



THE UNIVERSITY OF THE WEST INDIES
CAVE HILL CAMPUS
FACULTY OF SCIENCE AND TECHNOLOGY

HANDBOOK

2016 - 2017



FACULTY OF SCIENCE AND TECHNOLOGY

This booklet gives information on Courses offered in the Faculty of Science and Technology at the Cave Hill Campus of the University of the West Indies (Barbados). For courses offered at the other Campuses, please see Faculty booklets for the Mona (Jamaica) and St. Augustine (Trinidad & Tobago) and the Open Campus.

This Guide is intended for students entering the Faculty of Science and Technology from academic year 2016 - 2017. Continuing students must refer to Faculty Regulations that govern their year of entry – available on the Faculty website.

THE UNIVERSITY RESERVES THE RIGHT TO MAKE SUCH CHANGES TO THE CONTENTS OF THIS PUBLICATION AS MAY BE DEEMED NECESSARY.

Disclaimer:

The information in this booklet is accurate at the time of printing. Subsequent publications may therefore reflect updated information. Students should consult their Dean where clarification is required.

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INTRODUCTION TO THE FACULTY

The University of the West Indies is a regional and international institution primarily serving the needs of the Commonwealth Caribbean. Established in 1948 at Mona, Jamaica, as a college in special relationship with the University of London, it received full university status in 1962, as an independent degree granting institution. In 1960, a second campus was established at St Augustine, Trinidad, and in 1963 teaching started in Barbados, first at a temporary site at the Bridgetown Port and then at the Cave Hill Campus. Sciences have been taught at the Cave Hill Campus of the University of the West Indies from its inception. The Faculty was formerly known as the Faculty of Natural Sciences and later the Faculty of Pure and Applied Sciences before deciding that the name Faculty of Science and Technology best represented the degrees being offered. Our full-time Academic Staff are mainly Caribbean nationals but we are also very much an international Faculty with about one third of our lecturers drawn from countries far and wide. Our degree programmes are well-respected regionally and internationally with many of our graduates working or pursuing further studies overseas.

The Faculty comprises three sections:-

- Department of Biological & Chemical Sciences – undergraduate & graduate programmes
- Department of Computer Science, Mathematics & Physics – undergraduate & graduate programmes
- Centre for Resource Management and Environmental Studies (CERMES) – graduate programmes

In the undergraduate BSc programme, courses are offered in all major scientific disciplines, with first year courses also taught at Tertiary Level Colleges in Antigua and St. Lucia. Students may Major in one or two disciplines and current enrollment in the Faculty is just over one thousand undergraduates, most of whom are full-time students. Science graduates may register for the research degrees of M.Phil. and Ph.D. under the supervision of a member of the Academic Staff. The Faculty also offers MSc. programmes in various fields. CERMES offers an MSc. in Natural Resource and Environmental Management.

The Department of Computer Science and Mathematics offers a series of taught Masters programmes from the discipline of Computer Sciences, as well as the MSc. in Renewable Energy Management. A new MSc. in Biosafety will begin this academic year and will be offered by the Department of Biological and Chemical Sciences.

The research interests in the Faculty are diverse, addressing both fundamental questions in Science as well as finding scientific solutions to real life problems facing Caribbean people. Faculty members also constitute an unmatched source of expertise to Governments, Non-Governmental Organisations and the Private Sector in providing technical advice. The Sports Agronomy Research Unit (SARU), within the Department of Biological & Chemical Sciences, conducts basic and contract research and provides consultancy services in the area of living grass surfaces for sporting and recreational activities. It complements the UWI Centre for Cricket Excellence. Through collaboration with the Caribbean Institute for Meteorology and Hydrology, the Faculty offers a Major in Meteorology within the BSc degree.

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THE CARIBBEAN INSTITUTE FOR METEOROLOGY & HYDROLOGY (CIMH)

Is an Affiliate Institution whose Faculty members teach our degree programme in Meteorology

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Professor The Honourable Sir George Alleyne

OCC, MBBS UCWI, MD Lond, FRCP, FACP (Hons.), Hon. DSc UWI

Vice-Chancellor

Professor Sir Hilary Beckles

BA, PhD Hull, Hon DLitt, Hull, Hon DLitt Knust

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Sir Paul Altman

GCM, BCH, JP, BBA Mia, Hon. LLD UWI

Dr. Marshal Hall

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Professor Andrew Downes

BSc (Hons), MSc UWI, PhD Manc

Professor V. Eudine Barriteau – Cave Hill

BSc UWI, MPA NYC, PhD Howard

Professor Archibald McDonald

MBBS, DM (Surg) UWI, FRCSEd, FACS

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Dr Luz Longworth

BA UWI, MBA UWI, MA Queens, DBA Bath

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Professor Ishenkumba Kahwa – Mona

