills to equip them to function in the business world. It will provide 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 Organisational Theory
- Project Management, Production Planning and Control Techniques.
- Introduction to Business Law

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3022**
**COURSE TITLE: ELECTROMAGNETIC FIELD THEORY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2013 MATHEMATICS FOR ELECTRICAL ENGINEERS II**
**COURSE DESCRIPTION:** ECNG3022 encompasses the study of both electric and magnetic phenomena and their applications under both static and dynamic conditions. Maxwell's Equations provides the lenses through which many relevant engineering applications can be analysed. Examples include microwave and optical communications, electrical machines and drives, spectrum management, electromagnetic compatibility and high-speed microelectronics. While the evaluation of electric and magnetic fields is of utmost importance for efficient design of electromagnetic systems, in real applications, complex geometries and system assemblies limit the applicability of analytical solutions. ECNG3022 also introduces the usage of computer-aided techniques which can be utilised for complex-problem analysis of electromagnetic systems.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3023**
**COURSE TITLE: INTRODUCTION TO SOFTWARE ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 2007 COMPUTER SYSTEMS AND SOFTWARE DESIGN**
**COURSE DESCRIPTION:** This course introduces the concepts and techniques associated with the engineering of software systems. These concepts and techniques will be used to design and develop software to meet specified requirements and quality standards within the framework of time and cost. Historically, software applications have been developed as problem based solutions. While this method is sufficient for small, one-of-a-kind projects, it is very difficult to manage when applied to large projects which can have from thousands to millions of lines of code. The study of how software can be developed in an efficient, cost-effective manner has grown tremendously in importance. Software engineering processes improve the productivity of developers and the quality of the products. The IEEE Computer Society defines software engineering as the application of a systematic, disciplined, and quantifiable approach to the development, operation and maintenance of software; that is the application of engineering to software.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3024**
**COURSE TITLE: NETWORK SYNTHESIS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** This course involves the design of active filters. It focuses principally on implementation using op amps and treats with a wide range of filter types such as low pass, high pass multiple feedback and voltage controlled voltage service. Consideration is given to sensitivity issues.

**LEVEL: 3**
**SEMESTER:**
**COURSE CODE: ECNG 3025**
**COURSE TITLE: DISCRETE SIGNAL PROCESSING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** In this course, we will examine the techniques of discrete-time signal processing and digital signal processing, investigate the development of digital FIR and IIR filters, study the Discrete-time Fourier Transform and in particular, a numerical, efficient version called the Fast Fourier Transform (FFT) and use the FFT to carry out spectral analysis of some sample signals. We will also examine some Digital Signal Processors which are specialised microprocessors created for the sole purpose of performing numerical calculations.

**LEVEL: 3**
**SEMESTER:**
**COURSE CODE: ECNG 3029**
**COURSE TITLE: ROBOTIC TECHNOLOGY & APPLICATIONS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This optional final year course targets students who wish to investigate and/or utilise robotic technology in their capstone project. The effective application of robots requires an understanding of, robotic manipulator dynamics, as well as ongoing developments in Robotics research. Students will be exposed to simulated, experimental, and existing robot systems. At the conclusion of the course, students will be able to identify, analyse, recommend, and justify specifications for such systems. Topics discussed include: common robotic terminology and configurations; kinematics and dynamics of 6R manipulators, and differential drive platforms; research paradigms in human interaction, control and programming of robots; robot-related social, economic and technological developments.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3031**
**COURSE TITLE: ENGINEERING & TECHNOLOGY FOR ACOUSTICS & MUSIC**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** This course seeks to explore and present the principles and interrelationships of Acoustics, Music, Sound Technology and Engineering. The course treats with the principles, theories and parameters used to describe the nature and sources of sound and its propagation through space. It also looks at psycho-acoustic effects – how sound is actually perceived by humans. Signals and systems techniques are used to characterise music technology and the acoustic space. The latter addresses room characteristics, sound reinforcement system design and recording techniques to optimise the listening experience.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3032**
**COURSE TITLE: CONTROL & INSTRUMENTATION I**
**NUMBER OF CREDITS: 4**
**PREREQUISITE: ECNG 2009 CONTROL SYSTEMS**
**COURSE DESCRIPTION:** This course attempts to cross that bridge between control systems theory and control systems practice. The department considers it significant because of the importance of automation, control and instrumentation (collectively called instrumentation in the region) to the industrial processes which are the flagships of the Caribbean economies and to the burgeoning group of small manufacturing concerns. The instrumentation area is also of particular importance in supporting regional manufacturers who compete internationally; this competition requires greater focus on quality assurance and control which, in turn requires ever competent expertise in instrumentation technology.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: ECNG 3033**
**COURSE TITLE: COMMUNICATION SKILLS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 1010 COMMUNICATION SKILLS I**
**COURSE DESCRIPTION:** This course focuses on Oral Communication in professional contexts. Course participants will explore a range of oral communication principles and conventions. Most importantly, it will provide a forum for practicing spoken Standard English. The course is practical and students will be evaluated on their ability to appropriately and effectively communicate in a variety of speaking situations as they may arise in the engineering profession.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ECNG 3034**
**COURSE TITLE: EMBEDDED SYSTEMS PRODUCT DEVELOPMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** This course is the capstone course for the Computer Systems Engineering (CSE) option. Students will work in teams, creating and integrating electrical/electronic hardware, low and high-level software, instrument and communication networks, and multiple processes, to transform a conceptualized embedded system into a market-ready product. Product ideas may originate both within and outside of the Department ideally consisting of a preliminary prototype, and associated documentation. The focus of the course is on the systems, procedures, and issues involved when creating a business case for a commercially viable product. At the end of the course, originator and students may exercise the right to commercialize their product, in a manner consistent with UWI policies on ownership and intellectual property.

# 4.4 DEPARTMENT OF GEOMATICS ENGINEERING AND LAND MANAGEMENT

## 4.4.1 BSc Geomatics

Students are required to complete a minimum of 95 credits for the award of the BSc in Geomatics.

**PROGRAMME AIMS AND LEARNING OUTCOMES**
**AIMS**
The BSc Geomatics programme aims at providing a comprehensive and detailed knowledge of the theory and methods of land surveying and the management of land information that prepare and enable graduates to work effectively in response to regional, national and international needs.

**LEARNING OUTCOMES**
The intended learning outcomes are that graduates with a first degree in Geomatics will be able to:

- Explain the principles, theories, tools, and techniques of surveying and land information;
- Appropriately apply specialised knowledge in land surveying and land information management and other transferable skills appropriate to a wide range of disciplines;
- Use the skills required to work independently and as a member of a team;
- Critically examine land surveying and land information management problems and develop solutions within the context of given specifications and standards;
- Confidently develop and effectively communicate professional opinions on topical issues;
- Establish a sound basis for lifelong, self-motivated academic and professional studies.

## *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ENGR 1000 | Introduction to Engineering | E3 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| GEOM 1001 | Mathematics for Geomatics Engineering | E3 |
| GEOM 1010 | Surveying I | E3 |
| GEOM 1011 | Surveying Practice | C3 |

**LEVEL 1**
**SEMESTER 2** **17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 1015 | Surveying II (Prerequisite: GEOM 1010) | E3 |
| GEOM 1020 | Photogrammetry | E3 |
| GEOM 1030 | Geodesy | E3 |
| GEOM 1040 | Statistics for Surveying | E3 |
| GEOM 1045 | Communication Skills | C2 |
| GEOM 1050 | Surveying Project * (Prerequisite: GEOM 1010) | C3 |

* To be offered/treated as a Summer Course

**LEVEL 2**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 2001 | Numerical Methods for Geomatics Engineering (Prerequisite GEOM 1001) | E3 |
| GEOM 2010 | Fundamentals of GIS | E3 |
| GEOM 2020 | Digital Photogrammetry (Prerequisite: GEOM 1020) | E3 |
| GEOM 2030 | Adjustment Computations (Prerequisite: GEOM 1040) | E3 |
| GEOM 2040 | Hydrographic Surveying (Prerequisite: GEOM 1015) | E3 |

**LEVEL 2**
**SEMESTER 2** **18 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 2000 | Health and Safety Seminars | E0 |
| GEOM 2060 | Cartography | E3 |
| GEOM 2025 | Remote Sensing | E3 |
| GEOM 2035 | Geodetic Surveying (Prerequisites: GEOM 1015, GEOM 1030) | E3 |
| GEOM 2045 | Land Law | E3 |
| GEOM 2048 | Introduction to Planning | E3 |
| GEOM 2050 | Mapping Project* (Prerequisites: GEOM 1050, GEOM 2020) | C3 |

**LEVEL 3**
**SEMESTER 1** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 3016 | Applied Project Management | E3 |
| GEOM 3010 | Cadastral Systems (Prerequisite: GEOM 2045) | E3 |
| GEOM 3030 | Global Navigation Satellite Systems (Prerequisite: GEOM 2035) | E3 |
| GEOM 3040 | Integrated Surveying Design Project | C3 |
| | Elective Course | E3 |

**LEVEL 3**
**SEMESTER 2** **15 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 3015 | Professional Practice | E3 |
| GEOM 3025 | Engineering Surveying | E3 |
| GEOM 3050 | Special Investigative Project | C3 |
| | Elective Course | E3 |
| | Elective Course | E3 |

**ELECTIVES**

Candidates in Level 3 are expected to gain 9 credits of elective courses from the list below, or other courses subject to the approval of the Head of Department.

**LEVEL 3**
**SEMESTER 1**

| Course Code | Course Title | Credits |
|---|---|---|
| AGSL 3004 | Integrated Watershed Management | E3 |
| GEOM 3020 | Professional Internship | E3 |
| GEOM 3035 | Hydrography (GEOM 2040) | E3 |
| LMGV 3004 | Valuation Methods I† | E3 |
| MATH 3530 | Mathematics III | E3 |

**LEVEL 3**
**SEMESTER 2**

| Course Code | Course Title | Credits |
|---|---|---|
| ENGR 3001 | Natural Hazards & Disaster Management in the Caribbean | E3 |
| AGSL 3002 | Soil Survey and Land Evaluation | E4 |
| LMGV 3003 | Land Economy | E3 |

**NOTE:** The letter "E" or "C" preceding the credit allocation indicates Examination by written papers or by Coursework, respectively.

# Course Descriptions

## *Department of Geomatics Engineering and Land Management*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: GEOM 1001**
**COURSE TITLE: MATHEMATICS FOR GEOMATICS ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Trigonometric functions of acute angles, applications of right angled triangles, trigonometric functions of any angle, radians and arc length, trigonometric identities (Pythagorean, sum, co-function, double angle, half angle); Inverses of trigonometric functions, solving trigonometric equations, law of sines, law of cosines, polar coordinates and graphs, three dimensional coordinate systems; Vectors, dot product, cross product, equations of lines and planes; Systems of equations in two and three variables, matrices and systems of equations, matrix operations; Inverses of matrices, determinants and Cramer's rule, linear transformations and their matrix representations, examples of linear transformations - reflections, projections and rotations; Conic sections – parabola, ellipse and hyperbola. Cylinders and quadric surfaces, cylindrical and spherical coordinates; Derivatives and rates of change, differentiation formulae, derivatives of trigonometric functions, chain rule; Natural logarithms and exponentials and their derivatives, rates of change ; Related rates, linear approximations, anti-derivatives, the definite integral; Fundamental Theorem of Calculus, indefinite integrals, substitution rule; Functions of several variables, partial derivatives, tangent planes and linear approximations, chain rule for partial derivatives

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: GEOM 1010**
**COURSE TITLE: SURVEYING I**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Introduction to surveying. Theories of measurement errors and plane coordinate systems. Propagation of errors. Principles of basic survey instruments and their adjustment. Measurement of distance, direction, angle, height, position, area, volume, corresponding errors and computations. Establishing horizontal and vertical control. Detail survey methods - planimetry and hypsometry.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: GEOM 1011**
**COURSE TITLE: SURVEYING PRACTICE**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Hands-on field experience in the practical aspects of surveying; measuring, booking, reporting. Conventional distance measurement, height measurement, angular measurement. Tests and adjustment of basic survey instruments. Level circuit including adjustment of results. Traverse circuit including adjustment of results. Distance measurement: optical and electronic. Intersection and resection.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1015**
**COURSE TITLE: SURVEYING II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 1010**
**COURSE DESCRIPTION:** Topographical surveying including organisation and execution of projects, specification and representation of data in different formats. Route surveys including setting out. Vertical and transition curves and slope stakes. Project execution processes for all types of land surveys. Introduction to the theory of adjustments computation. Coordinate systems, 2-D coordinate transformation, GNSS principles, measurement techniques and data reduction.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1020**
**COURSE TITLE: PHOTOGRAMMETRY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Aerial photographs and digital images. Geometry of aerial photograph: scale, relief and tilt displacement. Photo-interpretation. Stereoscopic vision. Parallax measurements. Photogrammetric cameras and camera calibration. Introduction to analytical photogrammetry, collinearity equation, interior and exterior orientation. Photogrammetric instruments. Stereo restitution and compilation.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1030**
**COURSE TITLE: GEODESY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Spherical trigonometry and its application to surveying. Concepts of geodetic astronomy, astronomic azimuths. Field astronomy. Gravity: anomalies, potential, the geoid. Earth rotation: precession, nutation and polar motion. Ellipsoidal geometry and its application to satellite surveying. Satellite mechanics: Keplerian motion, perturbed motion, coordinate and time systems. Coordinate systems and relationships between ECEF inertial and topocentric reference frames.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1040**
**COURSE TITLE: STATISTICS FOR SURVEYING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Basic ideas of probability: Random variables, probability distribution, density functions, marginal and conditional distributions; independence. Moments, expectation, variance, covariance, correlation. Some often used distributions: normal, t, chi-square and F distributions; the multinormal distribution. Sampling and sampling distribution: graphical representation, sample statistics for measures of position and spread. Estimation: consistency, unbiasedness; minimum variance, efficiency and sufficiency, methods of estimation; maximum likelihood, least squares. Confidence intervals. Statistical tests on sample means for s known and unknown, tests concerning variance. Regression: technique of least squares.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1045**
**COURSE TITLE: COMMUNICATION SKILL**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Critical and creative thinking, elements of communication, written communication: technical reports, proposals, technical descriptions, technical instructions, oral communication: oral presentations, group dynamics and team building, visual aids, technology and communication: formatting reports, electronic documentation, visual aids, information retrieval and citations, ethics: Plagiarism, decision-making, rules of professional conduct. (100% Coursework)