BSc, MSc Dar, PhD Louisiana State

Professor Rhoda Reddock – St. Augustine

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Professor Julie Meeks Gardner – Open Campus

BSc, Dip Nutrition, PhD UWI

University Registrar

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University Bursar

Mr. Archibald Campbell

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University Librarian

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Dr. Michael Bucknor – Mona

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Science & Technology Faculty Clerk	Mrs. Denise Greenidge BSc	417-4471
Secretary	Ms. Kathy-Ann Watson	417-4120
Summer School Representative	Mrs. Nidra Grant	417-4114

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Administrative Assistant	Mrs. Eudine Spooner	417-4139
Administrative Assistant	Ms. Ingrid Lashley	417-4135
Stenographer/Clerk	Mrs. Ann Arthur	417-4137

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Stenographer/Clerk (Transcripts & Academic Records)	Ms. Esther Layne, BSc	417-4142

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Administrative Assistant	Ms. Maria Dodson, BSc	417-4910
Science & Technology Faculty Clerk	Miss Tara Moseley, BSc	417-4905

APPLICATION PROCEDURE

Applications for entry to all Faculties must be received on or before January 10 of the year in which the applicant wishes to enter and should be accompanied by:

Certified evidence of all examinations passed;

- A signed statement from parent/guardian agreeing that the applicant shall become an undergraduate in the Faculty*
- A signed statement from parent/guardian or from a responsible individual or authority that funds will be available for the payment of fees*
- The relevant application fee.

Students are encouraged to apply on-line at www.cavehill.uwi.edu/apply. Application forms may also be obtained from the Student Affairs Section at Cave Hill or other campuses of the UWI. * Not applicable for Mature students

Table 1:

Minimum CAPE (or equivalent) qualifications for entry to 3-Year BSc Science Programmes

BSc Major in	Required CAPE Passes
Biochemistry	Biology & Chemistry
Biology ¹	Biology & Chemistry
Ecology	Biology & Chemistry
Microbiology	Biology & Chemistry
Chemistry ¹	Chemistry & another subject
Computer Science ¹	Mathematics & another subject
Information Technology (IT)	Mathematics & another subject
Mathematics ¹	Mathematics & another subject
Electronics	Mathematics & Physics or another subject
Physics	Mathematics & Physics or another subject
Meteorology	Mathematics & Physics
Engineering Physics	
BSc Options ²	
Computer Science (or IT) & Accounting	Mathematics & another subject
Computer Science (or IT) & Management	Mathematics & another subject
Mathematics & Economics	Mathematics & another subject
Mathematics & Accounting	Mathematics & another subject
Science & Management	Mathematics & requirements as for the Science Major
Science & Psychology	Requirements as for the Science Major

¹ Double Major also offered

² Numbers taking these Options are restricted

INTERNATIONAL EXCHANGE/ STUDY ABROAD PROGRAMME

The exchange programme allows students to spend one or two semesters abroad at overseas universities in order to broaden their experience, understanding and perception. Such exchanges typically take place in Year 2 of the BSc degree and the application deadline is December 1st of the year prior to the exchange. UWI students, while at exchange Universities, continue as regular full-time students of the University of the West Indies. They pay UWI tuition and other fees and pursue matching and approved courses for credit. Credits earned abroad are transferred to UWI and applied to regular Faculty degree requirements in accordance with Regulation 38. For study abroad the requirements may vary. Interested students are advised to consult the International Exchange/Study Abroad brochure available from the Admissions Section of Student Affairs. This contains a current list of Universities with which UWI has entered into cooperative arrangements for study exchanges. Programmes of study must be pre-approved by the Dean.

UNIVERSITY REGULATIONS ON PLAGIARISM

(First Degrees, Diplomas and Certificates)

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.

PRIZES AWARDED ANNUALLY IN THE FACULTY OF SCIENCE AND TECHNOLOGY

THE GRAHAM GOODING BIOLOGY PRIZE

The prize consists of a commemorative scroll and voucher for BDS \$ 600.00 to be spent on books related to the Biological Sciences. It will be awarded to the best student majoring in the Biological Sciences (Biochemistry, Biology, Ecology, Microbiology) based on the student's performance (minimum B+ average) in the courses comprising the Biological major.