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: GEOM 1050**
**COURSE TITLE: SURVEYING PROJECT**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 1010**
**COURSE DESCRIPTION:** Topographic survey of selected site including all planimetric and hypsometric information. Plan preparation. Computer Aided Design (CAD), Production of topographic maps and thematic plans, compilations and reports.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: GEOM 2000**
**COURSE TITLE: HEALTH AND SAFETY SEMINARS**
**NUMBER OF CREDITS: 0**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** General Introduction to the Occupational Safety and Health Act 2004, Accident Reporting and Investigation, Accident Prevention and Control, Responsibilities, Offences and Penalties, Safety Policies, Consultation with Employees. Security on Site, Woodworking Machines, Asbestos, Buried Services, Dust Hazards and the Control of Fumes, Electricity on Site, Working in Confined Spaces, Personal Protection, Fire Prevention and Control in the Office, Fire Prevention and Control on Site, Highly Flammable Liquids and Petroleum-Based Adhesives, Liquefied Petroleum Gases and Vehicle Fuels (including Petrol, Diesel and LPG).

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2001**
**COURSE TITLE: NUMERICAL METHODS FOR GEOMATICS ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: GEOM 2001**
**COURSE DESCRIPTION:** Numerical methods and use of the computer in numerical work; Solution of equations in one variable; Polynomials and interpolation using Lagrange and differencing methods; Curve fitting using cubic splines.; Fourier methods in frequency response of time series analysis.; Discrete and fast Fourier transforms.; Numerical differentiation and integration.; Solution of ordinary differential equations using Euler and Rung-Kutta for initial value problems. Extend to consider second order ODE's and coupled first order.; Solution of systems of linear equations through elimination and iterative methods; LU factorisation and Cholesky applied to least squares adjustment.; LU factorisation applied to matrix inversion and assessment of system condition.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2060**
**COURSE TITLE: CARTOGRAPHY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Introduction to Cartography. Cartographic communication. Digital data sources. Representation of spatial data. Symbol design. Name design and placement, Components of a map. Map design. Map generalisation methods. Map projection systems. Topographic mapping. Thematic mapping. Map production process. Automation of cartographic processes.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: GEOM 2010**
**COURSE TITLE: FUNDAMENTALS OF GIS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** GIS concepts. Data models in GIS. Sources of GIS data. GIS applications. Data acquisition systems. Data conversion techniques. Topology and digital errors. Systems development. Databases design. Attribute data coding. Linking databases. Spatial queries and analyses.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: GEOM 2015**
**COURSE TITLE: GEOMATICS FOR CIVIL & 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).

**LEVEL: 2**
**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.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: GEOM 2020**
**COURSE TITLE: DIGITAL PHOTOGRAMMETRY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 1020**
**COURSE DESCRIPTION:** Digital images. Digital photogrammetry: image processing, softcopy-based mapping systems. Analytical photogrammetry; aerial triangulation and block adjustment. Automatic process for orientation, generation of DTM and orthophoto. Digital terrain models: data collection and interpolation. Digital image map: photo rectification, orthophotography mosaic. Lidar: principles, processing, and applications.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2025**
**COURSE TITLE: REMOTE SENSING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Electromagnetic radiation properties, interaction with atmosphere and earth features. Remote sensing sensors and systems. Multi-spectral image processing: geometric and radiometric image correction, image enhancement. Thematic information extraction. Applications in the environment and natural resource management.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2030**
**COURSE TITLE: ADJUSTMENT COMPUTATIONS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: GEOM 1040**
**COURSE DESCRIPTION:** Review of observables in geodetic surveying. Observation, condition and combined models for adjustment of terrestrial observations. Satellite time observations, corrections and adjustment. Stochastic models and weighting. Pre-analysis and post-analysis of geodetic survey data.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2035**
**COURSE TITLE: GEODETIC SURVEYING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: GEOM 1015; GEOM 1030**
**COURSE DESCRIPTION:** Geodetic control: design and strength analysis of geodetic networks. Control survey methods, observations, data corrections and reductions. Height systems, trigonometric heighting. Network adjustment, analysis and quality control. Field work in the design, execution and analysis of control surveys. Statistical testing and reliability analysis of observations and parameters in adjustment.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: GEOM 2040**
**COURSE TITLE: HYDROGRAPHIC SURVEYING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 1015**
**COURSE DESCRIPTION:** Brief on different areas of interest. Introduction to various sounding data and establishment of marine data. Simple tidal analysis and studies. Position fixing - principles and techniques: planimetric - optical and electronic position fixing, vertical - lead lines and acoustic soundings. Sources of errors in position fixing. Instrument calibration. The hydrographic survey process - from pre-planning to chart production.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2045**
**COURSE TITLE: LAND LAW**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Caribbean legal systems, case laws. Sources of land law: equity, statutes. Doctrines of estates. Reception of English law in the Caribbean and its evolution. The meaning of 'Law'. Estates and Interests: freehold, leasehold, absolute, co-ownership, joint tenancies, tenancies in common, profits-a-prendre. Easements, restrictive covenants. Adverse possession, prescription. Contract for sale of land, the Doctrine of part performance, pre-contract enquiries and inspection. Title of unregistered and Forms of deeds and other documents. Registration of deeds, title. Registration of title, Torrens system.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2048**
**COURSE TITLE: INTRODUCTION TO PLANNING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The nature of planning, urban growth and urbanism. Evolution of modern planning. Economics of planning. Aspects of planning practice. Land settlement and housing development. Physical planning and infrastructural development. Challenges for town planning. Town and country planning law. Public health and building regulations.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: GEOM 2050**
**COURSE TITLE: MAPPING PROJECT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: GEOM 1050; GEOM 2020**
**COURSE DESCRIPTION:** Field-to-finish practical experience in the process of topographic mapping of a selected area using photogrammetry. Provision of control. Field completion and verification. Production of machine plot, computation and report.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: GEOM 3010**
**COURSE TITLE: CADASTRAL SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 2045**
**COURSE DESCRIPTION:** Practical applications of cadastral surveying. Historical development of the cadastre. Land parcel, identifiers, boundaries, strata, interests, tenure. Techniques for cadastral survey and fitness for purpose. Ambulatory and riparian boundaries. Marine boundaries. Benefits of the cadastre, socio-economic importance. Land acquisition. Adjudication and demarcation. National Cadastre, Cadastral Index Map and their use in Land Information Systems and Land Administration. Cadastral systems in the Caribbean and internationally. Cadastral reform concepts and processes internationally.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: GEOM 3015**
**COURSE TITLE: PROFESSIONAL PRACTICE**
**NUMBER OF CREDITS: 3**
**PREREQUISITE:**
**COURSE DESCRIPTION:** Professional negligence and liability; misrepresentation; Law of Evidence; surveyor as a professional witness. Professional ethics and conduct. Practice of land surveying and mapping in the State and private sectors.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: GEOM 3020**
**COURSE TITLE: PROFESSIONAL INTERNSHIP**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** The internship serves as a way to gain insight into respective industries that are in line with current studies Geomatics and geoinformatics. It should provide students with the opportunity to independently apply and further develop the theoretical and methodological knowledge and understandings gained in their course of study. It should be used by students to put diverse scientific knowledge and methods into practice. Possible fields of work are concentrated in the areas of conceptual, evaluation, management and advisory tasks, in particular, fields of study offered at the department.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: GEOM 3025**
**COURSE TITLE: ENGINEERING SURVEYING**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Interpreting engineering drawings. Error analysis for engineering projects. Engineering design. Deformation surveys. Applications; Onshore pipeline project (postlay). Dimension control surveys. Safety issues in the industry for surveyors. Field exercise.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: GEOM 3030**
**COURSE TITLE: GLOBAL NAVIGATION SATELLITE SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: GEOM 2035**
**COURSE DESCRIPTION:** Code Pseudoranging, Satellite carrier phase observations and integer ambiguity resolution. GNSS concepts: GPS, Glonass, Galileo. Also WAAS, SBAS, EGNOS. Theory of different operational modes: Satic, FastStatic, RTK, DGPS. Continuously Operating Reference Stations (CORS). Virtual Reference Stations (VRS). Network adjustment of GPS/GNSS data in an international reference frame using local, regional & international CORS and processing software.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: GEOM 3035**
**COURSE TITLE: HYDROGRAPHY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: GEOM 2040**
**COURSE DESCRIPTION:** Hydrographic surveying in four dimensions. Underwater acoustics, tidal and non-tidal sea level variations and their analysis. Physical properties of atmosphere, seawater and seabed. Demarcation of maritime boundaries.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: GEOM 3040**
**COURSE TITLE: INTEGRATED SURVEYING DESIGN PROJECT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The purpose of this course is to develop the student's ability in the design, management, and execution of a surveying project, as well as the ability to work in a team. The project gives professional orientation by simulating as closely as possible, the investigation and design works which are required for substantial surveying works and projects. The emphasis is on self-learning, creativity, design, problem solving as well as project team working and communication skills.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: GEOM 3050**
**COURSE TITLE: SPECIAL INVESTIGATIVE PROJECT**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** This course is a project-based one, designed to generate an investigative learning atmosphere. The project work engenders a sense of enquiry, research and verification in the student, and draws on knowledge gained by the student in the programme. The emphasis is on self-reliance, critical thinking, and creativity in the analysis and problem solving as well as communication skills.

# 4.4.2 BSc in Land Management (Valuation)

Students are required to complete a minimum of **94** credits for the award of the BSc in Land Management

**PROGRAMME AIMS AND OBJECTIVES**
**AIMS**
The Land Management (Valuation) programme aims to provide excellent and expert training, and to graduate valuation surveying professionals who are proficient in the principles and concepts of valuation surveying within the framework of land management, in support of the Caribbean regions' socioeconomic and environmental goals and objectives.

**GENERAL OBJECTIVES**
The graduate with a BSc degree in Land Management (Valuation) will be able to regionally and locally:

- demonstrate and apply appropriate skills to satisfy a growing need for effective land valuation and land management in support of economic, environmental and social goals;
- demonstrate the ability to interact with other key professionals in the construction industry to support national, institutional, and individual physical development goals; and
- demonstrate an excellent grasp of the academic foundations needed to advance research and application in, land valuation, land management, land administration and land economy.

**LEARNING OUTCOMES**
The following learning outcomes were conceptualised for the Land Management (Valuation) programme and the graduate should be able to:

Knowledge and Understanding

- Demonstrate basic and advanced knowledge and understanding of valuation methods, concepts and principles;
- Demonstrate understanding of how valuation methods are applied locally, regionally and internationally;
- Demonstrate sound knowledge and understanding of land management, estate management, and land administration;
- Demonstrate basic understanding of quantity surveying;
- Demonstrate understanding of the principles of Planning and its implication for valuation surveying;
- Demonstrate sound understanding of the principles and concepts of land economics and land markets;
- Demonstrate sound understanding of the principles and concepts of general economics, finance, and accounting;
- Demonstrate sound understanding of the principles and concepts of engineering management, economics, finance, and accounting;
- Demonstrate understanding appropriate technologies and the ability to apply these technologies to valuation surveying practice;
- Demonstrate basic understanding of land surveying and other cadastral systems;
- Demonstrate understanding of professional and legal issues affecting the ethical practice of valuation surveying locally and regionally.

**COGNITIVE SKILLS**

- Formulate defined problems into well defined projects and reports;
- Apply numerical and reasoning skills to the critical review of different approaches;
- Solve complex problems and make decisions in new situations;
- Undertake independent and group research, applying known theories, concepts and principles.
- Demonstrate competency in written and oral communication skills.

## *COURSE LISTING*

**LEVEL 1**
**SEMESTER I (19 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| ACCT 1002 | Introduction to Financial Accounting | E3 |
| ECON 1001 | Introduction to Economics I | E3 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| GEOM 1010 | Surveying I | E3 |
| LMGV 1003 | Surveying Practical | C1 |
| LMGV 1004 | Valuation Methods I | E3 |
| LMGV 1005 | Valuation Project I | C3 |

**LEVEL 1**
**SEMESTER 2 (14 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| ACCT 1003 | Introduction to Cost & Managerial Accounting | E3 |
| CVNG 1008 | Building Services Engineering | E3 |
| ECON 1002 | Introduction to Economics II | E3 |
| GEOM 1045 | Communication Skills | C2 |
| LMGV 1000 | Land Economy | E3 |

**LEVEL 2**
**SEMESTER 1 (12 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| ECON 1005 | Introduction to Statistics | E3 |
| GEOM 2010 | Fundamentals of GIS | E3 |
| MGMT 2006 | Management Information Systems I | E3 |
| MGMT 2021 | Business Law | E3 |

**LEVEL 2**
**SEMESTER 2 (18 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| ECON 2020 | Caribbean Economy | |
| GEOM 2000 | Health and Safety Seminars | E0 |
| GEOM 2045 | Land Law | E3 |
| GEOM 2048 | Introduction to Planning | E3 |
| LMGV 2002 | Valuation Methods II | E3 |
| LMGV 2003 | Valuation Project II | C3 |
| MGMT 3051 | Taxation I | E3 |

**LEVEL 3**
**YEAR-LONG PROJECT (6 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| LMGV 3050 | Land Management Research Project | C6 |

**LEVEL 3**
**SEMESTER 1 (12 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 3010 | Cadastral Systems | E3 |
| LMGV 3000 | Applied Valuation | E3 |
| LMGV 3005 | Introduction to Quantity Surveying | E3 |
| MENG 3000 | Engineering Management I | C3 |

**LEVEL 3**
**SEMESTER 2 (12 CREDITS)**

| Course Code | Course Title | Credits |
|---|---|---|
| GEOM 3015 | Professional Practice | E3 |
| IENG 2006 | Engineering Economics, Accounting, & Financial Management | E4 |
| LMGV 3002 | Estate and Land Management | E3 |
| LMGV 3060 | Introduction to Land Administration | E3 |

# Course Descriptions

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: LMGV 1000**
**COURSE TITLE: LAND ECONOMY**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Property in land resources. Theories of land. Basic land economics; Land economy of the Caribbean. Land use and the availability of land for economic use. Economic returns to land. Land resource values and the real estate market. The role of the State in land economy and property taxation. The impact of planning and statutes on property values. The real estate industry and the finance sector. Land and property speculation. Formal and informal land economy. Welfare economics, land and the environment.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: LMGV 1003**
**COURSE TITLE: SURVEYING PRACTICAL**
**NUMBER OF CREDITS: 1**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Practical application of the use of theodolites, total stations, chains, levels, GPS equipment.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: LMGV 1004**
**COURSE TITLE: VALUATION METHODS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Role of the Valuer. Property markets. Demand & Supply of Landed Property. Landed property as an Investment Method of Valuations. Mathematics of the Valuation Tables. Comparison, investment, residual and profit approaches to valuation.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: LMGV 1005**
**COURSE TITLE: VALUATION PROJECT I**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: LMGV 1000**
**COURSE DESCRIPTION:** Conduct of valuations. The practical application is provided by actual case studies and field trips to ensure students can apply the theoretical concepts taught to property valuations in the field.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: LMGV 2002**
**COURSE TITLE: VALUATION METHODS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: LMGV 1004**
**COURSE DESCRIPTION:** The Comparison Method of Valuation; The Contractors Method; Leasehold Interests; Investment Appraisals; Residual Valuations in detail; Residual Cash Flows; Development Appraisal.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: LMGV 2003**
**COURSE TITLE: VALUATION PROJECT II**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: LMGV 1005**
**COURSE DESCRIPTION:** Conduct of valuations. The practical application is provided by actual case studies and field trips to ensure students can apply the theoretical concepts taught to property valuations in the field.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: LMGV 3000**
**COURSE TITLE: APPLIED VALUATION**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: LMGV 2002**
**COURSE DESCRIPTION:** Valuation of Agricultural Properties. Valuation of Specialised Properties. Asset Valuations. Valuation of Plant and Machinery. Compensation for Compulsory Purchase. Planning Compensation. Valuation for Rating and Taxation.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: LMGV 3002**
**COURSE TITLE: ESTATE AND LAND MANAGEMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Property development Process. Property Portfolio Management. Estate Formation. Property Records. Professional Practice. Estate Planning & Control. Management of Public Estates.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: LMGV 3005**
**COURSE TITLE: INTRODUCTION TO QUANTITY SURVEYING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Definition of quantity surveying. The components and function of Quantity Surveying in the construction team. Bills of Quantities (Definition, purpose and composition of Bills of Quantities. The process of preparing Bills of Quantities. The working up and billing process. The application of formulae in the setting out of dimensions). Construction (Scaffolding, Shoring and excavating, Foundations and reinforcement, Lintels and Brickwork, Presentation of materials, Roofing materials and methods, Window design and construction, Glass and Partitions, Door frames and linings, Timber stair building, Building drainage below ground, Heating, Ventilation and Air Conditioning). Taking-off (Demolitions and site clearance, Foundations, Superstructure, including walls, Measurements of windows, doors and plain openings, Measurement of roofs). Impacts of buildings on the natural and urban environment. Legislation applied to the provision of buildings.

**LEVEL: 3**
**SEMESTER: YEAR-LONG**
**COURSE CODE: LMGV 3050**
**COURSE TITLE: LAND MANAGEMENT RESEARCH PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Research project generally involving literature review, data acquisition, processing, analysis and conclusions in respect of identified property valuation problems of interest to the region or individual states.
(Coursework-100%)

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: LMGV 3060**
**COURSE TITLE: INTRODUCTION TO LAND ADMINISTRATION**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The role of professional land and valuation surveyors. Caribbean Survey Systems and Land Surveys Acts and Regulations. Cadastral surveys. Cadastral systems for valuation and taxation. Land, coastal, and marine boundaries. Caribbean and international and registration systems. Regulatory reform. Evidence of boundaries. Riparian rights. Title to land. Land reform. Design and implementation of a multi-purpose cadastre. Cadastral reform.

# 4.5 DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING

BSc (Hons) Programmes in the Department of Mechanical and Manufacturing Engineering have been accredited by the Institute of Mechanical Engineers (IMechE) of the UK to the BEng Level, en route to CEng.

## 4.5.1 BSc in Industrial Engineering

Students are required to complete 100/104 credits given that they have completed the specified number of electives for the award of the BSc in Industrial Engineering.

### *COURSE LISTING*

**LEVEL 1**
**SEMESTER 1**
**16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 1012 | Science of Materials C | E2 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| ENGR 1180 | Engineering Mathematics I | E3 |
| MENG 1008 | Engineering Drawing | C3 |
| MENG 1010 | Statics and Strength of Materials | E3 |
| MENG 1006 | Introduction to Engineering | E2 |

**LEVEL 1**
**SEMESTER 2** **16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 1007 | Electrical Engineering Technology | E3 |
| MENG 1001 | Engineering Thermodynamics I | E3 |
| MENG 1004 | Engineering Dynamics | E3 |
| MENG 1005 | Workshop Technology | C2 |
| MENG 1009 | Machine Drawing (Prerequisite: MENG 1008) | C2 |
| MENG 1*** | Communication Skills C1 | E2 |

**LEVEL 2**
**SEMESTER 1**
**16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 2002 | Operations Research I | E2 |
| MENG 2009 | Industrial Instrumentation | E2 |
| MATH 2230 | Engineering Mathematics II (Prerequisite: ENGR 1180) | E3 |
| MATH 2250 | Industrial Statistics | E3 |
| MENG 2004 | Mechanics of Machines I (Prerequisite: MENG 1004) | E3 |
| MENG 2011 | Machine Design I (Prerequisites: MENG 1008; MENG 1009; MENG 1010) | C3 |

**LEVEL 2**
**SEMESTER 2**
**20 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 2000 | Work Study & Ergonomics | E3 |
| IENG 2004 | Industrial Database Systems & Design (Prerequisite: ENGR 1001) | E3 |
| IENG 2006 | Engineering Economics, Accounting and Financial Management | E4 |
| IENG 2007 | Operations Research II (Prerequisite: IENG2002) | E2 |
| MENG 2008 | Manufacturing Technology | E3 |
| MENG 2014 | Communication Skills and Ethics | C2 |
| MENG 2*** | Control Systems Technology (Prerequisite: ECNG 1007) | E3 |

**LEVEL 3**
**SEMESTER: YEAR-LONG**
**6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 3012 | Industrial Engineering Project | C6 |

**LEVEL 3**
**SEMESTER 1**
**13/14 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 3000 | Industrial Management | E3 |
| IENG 3005 | Quality Control & Reliability Engineering (Prerequisite: MATH 2250) | E2 |
| MENG 3021 | Control Systems Technology (Prerequisite: ECNG 1007) | E3 |

Together with TWO (2) courses, subject to the approval of the Head of Department, to be chosen from:

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 3016 | Applied Project Management | E3 |
| IENG 3015 | Enterprise Information Systems (Prerequisite: IENG 2004) | E3 |
| IENG 3017 | Industrial Design of Products and Services | C3 |
| MENG 3015 | Materials Technology | E2 |

**LEVEL 3**
**SEMESTER 2**
**12/14 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| IENG 3001 | Production Planning & Control | E3 |
| IENG 3002 | Plant Layout & Materials Handling | E2 |
| MENG 3016 | Maintenance & Safety Engineering | E3 |

**Together with** TWO (2) courses, subject to the approval of the Head of Department, to be chosen from:

| Course Code | Course Title | Credits |
|---|---|---|
| ENGR 3000 | The Technology of the Steelpan (Prerequisite: MATH 2230) | E3 |
| IENG 3003 | Behavioural Science in Management | E2 |
| IENG 3006 | Automation | E2 |
| IENG 3013 | Simulation of Industrial & Business Processes | E3 |
| MENG 3001 | Engineering Management II | E2 |

Students doing Level 3 courses must first register for compulsory courses listed above. They must then select one (1) of the two (2) streams of specialty listed below by registering for those courses which are listed under that stream in the Undergraduate Students' Guide of the Department of Mechanical Engineering.

- Industrial Systems Technology & Integration
- Engineering & Operations Management
- Manufacturing (Design, Processes & Systems)

Students are asked to note that:

(i) Selection of a particular stream of specialisation does not exclude the possibility of registering for courses in other areas.

(ii) Registration for Level 3 courses will not be approved until credits for all required Level 1 courses have been attained.

**NOTE:** The letter 'E' or 'C' preceding the credit allocation indicates evaluation by written examination paper(s) (and may also include a coursework component) or by coursework only, respectively.

## 4.5.2 BSc in Mechanical Engineering

Students are required to complete 99/103 credits given that they have completed the specified number of electives for the award of the BSc in Mechanical Engineering.

**LEVEL 1**
**SEMESTER 1**
**16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 1012 | Science of Materials C | E2 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| ENGR 1180 | Engineering Mathematics I | E3 |
| MENG 1008 | Engineering Drawing | C3 |
| MENG 1010 | Statics and Strength of Materials | E3 |
| MENG 1006 | Introduction to Engineering | E2 |

**LEVEL 1**
**SEMESTER 2**
**16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 1007 | Electrical Engineering Technology | E3 |
| MENG 1001 | Engineering Thermodynamics I | E3 |
| MENG 1004 | Engineering Dynamics | E3 |
| MENG 1005 | Workshop Technology | C2 |
| MENG 1009 | Machine Drawing (Prerequisite: MENG 1008) | C2 |
| MENG 1011 | Engineering Fluid Mechanics | E2 |
| MENG 1*** | Communication Skills | C1 |

**LEVEL 2**
**SEMESTER 1** **17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MATH 2230 | Engineering Mathematics II (Prerequisite: ENGR 1180) | E3 |
| MENG 2009 | Industrial Instrumentation | E2 |
| MENG 2004 | Mechanics of Machines (Prerequisite: MENG 1004) | E3 |
| MENG 2007 | Engineering Thermodynamics II (Prerequisite: MENG 1001) | E3 |
| MENG 2010 | Strength of Materials I (Prerequisite: MENG 1010) | E3 |
| MENG 2011 | Machine Design I (Prerequisites: MENG 1008; MENG 1009; MENG 1010) | C3 |

**LEVEL 2**
**SEMESTER 2**
**19 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MATH 2240 | Statistics | E2 |
| MENG 2003 | Mechanical Vibrations (Prerequisite: MENG 1004) | E3 |
| MENG 2008 | Manufacturing Technology | E3 |
| MENG 2012 | Heat Transfer | E3 |
| MENG 2013 | Machine Design II (Prerequisites: MENG 2011) | C3 |
| MENG 2*** | Control Systems Technology (Prerequisites: ECNG 1007) | E3 |

**LEVEL 3**
**SEMESTER: YEAR-LONG**
**6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3019 | Mechanical Engineering Project | C6 |

**LEVEL 3**
**SEMESTER 1**
**13/14 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3021 | Control Systems Technology (Prerequisite: ECNG 1007) | E3 |
| MENG 3000 | Engineering Management I | E3 |
| ECNG 3030 | Electromechanical Energy Conversion E3 (Prerequisite: ECNG 1007) | |

**Together with** TWO (2) optional courses subject to the approval of the Head of Department to be chosen from:

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3006 | Production Management | E3 |
| MENG 3022 | Energy Engineering (Prerequisite: MENG 2007, MENG 2012) | E2 |
| MENG 3013 | Product Design & Development | E3 |
| MENG 3015 | Materials Technology | E2 |
| MENG 3023 | Environmental Control Engineering I (Prerequisite: MENG 2007) | E2 |
| MENG 3024 | Strength of Materials II (Prerequisite: MENG 2010) | E2 |
| MENG 3025 | Power Plant Engineering I (Prerequisite: MENG 2007) | E2 |

**OR** other Mechanical Engineering or Industrial Engineering Level 3 course(s) subject to the approval of the Head of Department.