R. L. SEALE & CO. LTD. PRIZE IN CHEMISTRY

This prize consists of a book voucher of BDS \$600.00 and a commemorative scroll. It is awarded to the best student (who meets the standard) on the basis of performance in Chemistry courses during the final two years of the programme.

SYSTEMS CONSULTING LTD. (SCL) PRIZES

in (a) Computer Science

(b) Computer Science and Accounting or Computer Science and Management

These prizes consist of a cash voucher of BDS \$1500 to be spent on computer-related materials. Students must have completed Year 1 of the Science and Technology Programme; and have fulfilled the Year 1 requirements for the major in Computer Science or Computer Science and Accounting or Computer Science and Management and have attained the highest average grade which must be at least B+.

None of these courses should have been repeated.

SCL will offer each Prize winner a three-month paid work attachment at SCL after graduation.

SYSTEMS CONSULTING LTD. (SCL) PRIZE IN MATHEMATICS

The prize consists of a voucher of BDS \$500 to be spent on books on Mathematics and related fields. Students must be graduating in the current year, have majored in Mathematics and have attained the highest average marks in the Mathematics courses relevant to the major with an overall average grade of at least B+.

None of the courses should have been repeated.

MOORE PARAGON PRIZE IN PHYSICS

The prize consists of a voucher for books and/or student materials, of a value of BDS \$500. The prize will be awarded annually to the student who obtains the highest average marks in the First Year courses offered in Physics, provided that the student obtains, at least a B+ average and continues within the degree programme in the Faculty of Science and Technology, Cave Hill.

None of the courses should have been repeated.

MOORE PARAGON PRIZE IN ELECTRONICS

This prize consists of a voucher for books and/or student materials of a value of BDS \$500. The prize will be awarded annually to the student who obtains the highest average marks in the First Year courses offered in Electronics, provided that the student obtains, at least a B+ average and continues within the degree programme in the Faculty of Science and Technology, Cave Hill.

None of these courses should have been repeated.

FACULTY PRIZE

This prize consists of a voucher of BDS \$ 500 to be spent on books. It is awarded to the Part I/Level I student with the best academic performance.

DEAN'S PRIZES, FACULTY OF SCIENCE AND TECHNOLOGY

There shall be two (2) Prizes awarded annually, called the Dean's Prizes, Faculty of Science and Technology. The Prizes shall be awarded to two (2) students registered in the Faculty of Science and Technology who:

- have obtained at least an A average grade over 64 credits in the Faculty of Science and Technology courses at Levels II/III
- should be nominated by their Department and interviewed by an Interdisciplinary panel. The names shall be inscribed on an appropriate plaque to be displayed in the Faculty Office.

The value of the Prizes shall be:

FIRST PRIZE (Bds)	\$900.00
SECOND PRIZE (Bds)	\$500.00

THE PFIZER CARIBBEAN SCIENCE PRIZE

Valued at BDS \$1000, it is open to undergraduate students registered for a major in Biology, Chemistry or their sub-disciplines in the Department of Biological and Chemical Sciences.

LOUIS CHINNERY ECOLOGY PRIZE

A commemorative scroll and a voucher for BDS \$900.00 to be used in the purchase of books related to the Biological/Ecological/Environmental Sciences. Awarded to the best student majoring in Ecology with a minimum B+.

GLOSSARY TO THE REGULATIONS

TERM	DEFINITION
Anti-requisites	Two courses of which credit may be granted for only one. Bodies on the basis of criteria such as method of enquiry, axioms, areas of application.
Course	A body of knowledge circumscribed by a syllabus to be imparted to students by sundry teaching methods and usually followed by an examination.
Credit	A measure of the workload required of students. 1 Credit Hour = 1 hour lecture/tutorial/problem class per week OR 2 hours laboratory session per week, for a Semester.
Cumulative GPA	Grade point average obtained by dividing the total grade point earned by the total quality hours for which the student has registered for any period of time excluding courses taken on a Pass/Fail basis, audited courses, courses taken for Preliminary credit, incomplete and in-progress courses.
Discipline	A body of knowledge encapsulated in a set of courses distinguishable from other such bodies on the basis of criteria such as method of enquiry, axioms, areas of application.
Elective	A course within a programme taken by choice of the student.
Faculty Courses	All courses except Foundation and Co-curricular courses.
Foundation Courses	Broad-based courses, three of which must be taken, and which provide a general foundation of knowledge.
Honours GPA	Weighted grade point average used to determine the class of degree. This GPA is computed on the basis of all courses done in the Advanced Part (Levels 2 & 3) of the degree programme, weighted with respect to credits and to earned quality hours.
In-Faculty Courses	All Faculty courses originating in the Science Faculties.
Level	A measure of the standard of a course, designated at UWI by the first digit in the course number.