**LEVEL 3**
**SEMESTER 2**
**11/14 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3016 | Maintenance & Safety Engineering | E3 |

**Together with** FOUR (4) optional courses subject to the approval of the Head of Department, to be chosen from:

| Course Code | Course Title | Credits |
|---|---|---|
| ENGR 3000 | The Technology of the Steelpan (Prerequisite: MATH 2230) | E3 |
| IENG 3002 | Plant Layout and Material Handling | E2 |
| IENG 3006 | Automation | E2 |
| MENG 3001 | Engineering Management II | E2 |
| MENG 3011 | Advanced Mechanics of Solids (Prerequisites:, MENG 3024) | E3 |
| MENG 3014 | Computer-aided Design & Manufacture | E2 |
| MENG 3017 | Finite Element Methods in Engineering Practice (Prerequisites: MENG 1011 MATH 2230, MENG 2010, MENG 2012) | E3 |
| MENG 3026 | Renewable Energy (Prerequisites: MENG 2012) | E2 |
| MENG 3027 | Traction & Power Hydraulics | E2 |
| MENG 3028 | Power Plant Engineering II (Prerequisite: MENG 3025) | E2 |
| MENG 3029 | Environmental Control Engineering II (Prerequisite: MENG 3023) | C2 |

**OR** other Mechanical Engineering or Industrial Engineering course(s) subject to the approval of the Head of Department.
Students doing Level 3 courses must first register for compulsory courses listed above. They must then select one (1) of the three (3) streams of specialty listed below by registering for those courses which are listed under that stream in the Students' Guide of the Department of Mechanical Engineering.

- Thermal Engineering & Energy Systems
- Engineering Mechanics & Design
- Manufacturing (Design, Processes & Systems)

Students are asked to note that:

(i) Selection of a particular stream of specialisation does not exclude the possibility of registering for courses in other areas.
(ii) Registration for Level 3 courses will not be approved until credits for all required Level 1 courses have been attained.

## 4.5.3 BSc in Mechanical Engineering with a Minor in Biosystems

Students are required to complete 101/103 credits given that they have completed the specified number of electives for the award of the BSc in Mechanical Engineering with a minor in Biosystems.

**LEVEL 1**
**SEMESTER 1** **16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 1012 | Science of Materials C | E2 |
| ENGR 1001 | Information Technology for Engineers | E3 |
| ENGR 1180 | Engineering Mathematics I | E3 |
| MENG 1008 | Engineering Drawing | C3 |
| MENG 1010 | Statics and Strength of Materials | E3 |
| MENG 1006 | Introduction to Engineering | E2 |

**LEVEL 1**
**SEMESTER 2**
**16 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| ECNG 1007 | Electrical Engineering Technology | E3 |
| MENG 1001 | Engineering Thermodynamics I | E3 |
| MENG 1004 | Engineering Dynamics | E3 |
| MENG 1005 | Workshop Technology | C2 |
| MENG 1009 | Machine Drawing (Prerequisite: MENG 1008) | C2 |
| MENG 1011 | Engineering Fluid Mechanics | E2 |
| MENG 1*** | Communication Skills | C1 |

**LEVEL 2**
**SEMESTER 1**
**17 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MATH 2230 | Engineering Mathematics II (Prerequisite: ENGR 1180) | E3 |
| MENG 2009 | Industrial Instrumentation | E2 |
| MENG 2004 | Mechanics of Machines (Prerequisite: MENG 1004) | E3 |
| MENG 2007 | Engineering Thermodynamics II (Prerequisite: MENG 1001) | E3 |
| MENG 2010 | Strength of Materials I (Prerequisite: MENG 1010) | E3 |
| MENG 2011 | Machine Design I (Prerequisites: MENG 1008; MENG 1009; MENG 1010) | C3 |

**LEVEL 2**
**SEMESTER 2**
**19 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MATH 2240 | Statistics | E2 |
| MENG 2003 | Mechanical Vibrations (Prerequisite: MENG 1004) | E3 |
| MENG 2008 | Manufacturing Technology | E3 |
| MENG 2012 | Heat Transfer | E3 |
| MENG 2013 | Machine Design II (Prerequisites: MENG 2011) | C3 |
| MENG 2014 | Communication Skills and Ethics | C2 |
| MENG 2*** | Control Systems Technology (Prerequisite: ECNG 1007) | E3 |

**LEVEL 3**
**YEAR-LONG**
**6 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3019 | Mechanical Engineering Project | C6 |

**LEVEL 3**
**SEMESTER 1**
**14 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| CVNG 3007 | Environmental Engineering I | E3 |
| MENG 3021 | Control Systems Technology (Prerequisite: ECNG 1007) | E3 |
| ECNG 3030 | Electromechanical Energy Conversion (Prerequisite: ECNG 1007) | E3 |
| MENG 3000 | Engineering Management I | E3 |
| MENG 3004 | Soil & Water Engineering | E2 |

**LEVEL 3**
**SEMESTER 2** **11 CREDITS**

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3016 | Maintenance & Safety Engineering | E3 |
| MENG 3030 | Elements of Food Engineering (Prerequisite: ECNG 1007) | E2 |

**Together with** THREE (3) optional courses subject to the approval of the Head of Department, to be chosen from:

| Course Code | Course Title | Credits |
|---|---|---|
| MENG 3001 | Engineering Management II | E2 |
| MENG 3002 | Post-harvest Technology | E2 |
| MENG 3007 | Drainage & Irrigation Engineering | E3 |
| MENG 3008 | Field Machinery & Equipment | E2 |
| MENG 3027 | Traction & Power Hydraulics | E2 |
| MENG 3030 | Basic Engineering Infrastructure | E2 |

**NOTE**: The letter "E" or "C" preceding the credit allocation indicates evaluation by written examination paper(s) (and may also include a coursework component) or by coursework only, respectively. Registration for Level 3 courses will not be approved until credits for all required Level 1 courses have been attained.

# Course Descriptions

## *DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: MENG 1008**
**COURSE TITLE: ENGINEERING DRAWING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Introduction to Engineering Drawing, Plane Geometrical Drawing, Projection of Points and Lines (In First Angle Projection Only), Projections of Planes and Solids, Development and Interpenetration of Solids, Isometric Projections, Conversion of Orthographic Views into Isometric Views and Conversion of Isometric Views to Orthographic Views, Perspective Projections, Computer Aided Drafting (Hands On Experience - AutoCAD Package

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1001**
**COURSE TITLE: ENGINEERING THERMODYNAMICS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Introduction. Macroscopic and microscopic approaches. Definitions of Systems, Properties, Processes, Cycles. Concepts of Thermodynamic equilibrium and Quasi-static process. Laws of perfect gases. Work and Heat. 1$^{st}$ law for closed system. 1$^{st}$ law for open system. 2$^{nd}$ law: Kelvin-Planck and Clausius statements, forward and reversed Carnot cycles. Entropy calculations. Gas power cycles : Introduction, Otto and Diesel cycles. Properties of liquid and vapour. Vapour power cycles : Introduction, Carnot, Rankine and Vapour compression refrigeration cycles.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1009**
**COURSE TITLE: MACHINE DRAWING**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 1008**
**COURSE DESCRIPTION:**
Machine Drawing Conventions, Drawing of Machine Elements and Simple Parts, Assembly Drawings, 3D/Solid Modeling (using AutoCAD **3D Module** and SolidWorks Package)

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: MENG 1010**
**COURSE TITLE: STATICS & STRENGTH OF MATERIALS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Review of statics: Two- and Three dimensional vector representation of forces, moments and couples. Free body diagrams. Equilibrium of forces. Distributed forces; centres of gravity and mass. Moments of inertia. Analysis of trusses, frames and machines. Friction. Stress and strain in axially loaded members. Properties of materials. Generalised Hooke's law. Statically determinate and indeterminate stress systems. Shear force, bending moments and bending stresses in beams. Beams of two materials. Deflection in statically determinate beams. Analysis of stresses in two dimensions, principal stresses, Mohr circle. **Design of beams.** Torsion of circular cross sections

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1004**
**COURSE TITLE: ENGINEERING DYNAMICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Review of basic mechanics. Kinematics of particles: rectilinear and angular motion, plane curvilinear motion, relative motion in a plane. Kinetics of particles: equation of motion, work and energy, impulse and momentum. Introduction to central-force motion. Kinetics of systems of particles: generalised F-m-a. Work-energy (introductory section). Impulse-momentum (introductory section). Conservation laws. Plane kinematics of rigid bodies: absolute motion, relative motion - translating axes, relative motion - rotating axes. Plane kinetics of rigid bodies: review of moments of inertia. Force, mass and acceleration. Work and energy. Impulse and momentum.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1005**
**COURSE TITLE: WORKSHOP TECHNOLOGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Basic workshop tools and procedures. Health and safety issues - OSHA Act, Factories Ordinance; ergonomic hazards; liability; safety training and promotion. Engineering materials, workshop measurements, processes (material removal), forming and joining, machine tools and special equipment. Precision fits and tolerances, fabrication techniques, jigs and fixtures. Ventilation of workshops. Lifting gear for heavy work-pieces. Machinery hazards. Electrical safety. Precautions for welding/cutting/gouging operations. Proper use of hand tools. Workshop fire safety.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: MENG 1006**
**COURSE TITLE: INTRODUCTION TO ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** An introduction to the following: historical development of engineering; formation of the engineer; role and functions of engineers and professional organisations; technical communications; 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. Scope of safety engineering. Hazardous materials used in engineering practice. Non-destructive testing. Introduction to plant maintenance. Condition monitoring. Hazards in the process industries. Rupture of process vessels.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1011**
**COURSE TITLE: ENGINEERING FLUID MECHANICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
Mechanics deals with force, energy, motion and material properties. The study of mechanics of fluids (liquids and gases) is called Fluid Mechanics. You will learn fluid properties, fluid static, fluids in motion, conservation equations, flow through pipes, characteristics and selection of pump.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: MENG 1012**
**COURSE TITLE: SCIENCE OF MATERIALS C**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Introduction to materials science. Crystal structures. Thermal equilibrium diagrams. Iron and steels I. Non-ferrous alloys I. Properties of materials. Iron and Steels II. Non-ferrous alloys II. Design and selection of materials. Polymers. Ceramics. Composite materials.

**LEVEL: 1**
**SEMESTER: 2**
**COURSE CODE: MENG 1xxx**
**COURSE TITLE: COMMUNICATION SKILLS AND ETHICS**
**NUMBER OF CREDITS: 1**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Course participants will explore a range of communication principles and conventions and their application to a variety of communicative situations as they may arise in the engineering. These situations include written and oral communication for industry; and research development.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: IENG 2000**
**COURSE TITLE: WORK STUDY & ERGONOMICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Productivity; method study; work measurement - rating, allowances, standard time, PMTS; work sampling; fatigue and boredom; job enlargement; working conditions and influence on output; work place design.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: IENG 2002**
**COURSE TITLE: OPERATIONS RESEARCH I**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Operations research methodology; Linear programming: applications, graphical methods, simplex and dual simplex algorithms, sensitivity analysis and duality; Integer programming applications, cutting plane algorithm; Transportation and assignment models; Decision theory, Expected Monetary value and Expected Opportunity Loss models: Decision making under uncertain condition(optimistic, pessimistic, Savage, Laplace and Hurwicz criteria).

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: IENG 2004**
**COURSE TITLE: INDUSTRIAL DATABASE SYSTEMS & DESIGN**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ENGR 1001**
**COURSE DESCRIPTION:** Introduction to Information Systems; data requirements; Industrial Database Applications; conceptual database design; Database and Systems Planning; database design techniques and methods; Relational Database Design; Relational and Distributed Systems; database systems implementation and maintenance; Introduction to HTML, XML and Web Applications.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MENG 2009**
**COURSE TITLE: INDUSTRIAL INSTRUMENTATION**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:**. Introduction and overview: analogue & digital Instruments; threshold sensors; pulse train sensors; shaft encoders. Displacement measurement: resolution; pulse timing & pulse counting methods; LVDT. Temperature measurement: resistance thermometers; thermisters; thermocouples. Force measurement: strain gauges; Wheatstone bridge. Pressure measurement: u-tube manometer; mechanical sensors; strain gauge transducer. Flow measurement: differential pressure & orifice plates; characteristics of flow & Reynolds number; differential pressure transducer; Venturi meter. Signal conditioning: pre-conditioning; concepts of differential & instrumentation amplifiers; error specifications & components; offset & bias currents; effect of noise; signal/noise ratios; filters; Butterworth filter data; sample & hold; analogue multiplexers; analogue to digital conversion. Electrical measurement & calibration. International conventions & standards.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: IENG 2006**
**COURSE TITLE: ENGINEERING ECONOMICS, ACCOUNTING**
**AND FINANCIAL MANAGEMENT**
**NUMBER OF CREDITS: 4**
**COURSE DESCRIPTION:**. Basic accounting concepts and policies; analysis of financial statements; management accounting; cost-volume-profit relationship; cost analysis and estimating; techno-economic evaluation of capital investment projects; capital budgeting techniques; manufacturing systems economics; capital structure/ leverage; financial planning and control with budgeting; financial planning for initial capitalisation, working capital management, valuation of securities, multi-national financial management topics.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: IENG 2007**
**COURSE TITLE: OPERATIONS RESEARCH II**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: IENG 2002**
**COURSE DESCRIPTION:** Non-linear programming: classical optimization method, D-Rule, Lagrange methods, Kuhn Tucker conditions, Decision trees, Markov processes; Network models; shortest route and minimal spanning tree methods; Deterministic dynamic programming model. Queuing models. Games theory and Simulation.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2012**
**COURSE TITLE: HEAT TRANSFER**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Steady and unsteady state heat conduction. Analytical, graphical and numerical solutions, convection - forced and free convection on flat plates and in pipe flow; Radiation - properties, shape factor and exchange between surfaces, Introduction to heat exchangers; combined mode of heat transfer. Introduction to mass transfer.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MENG 2010**
**COURSE TITLE: STRENGTH OF MATERIALS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 1010**
**COURSE DESCRIPTION:** True stress and true strain, two and three dimensional systems, generalized Hooke's Law. Analysis of stresses in two dimensions, theories of failure. Elastic theorems, three-moment theorem. Thin Walled pressure vessels. Strut and beam columns. Stress Concentration, creep, fatigue, plastic behaviour of solids**.** Practical applications of strain gauge circuitry. Stresses due to shock loading. Design of bolted and welded joints

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2003**
**COURSE TITLE: MECHANICAL VIBRATIONS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 1004**
**COURSE DESCRIPTION:** Mechanical vibrations: fundamentals. Single degree of freedom systems. Free vibrations with and without damping. Forced vibrations. Vibration of multi-degree-of-freedom systems. Free and forced vibrations of two-degree-of-freedom systems. Vibration isolation. Transmissibility. Dynamic absorber-undamped and damped. Torsional vibrations. Lateral vibrations and whirling speeds. Introduction to controls.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MENG 2004**
**COURSE TITLE: MECHANICS OF MACHINES**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: MENG 1004**
**COURSE DESCRIPTION:** Introduction and principles. General dynamics. Kinematics of mechanisms. Velocity and acceleration in link mechanisms. Simple harmonic motion and the reciprocating engine. Cams. Toothed gearing and geared systems. Epicyclic gears. Dry friction. Lubrication. Belt drives and brakes. Friction clutches. Kinetics of machine elements. Static forces in machines. Inertia forces in machines. Turning moment diagrams and flywheels. Balancing of machines. Gyroscopes.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MENG 2011**
**COURSE TITLE: MACHINE DESIGN 1**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 1008;MENG 1009;MENG 1010**
**COURSE DESCRIPTION:** Design Basics. Technical Report preparation. Design for Static Strength, Design for Fatigue Strength, Power Screws, Cotters and Knuckle Joints, Fasteners, Design of Shafts, keys and Couplings; Tolerances and fits; Introduction to Finite Element Analysis

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2013**
**COURSE TITLE: MACHINE DESIGN II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 2011**
**COURSE DESCRIPTION:** Bearings and Lubrication: Lubrication & lubricants. Ball and Roller bearings, journal bearings. The design of clutches and brakes. Gears: spur gears, helical gears, bevel gears and worm gears. Design of internal combustion engine components: cylinder, piston, crank shaft and connecting rod. Design of machine tool elements: beds, spindles and slideways.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2xxx**
**COURSE TITLE: CONTROL SYSTEMS TECHNOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 1007**
**COURSE DESCRIPTION:** Mathematical modeling of systems: governing equations of common systems; Laplace transforms and standard forms of equations of different orders; block diagrams and signal flow graphs; deriving transfer function of a DC electric motor in particular. System response: deriving time response by taking inverse Laplace transforms; standard time responses for first and second order systems. System stability and Root Locus: Routh Hurwitz stability criterion; Root Locus and its use in determining key system parameters. Frequency domain system analysis: Bode plots; Nyquist diagrams; Phase and gain margins; Relationship of frequency analysis to time response. Controller system design: PID controller design; Lag and lead compensators.

*NOTE: Offered in Year two for students now entering year 2 and in Year 3 for students entering Year 3 for academic year 2013- 2014 only.*

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2014**
**COURSE TITLE: COMMUNICATION SKILLS AND ETHICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** The course deals with two distinct but equally important, and somewhat connected topic areas. Firstly, course participants will explore a range of communication principles and conventions and their application to a variety of communicative situations as they may arise in the practice of engineering. These situations include written and oral communication for industry and research and development. Secondly, ethical considerations in engineering professional practice and decision making will be introduced. Considering, as a departure point, what it means to be a professional, participants will apply themselves to poignant case studies in which an ethical dilemma is posed.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MENG 2007**
**COURSE TITLE: ENGINEERING THERMODYNAMICS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 1001**
**COURSE DESCRIPTION:** Non-reactive and reactive mixtures, psychrometry, one-dimensional compressible fluid flow; vapour and gas power cycles; reciprocating engines and machine systems; refrigeration and heat pump cycles.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MENG 2008**
**COURSE TITLE: MANUFACTURING TECHNOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: NONE**
**COURSE DESCRIPTION:** Review of properties and applications of engineering materials. Elements of the theory and practice of metal-forming, metal-cutting, foundry technology, joining processes, heat treatment, finishing operations, industrial coatings, and polymer technology.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: IENG 3000**
**COURSE TITLE: INDUSTRIAL MANAGEMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Formal and informal organisation. Corporate planning. Marketing. Human resource management. Industrial relations. Competitive strategy. Management game. Performance and appraisal systems. Communication in organisations.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: IENG 3001**
**COURSE TITLE: PRODUCTION PLANNING & CONTROL**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Production systems; forecasting; resource planning; production planning; aggregate planning; master schedule; requirements planning systems; production scheduling; progress control; integrated production control systems.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: IENG 3002**
**COURSE TITLE: PLANT LAYOUT & MATERIALS HANDLING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Plant location; plant layout - types, layout planning and evaluation of layouts; plant services; principles of materials handling system design; techniques for analysis and solution of plant location, plant layout and material handling problems. Materials handling equipment. Warehousing - principles, design and operations.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: IENG 3003**
**COURSE TITLE: BEHAVIOURAL SCIENCE IN MANAGEMENT**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Motivation: history of the approaches to motivation: need theories and their current status. Cognitive theories: expectancy, equity, goals, current status. Laboratory approaches: classical conditioning, operant conditioning. Current status. Some applications. Leadership: history of the approaches to leadership. Trait theory and problems with this approach. Behavioural approach: Ohio State studies. Methodology. Situational (contingency) approach: current status, experiential exercises. VDL model, alternatives to leadership. Communication: defensive or problem-solving, climate, interpersonal communication. The communication process. Perception: experiential exercises. The perception process.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: IENG 3005**
**COURSE TITLE: QUALITY CONTROL & RELIABILITY ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MATH 2250**
**COURSE DESCRIPTION:** Inspection; Statistical quality control; Control charts for variables and attributes; Process capability analysis; Sampling inspection, OC curves, Sampling plans for attributes and variables; Product reliability; System reliability; Equipment survival; Reliability prediction methods; Redundancy and maintainability of equipment

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: IENG 3006**
**COURSE TITLE: AUTOMATION**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Introduction to Automation and Principles. Industrial Automation including Fluidic Logic, Hard / Soft Automation. Assembly Automation and Robots in Automation. Boolean Algebra, Combinational Logic and Sequential Logic. Economics of Automation. Introduction to Programmable Logic Controllers (PLCs) Ladder Logic and introduction to High Level Code for PLCs. Introduction to Digital Control Systems and Supervisory Control And Data Acquisition (SCADA).

**LEVEL: 3**
**SEMESTER:**
**COURSE CODE: IENG 3009**
**COURSE TITLE: INDUSTRIAL DATABASE DESIGN**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Production systems and data requirements; evolution of database systems and technology; database applications and systems development; conceptual database design: principles and modelling; systems planning and database design; data element design; relational database design; introduction to E-business, E-commerce, and enterprise resources planning systems; introduction to HTML, XML and Web applications.

**LEVEL: 3**
**SEMESTER: YEAR LONG**
**COURSE CODE: IENG 3012**
**COURSE TITLE: INDUSTRIAL PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Special project in the field of Industrial Engineering will be undertaken by all students under the supervision and direction of academic staff in the Department. Examination will be by coursework - a presentation and project report.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: IENG 3013**
**COURSE TITLE: SIMULATION OF INDUSTRIAL & BUSINESS PROCESSES**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Overview of simulation systems; components of simulation models; simulation processes; modelling methodologies and techniques; computer interfacing and networking fundamentals; system dynamics approach to modelling and decision support; simulation applications in manufacturing and service operations.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: IENG 3015**
**COURSE TITLE: ENTERPRISE INFORMATION SYSTEMS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: IENG 2004**
**COURSE DESCRIPTION:** Organisation dynamics; Enterprise resource planning; data sources and data quality requirements; design, development and deployment of data warehouses; web-enabled data management and e-commerce; Knowledge management; strategic implications of EIS.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: IENG 3016**
**COURSE TITLE: APPLIED PROJECT MANAGEMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Definitions and feasibility of projects; project management processes; project management knowledge areas; project management information systems; team communication and conflict resolution; experimental/action-learning workshop.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: IENG 3017**
**COURSE TITLE: INDUSTRIAL DESIGN OF PRODUCTS AND SERVICES**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Combine design principles, (engineering and industrial), innovation and project management to aid in decision-making. Understanding of the practical and theoretical aspects of the creation of a product, methods used in form design, form factors and the appearance of the product.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3000**
**COURSE TITLE: ENGINEERING MANAGEMENT I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Management functions - corporate governance, planning and control. Business functions - Marketing - marketing mix (products, pricing, promotion, distribution). Human resources - legal and ethical issues in managing people, motivational theories, management styles and leadership, labour-management relations. Accounting and finance - financial statements and analysis, capital budgeting and project evaluation, financial and risk management. Quantitative approaches to decision-making.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3001**
**COURSE TITLE: ENGINEERING MANAGEMENT II**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Strategic management of technological innovation and new venture formation. The Engineering manager and the legal environment (legal forms of association, contracts, torts, company law, intellectual property).

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3002**
**COURSE TITLE: POST-HARVEST TECHNOLOGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** An introduction to post-harvest physiology, physical properties of plant material; materials handling, cleaning, grading and packaging. Quality assurance, food safety principles and storage requirements for fruits, vegetables, root crops and cut flowers. Pre-cooling, modified and controlled atmosphere storage; **freezing** and heat loads for perishables; packing-house layout and design; drying and drying systems, processing of durable Caribbean crops, e.g., root crops, coconuts, cocoa, nutmeg; milling and mixing.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3004**
**COURSE TITLE: SOIL & WATER ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Soil constituents, texture, structure and plasticity. Phase relations. Soil compression, **shear** strength and stress-strain relations. Prediction of forces on soil engaging tools. Design of shear walls. Hydrologic cycle. Rainfall measurement and analysis. Stream flow measurement. Runoff analysis. Open channel flow and channel design for steady uniform flow. Introductory ground water hydrology. Computer applications

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3006**
**COURSE TITLE: PRODUCTION MANAGEMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Operations strategy; product-process-capacity planning; forecasting and investment analysis; operations layout; materials management - inventory, JIT, MRP; shop-planning and scheduling; quality assurance/quality control; project management.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3007**
**COURSE TITLE: DRAINAGE & IRRIGATION ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Basic soil-plant-water relations. Irrigation water requirements, sources, quantity and quality of irrigation water: Irrigation planning, scheduling and efficiencies. Design and **evaluation** of irrigation and drainage systems. Computer applications and simulation modelling.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3008**
**COURSE TITLE: FIELD MACHINERY & EQUIPMENT**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Concept of Mechanization and machinery management. Analysis of field machines. Planting and transplanting. Seed metering mechanisms; seed storage and treatment Mechanical weeding. Dry and liquid chemical application; Sickle bar mower, flail and rotary mower design and operation. Power calculations. Design and operation of Grain Harvesters, Root crops and fruit trees harvesters. Review of local crop production designs and fabrication.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3011**
**COURSE TITLE: ADVANCED MECHANICS OF SOLIDS**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: MENG 3024**
**COURSE DESCRIPTION:** Elasticity, plasticity, torsion of prismatic bars, thin plates, shells, thermal stresses, photo-elasticity and fracture mechanics. Applications of the finite element method.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3013**
**COURSE TITLE: PRODUCT DESIGN & DEVELOPMENT**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Synthesis of materials, design and processes into final products/ components. Emphasis will be placed on the following:- sheet metal products, case or moulded metal products, plastics, composites, machined products. Special machining processes. Generation of forms, tooling design, use of jigs and fixtures. Assembly processes, costing.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3014**
**COURSE TITLE: COMPUTER-AIDED DESIGN & MANUFACTURE**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Review of the role and elements of computer-aided design. Development of integrated databases for design and manufacture. Solid and surface modelling techniques for design and manufacture. Generation of tool path data from solid and surface models. Numerical Control technology:- manual part programming, computer-assisted part programming, CAI applications for tool path generation, e.g.: SMARTCAM.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3015**
**COURSE TITLE: MATERIALS TECHNOLOGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Basic background to the relationship between structure and properties of engineering materials with respect to selection of materials for design, processing and fabrication, the behaviour of materials in service and methods of evaluating performance. Topics include: metal alloy systems, metal structure texture and strengthening mechanisms; non-metallic materials, destructive and non-destructive testing, failure analysis, corrosion and use of standard specifications.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3016**
**COURSE TITLE: MAINTENANCE AND SAFETY ENGINEERING**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Maintainability, corrective maintenance, preventive maintenance. Scheduling, organisation and control. Diagnostic and predictive techniques and programmes. Data acquisition and processing. Computer applications. Costs and cost benefits. Safety legislation. Accident prevention. Causation of industrial accidents. Ergonomic design. Safety management. Fire and explosion risks. Pressure vessels. Reliability and conditional probability. Environmental toxicity. Gaseous and particulate emissions. Noise and vibration. Hazard analysis techniques.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3017**
**COURSE TITLE: FINITE ELEMENT METHODS IN ENGINEERING PRACTICE**
**NUMBER OF CREDITS: 3**
**PREREQUISITES: MENG 1011; MATH 2230, MENG 2010, MENG 2012**
**COURSE DESCRIPTION:** Introduction to finite element analysis - determinations. Applications: analysis of problems described by parabolic differential equations - torsion and moisture diffusion. Multidimensional finite element formation and solutions for solid bodies subjected to various boundary conditions. One-dimensional finite element formation and solution for heat transfer with mass transport. Solution to an axisymmetric stress distribution problem using the constant strain triangle method. Applications to beam, plate and trip elements.

**LEVEL: 3**
**SEMESTER: YEAR LONG**
**COURSE CODE: MENG 3019**
**COURSE TITLE: MECHANICAL ENGINEERING PROJECT**
**NUMBER OF CREDITS: 6**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Special projects in Mechanical Engineering will be undertaken by all students under the supervision and direction of academic staff of the Department. Examination will be by coursework - a presentation and project report.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3020**
**COURSE TITLE: ELEMENTS OF FOOD ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Heat and mass balances in food process operations, heat transfer and thermal properties of foods, heat exchange equipment for food processing; psychrometric, moisture equilibrium and drying characteristics of crops, thin layer drying. Freezing of foods (meats), thermal processing, evaporation and an introduction to food rheology.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3021**
**COURSE TITLE: CONTROL SYSTEMS TECHNOLOGY**
**NUMBER OF CREDITS: 3**
**PREREQUISITE: ECNG 1007**
**COURSE DESCRIPTION:** Mathematical modeling of systems: governing equations of common systems; Laplace transforms and standard forms of equations of different orders; block diagrams and signal flow graphs; deriving transfer function of a DC electric motor in particular. System response: deriving time response by taking inverse Laplace transforms; standard time responses for first and second order systems. System stability and Root Locus: Routh Hurwitz stability criterion; Root Locus and its use in determining key system parameters. Frequency domain system analysis: Bode plots; Nyquist diagrams; Phase and gain margins; Relationship of frequency analysis to time response. Controller system design: PID controller design; Lag and lead compensators.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3022**
**COURSE TITLE: ENERGY ENGINEERING**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: MENG 2007, MENG 2012**
**COURSE DESCRIPTION:** Role of energy in society, energy use data, resources, environmental effects. Review of Thermodynamics, irreversibility, entropy generation, exergy analyses and 2$^{nd}$ law efficiency. Principles and applications of cogeneration. Economic analyses of investments. Applications of optimization principle to energy systems

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3023**
**COURSE TITLE: ENVIRONMENTAL CONTROL ENGINEERING I**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 2007**
**COURSE DESCRIPTION:** Indoor conditions for comfort. Climatic design information. Thermal properties of common building and insulation materials. Infiltration and ventilation loads. Cooling load calculation. Psychrometrics. Air Distribution. Life Cycle Analysis costing.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MENG 3024**
**COURSE TITLE: STRENGTH OF MATERIALS II**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 2010**
**COURSE DESCRIPTION:** Product of Area. Parallel Axis theorem. Rotation of Axes. Stresses in Unsymmetrically Loaded members in bending. Stresses in thick Beams with initial Curvature. Thick Walled Pressure Vessels**.**
Analysis of Stresses in and Design of Springs. Stresses under combined loading. Theory of Plastic Bending. Theory of Elastic-Plastic torsion.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3025**
**COURSE TITLE: POWER PLANT ENGINEERING I**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 2007**
**COURSE DESCRIPTION:** Power Plant Engineering I is a comprehensive and complete course on the Steam Power Plant. It consists of four major modules as follows:

- Steam Generating Plant (Boilers, Superheaters, Reheaters, Economizers, Air Pre-Heaters etc).
- Steam Turbine Design, Operations and Technology.
- Balance of Plant (Condensers, Feedwater Heaters, Circulating Cooling Water Systems, Cooling Towers, Evaporators, Water Treatment etc).
- Overall Thermodynamic Analysis and Heat Balance of the Steam Power Plant

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3026**
**COURSE TITLE: RENEWABLE ENERGY**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 2012**
**COURSE DESCRIPTION**: Problems of fossil fuels. Solar Energy: Flat plate collector, concentrating collectors, photo-voltaic cell. Wind Energy: Characteristics of wind, wind-turbine analysis and siting. Brief description of geothermal, ocean-thermal, tidal, ocean wave and biomass energy.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3028**
**COURSE TITLE: POWER PLANT ENGINEERING II**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 3025**
**COURSE DESCRIPTION:** Power Plant Engineering II is a comprehensive and complete course which consists of three major modules as follows:

- Gas Turbine Technology.
- Reciprocating Internal Combustion Engines.

Combined Cycle and Cogeneration Systems

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3027**
**COURSE TITLE: TRACTION & POWER HYDRAULICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Terra-mechanics, mechanized field operations and fluid power applications. Traction theory, performance parameters and stability of 2WD, 4WD and track-type tractors. Soil and tool interactions, tillage and **bulldozing,** machine-tool selection and power calculations; Power take-off and fluid power (Power hydraulics) system design and calculations.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3029**
**COURSE TITLE: ENVIRONMENTAL CONTROL ENGINEERING II**
**NUMBER OF CREDITS: 2**
**PREREQUISITE: MENG 3023**
**COURSE DESCRIPTION:** Estimating of Cooling Loads in various building application. Typical manual calculation of a Cooling Load. Heat Balance (HB) and Radiant Time Series (RTS) methods of Cooling Load Calculations.Cooling Load Calculations of a typical building application based on Architectural Drawings and/or building survey. Practical Psychrometrics. Air Distribution. Duct design. Life Cycle Analysis. Costing of systems

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: MENG 3030**
**COURSE TITLE: BASIC ENGINEERING INFRASTRUCTURE**
**NUMBER OF CREDITS: 2**
**PREREQUISITES: NONE**
**COURSE DESCRIPTION:** Layout, economic feasibility, structural design and environmental requirements of small and/or commercial food production buildings and structures. Local water supplies: planning water supply works like pipelines, design of ponds and boreholes, access road construction.

# OTHER COURSES

## Course Descriptions

### *COMPUTER SCIENCE COURSES*

**LEVEL:**
**SEMESTER:**
**COURSE CODE: COMP 3100**
**COURSE TITLE: OPERATING SYSTEMS**
**NUMBER OF CREDITS: 4**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Operating system functions: job control and command languages. Operating system structure. Primary and secondary storage management. Process management. Resource allocation. Performance evaluation. Protection. Reliability and recovery.

**LEVEL: 3**
**SEMESTER:**
**COURSE CODE: COMP 3750**
**COURSE TITLE: NUMERICAL COMPUTING I**
**NUMBER OF CREDITS: 4**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Floating point arithmetic: basic concepts of floating point number systems. Implications of finite precision. Illustrations of errors due to round-off. Use of mathematical sub-routine packages. Interpolation: finite differences. Polynomial interpolation. Inverse interpolation. Spline interpolation. Approximation: uniform approximation. Discrete least squares. Polynomial approximation. Fourier approximation. Chebyshev economisation. Solution of non-linear equations: bisection. Fixed point iteration. Newton's method. Secant method. Muller's method. Aitken's process. Rates of convergence. Efficient evaluation of polynomials. Bairstow's method. Direct methods for linear system of equations: Gaussian elimination. Operational counts. Implementation including pivoting and scaling. Direct factorisation methods. Error analysis and norms: vector and matrix norms. Condition numbers and error estimates. Iterative improvement. Iterative methods. Over-relaxation.

## *FACULTY OF ENGINEERING COURSES*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ENGR 1000**
**COURSE TITLE: INTRODUCTION TO ENGINEERING**
**NUMBER OF CREDITS: 3 CREDITS**
**PREREQUISITES:**
**COURSE DESCRIPTION:** An introduction to the following: historical development of engineering; formation of the engineer; role and functions of engineers and professional organisations; creative and critical thinking; technical communications; 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.

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ENGR 1001**
**COURSE TITLE: INFORMATION TECHNOLOGY FOR ENGINEERS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Spreadsheets: Introduction to spreadsheets for repeat computations, creating and editing graphs and charts, use of solver, introduction to analysis tools. Databases: constructing a database using tables and forms, retrieving information through reports and queries. Binary computations: storage of data within the computer, variable types and limitations imposed on computations. Algorithms for simple numerical methods. Development of algorithms. Programming: Introduction to C++, coding of algorithms, syntax for data types, input and output, mathematical operations, loops, functions and pointers.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ENGR 3000**
**COURSE TITLE: THE TECHNOLOGY OF THE STEELPAN**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** This course attempts to summarise and present, in a formal fashion, current knowledge on various technological aspects of the steelpan musical instrument. The major technologies that impact on the instrument are acoustics, mechanical vibrations, metallurgy, physical structure and signal analysis. However, no special prerequisite knowledge is required in any of these areas. The course starts off with an overview of the very subjective area of the perception of music. This is essential as it provides a reference point for later discussions. Other topics include the manufacturing process, including a discussion on the types of metallurgical properties required for different instrument characteristics, the modal properties of the instrument and the dynamics of the stick impact. The course ends with some consideration of significant recent developments.

**LEVEL: 3**
**SEMESTER: 2**
**COURSE CODE: ENGR 3001**
**COURSE TITLE: NATURAL HAZARDS & DISASTER MANAGEMENT IN THE CARIBBEAN**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Definitions and concepts, characteristics of natural hazards in the Caribbean, economic, social and environmental impacts; techniques for identification, mapping and prediction, vulnerability and risk assessment, the disaster management cycle, structural and non-structural mitigation, emergency planning, recovery and reconstruction, disaster management and development planning, disaster management and agriculture, tourism, public health, public policy and legislation, sociology of disasters, disaster education.

**SEMESTER: 1**
**COURSE CODE: FOST 3000**
**COURSE TITLE: PRINCIPLES OF FOOD SCIENCE**
**NO. OF CREDITS: 3**
**PREREQUISITES:**
**SYLLABUS:** The basic chemistry of carbohydrates, proteins, lipids, vitamins, salt, preservatives and antioxidants, enzymes, additives and water in relation to food preservation and processing.

**SEMESTER: 2**
**COURSE CODE: FOST 3001**
**COURSE TITLE: PRINCIPLES OF FOOD PROCESSING**
**NO. OF CREDITS: 3**
**PREREQUISITES:**
**SYLLABUS:** Introduction to basic concepts and operations used to accomplish food preservation.

## *MATHEMATICS COURSES*

**LEVEL: 1**
**SEMESTER: 1**
**COURSE CODE: ENGR 1180**
**COURSE TITLE: ENGINEERING MATHEMATICS I**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**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, modelling 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.

**LEVEL: 2**
**SEMESTER: 1**
**COURSE CODE: MATH 2230**
**COURSE TITLE: ENGINEERING MATHEMATICS II**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MATH 2240**
**COURSE TITLE: STATISTICS**
**NUMBER OF CREDITS: 2**
**PREREQUISITES:**
**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.

**LEVEL: 2**
**SEMESTER: 2**
**COURSE CODE: MATH 2250**
**COURSE TITLE: INDUSTRIAL STATISTICS**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Statistics and probability; frequency distributions, 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; distribution of sample means; point estimates; confidence intervals; statistical inference - tests of significance. Regression analysis; analysis of multiple regression; non-parametric statistical methods; analysis of variance; design of experiments; randomised block design and analysis.

**LEVEL: 3**
**SEMESTER: 1**
**COURSE CODE: MATH 3530**
**COURSE TITLE: MATHEMATICS III**
**NUMBER OF CREDITS: 3**
**PREREQUISITES:**
**COURSE DESCRIPTION:** Linear algebra: systems of equations, vector spaces, determinants, eigenvalues, similarity, positive definite matrices, singular value decomposition. Optimisation and mathematical programming, calculus of variations.

# SECTION 5 CO-CURRICULAR PROGRAMME

The Co-curricular programme is an integral part of the official credit system at undergraduate level at The University of the West Indies. It provides 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.

At the St. Augustine Campus, Co-curricular credits are currently awarded for involvement in the following courses:

**LEVEL 1**

| Course Code | Course Title | Credits |
|---|---|---|
| COCR 1012 | Workplace Protocol for Students | 3 |
| COCR 1001 | Minding SPEC | 3 |
| COCR 1031 | Managing My High (MY High): Alcohol Drugs and Addictive Behaviours | 2 |
| COCR 1030 | Technology Literacy | 3 |

**Desktop Productivity Professional Training with Microsoft Office Specialist (MOS) International Certifications :-**

| | | |
|---|---|---|
| COCR 1025 | Microsoft Word 2010 | 1 |
| COCR 1026 | Microsoft Excel 2010 | 1 |
| COCR 1027 | Microsoft PowerPoint 2010 | 1 |
| COCR 1028 | Microsoft Outlook 2010 | 1 |
| COCR 1029 | Microsoft Access 2010 | 1 |

All co-curricular course codes begin with COCR. Visit **http://sta.uwi.edu/cocurricular/** for course descriptions and registration instructions. New courses are to be introduced so keep checking the website for updates during the academic year. You can also speak with your Faculty COCR coordinators for help with course selection and for answers to questions related to the COCR Programme. You will find their names and contact information at the co-curricular website at: **http://sta.uwi.edu/cocurricular/contactus.asp** or check your faculty office.

Think you won't have time for co-curricular courses? Visit **http://www2.sta.uwi.edu/timetable** for the official timetable to see how you can work a COCR course into your schedule!

# LANGUAGES

## Centre for Language Learning (CLL)

*E-mail: CLL.FHE@sta.uwi.edu*
*Telephone: 645-2278*

The Centre for Language Learning is staffed by three full-time lecturers and a number of part-time foreign language tutors.

Courses are offered in:
**ARABIC, MANDARIN CHINESE, FRENCH, GERMAN, HINDI, ITALIAN, JAPANESE, PORTUGUESE, SPANISH, YORUBA**

**No prerequisite is necessary to pursue Level 1 courses. If students have knowledge of the target language, they will be assigned a class based on a Common European Framework of Reference for Languages. To register, students must complete a Registration Form at the CLL, where they will be further guided. To register for credit, students must do so online and then inform the Centre in person.**

**FEES**
**For credit: $400.00 per credit PLUS**
**Registration - TT$50.00 = $850.00**
Not for credit: Registration only - TT$50.00

Additional information is available in a separate student handbook by the Centre for Language Learning

## *CENTRE FOR LANGUAGE LEARNING:*

List of courses with 2 credit weighting

**SEMESTER I**

| Course Code | Course Title | Credits |
|---|---|---|
| FREN 1001 | French 1A | 2 |
| FREN 1002 | French 1B | 2 |
| FREN 1003 | French 2A | 2 |
| FREN 1004 | French 2B | 2 |
| FREN 1005 | French 3A | 2 |
| FREN 1006 | French 3B | 2 |
| SPAN 1101 | Spanish 1A | 2 |
| SPAN 1102 | Spanish 1B | 2 |
| SPAN 1103 | Spanish 2A | 2 |
| SPAN 1104 | Spanish 2B | 2 |
| SPAN 1105 | Spanish 3A | 2 |

**SEMESTER II**

| Course Code | Course Title | Credits |
|---|---|---|
| FREN 1001 | French 1A | 2 |
| FREN 1002 | French 1B | 2 |
| FREN 1003 | French 2A | 2 |
| FREN 1004 | French 2B | 2 |
| FREN 1005 | French 3A | 2 |
| FREN 1006 | French 3B | 2 |
| SPAN 1101 | Spanish 1A | 2 |
| SPAN 1102 | Spanish 1B | 2 |
| SPAN 1103 | Spanish 2A | 2 |
| SPAN 1104 | Spanish 2B | 2 |
| SPAN 1105 | Spanish 3A | 2 |
| SPAN 1106 | Spanish 3B | 2 |

## Course Descriptions

**COURSES WITH 2 CREDIT WEIGHTING**

## *FRENCH*

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: FREN 1001**
**COURSE TITLE: FRENCH 1A**
**NUMBER OF CREDITS: 2**
**PRE-REQUISITES: NONE**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that introduces students to the French language and to some of its cultural aspects. Students will develop an initial ability to communicate in the target language in basic situations relating to their personal lives. Students will be introduced to the concept of learner autonomy in language learning.
**ASSESSMENT:**
100% in course testing
Test 1: 40% of the overall mark
Test 2: 60% of the overall mark

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: FREN 1002**
**COURSE TITLE: FRENCH 1B**
**NUMBER OF CREDITS: 2**
**PRE-REQUISITE: FREN 1001 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Level 1A French. Students will enhance their ability to communicate in the target language in situations relating to themselves and areas of immediate relevance. Students will continue to develop their autonomy in language learning.
**ASSESSMENT:**
100% in course testing
Test 1: 40% of the overall mark
Test 2: 60% of the overall mark

**LEVEL I**
**SEMESTER: ALL**
**COURSE CODE: FREN 1003**
**COURSE TITLE: FRENCH 2A**
**CREDITS: 2**
**PRE-REQUISITES: FREN 1002 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in French 1B. Students will be able to function Increasingly Independently In all four skills in familiar situations and topics.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL I**
**SEMESTER: ALL**
**COURSE CODE: FREN 1004**
**COURSE TITLE: FRENCH 2B**
**CREDITS: 2**
**PRE-REQUISITES: FREN 1003 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in French 2A. Students will be able to function more independently in a variety of familiar situations and topics.
**ASSESSMENT:**
100% in course testing
Test 1: 40%; Test 2: 60%

**LEVEL I**
**SEMESTER: ALL**
**COURSE CODE: FREN 1005**
**COURSE TITLE: FRENCH 3A**
**CREDITS: 2**
**PRE-REQUISITES: FREN 1004 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in French 2B. Students will start showing a degree of fluency in the four different skills. Students will demonstrate more of the behaviours and attitudes of independent learners.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL I**
**SEMESTER II**
**COURSE CODE: FREN 1006**
**COURSE TITLE: FRENCH 3B**
**CREDITS: 2**
**PRE-REQUISITES: FREN 1005 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in French 3A. Students will be able to demonstrate increased ease when interacting whether orally or in writing. Students will demonstrate more of the behaviours and attitudes of independent learners.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

## *SPANISH*

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1101**
**COURSE TITLE: SPANISH IA**
**NUMBER OF CREDITS: 2**
**PRE-REQUISITES:** NONE
**COURSE DESCRIPTION**: A four skill (listening, speaking, reading and writing) course that introduces students to the Spanish language and to some of its cultural aspects. Students will develop an initial ability to communicate in the target language in situations relating to their personal lives. Students will be introduced to the concept of learner autonomy in language learning.
**ASSESSMENT**:
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL 1**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1102**
**COURSE TITLE: SPANISH IB**
**NUMBER OF CREDITS: 2**
**PRE-REQUISITES: SPAN 1101 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Level 1A Spanish. Students will enhance their ability to communicate in the target language in situations relating to themselves and areas of immediate relevance. Students will continue to develop their autonomy in language learning.
**ASSESSMENT:**
100% in course testing
Test 1: 40; Test 2: 60%

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1103**
**COURSE TITLE: SPANISH 2A**
**CREDITS: 2**
**PRE-REQUISITES: SPAN 1102 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Spanish 1B. Students will be able to function Increasingly Independently In all four skills in familiar situations and topics.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1104**
**COURSE TITLE: SPANISH 2B**
**CREDITS: 2**
**PRE-REQUISITES: SPAN 1103 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Spanish 2A. Students will be able to function more independently in a variety of familiar situations and topics.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1105**
**COURSE TITLE: SPANISH 3A**
**CREDITS: 2**
**PRE-REQUISITES: SPAN 1104 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Spanish 2B. Students will start showing a degree of fluency in the four different skills. Students will demonstrate more of the behaviours and attitudes of independent learners.
**ASSESSMENT:**
100% in course testing
Test 1: 40% Test 2: 60%

**LEVEL: I**
**SEMESTER: ALL**
**COURSE CODE: SPAN 1106**
**COURSE TITLE: SPANISH 3B**
**CREDITS: 2**
**PRE-REQUISITES: SPAN 1105 OR EQUIVALENT**
**COURSE DESCRIPTION:** A four skill (listening, speaking, reading and writing) course that builds on the work done in Spanish 3A. Students will be able to demonstrate increased ease when interacting whether orally or in writing. Students will demonstrate more of the behaviours and attitudes of independent learners.
**Assessment:**
100% in course testing
Test 1: 40% Test 2: 60%

# SECTION 6

Time to start thinking about …

# 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 programme, our research areas and any undergraduate requirements or prerequisites. For more detailed information and advice, please consult the Postgraduate Information Guide and speak with your Academic Advisor.

**About Postgraduate Study**
The Faculty of Engineering at the University of the West Indies offers 10 Diploma programmes, 27 MSc programmes, 15 MPhil programmes and 15 PhD programmes. Our Diploma and taught Masters programmes (eg. MASc) are particularly well suited to those who have already embarked upon their professional career and are looking to gain deeper insight into a specialised area in their field. 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.

**Definitions and Admission Requirements**
Below are brief descriptions of the different types of programmes offered by the Faculty and the general admission requirements. Please consult the Postgraduate Information Guide for more detailed information.

**Postgraduate Diplomas**
These programmes involve a mix of taught classes, examinations, coursework and a written paper. The duration is generally one year for full-time study and two years for part-time study.
**General Admission Requirements**:

- A Bachelor's Degree (at least Second Class Honours) in the specific subject area or in a related area with a record of experience in the subject area.
- Students with Pass degrees in the relevant field of study shall only be accepted for admission provided they have obtained at least two years experience in the field and have a satisfactory confidential reference from their employer.
- Applicants holding non-engineering Bachelor's degrees may be required to pass a qualifying examination.

**Master's Degrees**
All Master's programmes offered by the Faculty are generally one year in duration for full-time study and two years for part-time study. MSc, MASc, MfgE and the MRP programmes involve courses of instruction, examination by written papers, supervised design/research work which may be industry-based and oral and written presentations. Master of Philosophy (MPhil) degrees are research degrees and are awarded on the basis of an examination by thesis.

**General Admission Requirements:**

- MSc, MfgE and MRP candidates should normally possess at least a Second Class Honours Degree in the specific subject area or a degree in a related area with a record of experience in the subject area. Students with Pass degrees in the relevant field of study shall only be accepted for admission provided they have obtained at least two years experience in the field and have a satisfactory confidential reference from their employer.
- MPhil candidates should normally possess at least a Second Class Honours Degree or equivalent in the area in which he/she is working or in a related area. Holders of a Pass Degree or a General Bachelor's Degree must normally pass qualifying examinations.
- A candidate may be required to satisfy such prerequisites as are deemed necessary before proceeding to the Masters Degree programme.

**Doctor of Philosophy**
PhD degrees are research degrees and are awarded on the basis of an examination by thesis.
**Admission Requirements**

- Applicants who do not already have a Master's degree by research will be required to register for the MPhil first and may be allowed to upgrade their registration to the PhD upon satisfying the appropriate regulations.
- Candidates who have obtained a Master of Science (MSc) degree with distinction maybe allowed to register for the PhD provided a substantial part of the MSc project has been carried out in the relevant area.

**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.**

## *PREREQUISITE COURSES*

Some postgraduate programmes in the Faculty require students to have passed particular courses offered at the undergraduate level. In 2013-201 these include:

**DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING**

**MASC AND DIPLOMA PROGRAMMES**

**MAJOR IN COMMUNICATION SYSTEMS**
**PREREQUISITE COURSES:**

| | |
|---|---|
| ECNG 3001 | Communication Systems II |
| ECNG 3002 | Data Communication Systems |
| ECNG 3003 | Telecommunication Networks |

**MAJOR IN CONTROL SYSTEMS**
**PREREQUISITE COURSES:**

| | |
|---|---|
| ECNG 3004 | Control and Instrumentation II |
| ECNG 3032 | Control and Instrumentation I |

**MAJOR IN ENERGY SYSTEMS**
**PREREQUISITE COURSES:**

| | |
|---|---|
| ECNG 3008 | Power Electronic Circuits |
| ECNG 3010 | Electrical Machines & Drive Systems |
| ECNG 3012 | Power Systems Analysis |
| ECNG 3015 | Industrial and Commercial Electrical Systems |

**MAJOR IN INTEGRATED SYSTEMS**
**PREREQUISITE COURSES:**

| | |
|---|---|
| ECNG 3006 | Microprocessor Systems Design and Applications |

**DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING**

**MASTER OF PHILOSOPHY (MPHIL) OR A DOCTOR OF PHILOSOPHY (PHD) IN MECHANICAL ENGINEERING, MANUFACTURING ENGINEERING OR INDUSTRIAL ENGINEERING**
**PREREQUISITE COURSES:**

| | |
|---|---|
| IENG 3004 | Control Systems Technology |
| IENG 3013 | Simulation of Industrial & Business Processes |
| MATH 2240 | Statistics |
| IENG 3007 | Operations Research II |

**MECHANICAL/MANUFACTURING ENGINEERING OPTION**
**PREREQUISITE COURSES:**

| | |
|---|---|
| MENG 2008 | Manufacturing Technology |

**MSC PROGRAMMES IN PRODUCTION ENGINEERING & MANAGEMENT, PRODUCTION MANAGEMENT, & ENGINEERING MANAGEMENT**
**COURSE NAME: PRODUCTION TECHNOLOGY AND MATERIALS**
**PREREQUISITE COURSES:**

| | |
|---|---|
| MENG 2008 | Manufacturing Technology |
| MENG 3015 | Materials Technology |

**COURSE NAME: PRODUCTION SYSTEMS DESIGN**
**PREREQUISITE COURSES:**

| | |
|---|---|
| MENG 3006 | Production Management |

**COURSE NAME: ENGINEERING MANAGEMENT & OPTIMISATION**
**PREREQUISITE COURSES:**

| | |
|---|---|
| MENG 3013 | Product Design & Development |

# Postgraduate Programmes 2013-2014

All postgraduate programmes offered by the Faculty of Engineering may be pursued part-time or full-time. Programmes offered in the current academic year are as follows:

| **CHEMICAL ENGINEERING** | **Diploma** | **MSc** | **MPhil** | **PhD** |
|---|---|---|---|---|
| Food Science & Technology | • | • | • | • |
| Petroleum Engineering | • | • | | |
| Chemical Engineering | | | • | • |
| Chemical & Process Engineering | | • | | |
| Chemical & Process Engineering with Environmental Engineering | | • | | |
| Chemical & Process Engineering with Management | | • | • | |
| Reservoir Engineering | | • | | |
| Geoscience | | | • | • |
| Petroleum Geoscience | | | • | • |
| **CIVIL & ENVIRONMENTAL ENGINEERING** | **Diploma** | **MSc** | **MPhil** | **PhD** |
| Construction Engineering & Management | • | • | • | • |
| Construction Management | • | • | • | • |
| Construction Engineering | • | | • | • |
| Coastal Zone Processes | • | | | |
| Civil Engineering | | • | • | • |
| Civil with Environmental Engineering | | • | • | • |
| Coastal Zone Engineering & Management | | • | | |
| Environmental Engineering | | • | | |
| **ELECTRICAL & COMPUTER ENGINEERING** | **Diploma** | **MASc** | **MPhil** | **PhD** |
| Communication Systems (Major)* | | • | | |
| Control Systems (Major)* | | • | | |
| Energy Systems (Major)* | | • | | |
| Integrated Systems* (Computer Systems and Electronic Systems) | | • | | |
| **GEOMATICS ENGINEERING AND LAND MANAGEMENT** | **Diploma** | **MASc** | **MPhil** | **PhD** |
| Land Administration | • | | | |
| Geoinformatics | • | • | • | • |
| Urban and Regional Planning | • | • | • | • |
| Surveying and Land Information | | | . | . |

| **Postgraduate Programmes 2013-2014 cont'd** | | | | |
|---|---|---|---|---|
| **MECHANICAL & MANUFACTURING ENGINEERING** | **Diploma** | **MSc** | **MPhil** | **PhD** |
| Manufacturing Engineering* | | • | • | |
| Production Engineering & Management* | | • | | |
| Production Management* | | • | | |
| Engineering Management* | | • | | |
| Agricultural Engineering | | | • | • |
| Industrial Engineering* | | | • | • |
| Mechanical Engineering* | | | • | • |
| **OFFICE OF THE DEAN** | **Diploma** | **MSc** | **MPhil** | **PhD** |
| Project Management | | • | • | • |
| * Denotes undergraduate prerequisites. See below for details. | | | | |

# Research 2013-2014

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:

## *DEPARTMENT OF CHEMICAL ENGINEERING*

- Agricultural Crop Processing
- Biochemical Engineering
- Enhanced Oil Recovery
- Food Science & Technology
- Heavy Oil Recovery
- Industrial Pollution Control
- Mineral Processing
- Natural Gas Engineering
- Petroleum Processing Technology
- Process Design, Optimisation and Control
- Reaction Engineering
- Reservoir Engineering
- Sugar Technology
- Utilisation of Biomass

## *DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING*

- Behaviour of Structural Elements/Systems under Loadings
- Building Aerodynamics
- Caribbean Construction Firms
- Civil Engineering Economics
- Civil Engineering Project Management
- Computer-aided Engineering & Design
- Construction Economics
- Construction Finance
- Construction Management & Administration
- Construction Materials
- Construction Public Policy
- Construction Technology
- Contract Procurement Systems
- Disaster Mitigation & Management
- Disaster Mitigation & Management
- Earthquake & Hurricane Resistance Design
- Energy Management and Thermal Comfort in Buildings
- Environmental Engineering
- Expert Systems
- Flood Management
- Infrastructure Planning
- Infrastructure Technology in Construction Management
- Macro & Micro Economic Issues in Construction
- Maintenance, Rehabilitation & Finance
- Management of Quality in Construction
- Materials Engineering
- Productivity in Construction
- Resource Management
- Structural Design & Codes for Disaster Mitigation
- The Analysis & Design of Foundations
- The Analysis & Design of Hydraulic Systems
- The Analysis & Design of Structures
- Transport Engineering

## *DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING*

**COMMUNICATION SYSTEMS RESEARCH**

- Mobile technologies to demonstrably advantage traditionally excluded populations in the Caribbean
- Cognitive, semantic and related technologies to enable increased business effectiveness and personal productivity
- Communication network and application performance studies

**CONTROL SYSTEMS RESEARCH**

- Distributed Control Systems
- Optimum deployment of control networks for small and medium sized plants
- Algorithms for control system performance enhancement
- Web labs

**ENERGY SYSTEMS RESEARCH**

- Motors and Drives
- Renewable Energy
- Modelling, simulation and analysis
- Energy efficiency in motors and drives
- Alternative sources of energy
- Vector controlled motor drives, convertors and controllers
- Innovation systems for small developing countries

**INTEGRATED SYSTEMS RESEARCH**

- Artificial intelligence
- Robotics
- Computer Architecture
- Embedded systems
- Electronic System Design Methods
- Reconfigurable Hardware
- Linear Circuit Applications
- Near-Field Acoustical Holography for the PAN Acoustic Study
- Visualization

## *DEPARTMENT OF GEOMATICS ENGINEERING AND LAND MANAGEMENT*

- Priority areas and new themes of research have been identified and are being pursued. The research focus extends to areas covering geomatics, geodesy, land administration, spatial analysis, geoinformatics, spatial and settlements planning, the environment and ecosystems. The following are some topics of immediate concern:
  Mapping, monitoring, and modeling land use/cover dynamics for the sustainable management of the environment and natural resources.
- Image processing for the extraction of spatial information from aerial and satellite Imagery and Lidar.
- Coastal zone management, developing plans for coastal zones, coastal erosion and modelling coastal changes for sustainable development.
- Comparative analysis of planning statutes and administrative structures in the Caribbean.
- Design for sustainable development of urban and other settlement areas, environmental planning and policy planning.
- Urban structure and urban form in the Caribbean.
- Community and participatory planning.
- Non-structural measures for hazard mitigation.
- Formulation and definition of national datums.
- Geohazards; flooding and landslides, developing plans for areas exposed to natural and man-made hazards.
- Global climate change, climate change and food security, sea level change.
- Land tenure rights and practices including family land in specific jurisdictions.
- Quality assurance of spatial data and other land-related information, development of standards for spatial data exchanges.
- Relevant theory and methodology for Caribbean Planning and Resource Management.

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

## *DEPARTMENT OF MECHANICAL & MANUFACTURING ENGINEERING*

**Agricultural (Biosystems) Engineering**

- Thermal and Electrical Conductivity of Soils
- Hydroponics System of Irrigation
- Computer-Aided Irrigation Water Scheduling
- Engineering Properties of Soils and Water Treatment Sludge
- Evaluation of Livestock Structures
- Drying of Agricultural Materials
- Post-Harvest Technology
- Engineering Design of Machinery

**Industrial Engineering**

- Workstudy and Ergonomics
- Testing of the Eco Tech Tutor
- Quality Management Systems
- HSC Radiation Management Model
- Strategic Formulation, Performance and Knowledge Measurement
- Comparative Studies on Different Industrial Layouts
- Science, Technology and Innovation

**Manufacturing and Mechanical Engineering**

- Computer Integrated Manufacture
- Rapid Prototyping Paradigms for Virtual Manufacturing Systems
- Computer-Aided Design and Drafting of Machine Elements
- Modeling, Scheduling and Analysis of Flexible Manufacturing Systems
- Cellular Manufacturing Systems
- Virtual Learning (e-Learning) to Aid Distance Engineering Education
- Disaster Management
- Thermal Conductivity of Engineering Materials
- Heat Transfer
- Solar Engineering
- Vehicle Emissions
- University-Industry Collaboration and Technology Transfer

## *For More Information and Advice*

**FIRST**

- Request the 2013-2014 Faculty of Engineering Postgraduate Information Guide CD OR download the guide from the UWI St. Augustine website **http://www.sta.uwi.edu**

**THEN**

- Contact the following person for an appointment:
  *Research & Postgraduate Student Affairs*
  ***Lewis, Winston G.***
  BSc (Eng), MPhil (UWI), PhD (Tuns), MAPETT, MISS, MTSISS, REng
  Professor of Industrial Systems Engineering
  (Manufacturing Technology, Plant Layout & Ergonomics)
  Ext: 83181

# APPENDIX TO REGULATIONS

## A1: Additional GPA Designations

AB Absent - when a student is absent from an examination for acceptable reasons other than medical reasons.

AM Absent Medical

CR Credit

DIS Disqualified

E Exemption.

EC Exemption with credit.

EI Examination 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 authorised medical practitioner

FNP Failed – No Penalty

FO Fail Oral

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 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' letter 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

# A2: ACADEMIC SUPPORT/ DISABILITIES LIAISON UNIT (ASDLU)

The Unit 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 and evening students, international students, student athletes and students with special needs (disabilities).

**Support Services for STUDENTS WITH SPECIAL NEEDS (Temporary and Permanent)~**

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

Students with special needs should make contact 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.

**Academic Support Services for ALL STUDENTS**

- Educational Assessment – LADS (dyslexia) – LASSI (Study Skills)
- Time Management
- Examinations Strategies
- Workload Management
- Career Planning
- Study Skills
- Peer Tutoring

**How do I register at ASDLU?**

- Visit ASDLU to make an appointment to meet the Co-ordinator.
- Complete the required registration form.
- Students with disabilities must submit a medical report from a qualified medical professional.
- An assessment of the student's needs will be conducted.
- The required assistance will be provided.

All Students experiencing academic challenges should communicate with **Ms. Jacqueline Huggins**, Coordinator, Academic Support/Disabilities Liaison Unit, south of The Alma Jordan Library.

Tel: 662-2002 Exts 83921, 83923, 83866, 84254.

Hours: 8: 30 am - 4:30 pm Monday, Wednesday & Friday
8:30 am - 6:00 pm Tuesday & Thursday to accommodate Part-time and Evening students.

Email: **ASDLU.Office@sta.uwi.edu**.

Registration forms are available at the office or from the website at **www.sta.uwi.edu/asdlu**

# A3: 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.

# A4: 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:

(i) awarded a fail mark;
(ii) excluded from some or all further examinations of the University for such period as it may determine;
(iii) 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.

# A5. 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 _____

UWI

ST. AUGUSTINE
CAMPUS