Major	30 credits (minimum) from prescribed courses at Levels 2 & 3 (as defined).
Marginal Failure	A score for the overall examination of a course which is not more than 5 marks below the minimum pass mark for that course.
Minor	15 credits (minimum) of prescribed courses at Levels 2 & 3 (as defined).
Option	A prescribed programme, comprising in-Faculty and, in some cases, out-of-Faculty courses, leading to a specific degree.
Out-of-Faculty Courses	All Faculty courses originating in Faculties other than the Science Faculties.
Preliminary Course	A Level 0 course used to satisfy entry requirements but does not contribute towards the requirements for the award of the degree.
Pre-requisite	A course which must be passed before another course for which it is required may be pursued.
Programme	A selection of courses (designed to achieve pedagogical goals) the taking of which is governed by certain regulations and the satisfactory completion of which (determined by such regulations) makes a candidate eligible for the award of a degree/diploma/certificate.
Science Faculties	The Faculties of Science and Technology at Cave Hill, Mona and St. Augustine.
Semester GPA	Grade point average (GPA) computed on the basis of all courses done in a semester, without reference to weighting except in terms of credits. (The terms Grade Point, GPA, Quality Hours and Quality Points are defined in The UWI Grade Point Average Regulations Booklet).
Subject	An area of study traditionally assigned to the purview of a department.
Supplemental Examination	A re-sit of an examination of a course which is not more than 5 marks below the minimum pass mark for that course.
Supplementary Oral	An oral examination, offered on recommendation of Department and Faculty, to candidates who have registered a marginal failure in a Level 2 or 3 course.

FACULTY REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE

All students of the University are subject to the University Regulations for Students approved by the Senate of the UWI.

Where there is conflict between the regulations of any Faculty and the University Regulations, the University Regulations shall apply.

A. QUALIFICATION FOR ADMISSION

1. In order to be admitted to the **three-year degree programme**, candidates must satisfy the University requirements for Matriculation (see The UWI University Regulations for Students) and have passed Mathematics and two approved science subjects [Appendix I(b)] at CSEC General Proficiency level at Grades I, II or, since 1998, Grade III (or equivalent qualification)
and
(a) Have obtained passes in four Units at CAPE, at least two Units in one subject, all at Grade V or better (or equivalent qualification). One of the CAPE subjects must be an Approved Science subject [see Appendix I(a)].
or
(b) Have an approved Associate Degree with a GPA of 2.5 (or equivalent qualification) or higher, from a Tertiary Level Institution.

(**N.B.** Candidates must also satisfy Departmental Requirements).
2. In order to be admitted to the **four-year degree programme**, candidates must satisfy the University requirements for Matriculation (see The UWI University Regulations for Students) **and** have passed Elementary Mathematics at CSEC General Proficiency level at Grades I, II or, since 1998, Grade III (or equivalent qualification) plus at least two of the disciplines listed in Appendix I(b).

B. OUTLINE OF THE DEGREE PROGRAMME

3. The degree of B.Sc. is awarded on the basis of a programme of studies comprising combinations of courses in Science disciplines, together with certain Foundation courses. Approved Out-of-Faculty (see Glossary) courses may be included.
4. The Science Faculties offer the following Bachelors degrees in Science (the terms Major, Minor, Option etc., are defined in the Glossary):

- (a) **A degree with a single Major** (30 credits minimum from Levels 2 and 3) or a **double Major** in one or two Science disciplines (2 x 30 credits minimum or 1 x 60 credits minimum, from Levels 2 and 3). (See Appendix II for a list of Science Majors offered).
 - (b) **A degree with a single Major in a Science discipline plus**
 - (i) one or two Minors from other distinct Science disciplines (each with **15** credits minimum from Levels 2 and 3)
 - (ii) a Major, or one or two Minors, from other Faculties. Out-of-Faculty Majors and Minors are governed by the regulations of the Faculty of origin. Only certain such combinations are allowed and these are considered Option. (See Appendix VI).
5. The following types of courses, which may consist of both theoretical and practical parts, are offered by the University:
- (a) Courses taught by the Science Faculties (**in-Faculty courses**) include Preliminary (Level 0) and Levels 1, 2 and 3 courses. (Preliminary courses may be used to satisfy entry requirements of Regulation 1 above, but do not contribute towards the requirements for the award of a degree.)
 - (b) **Service courses**, which provide students with basic techniques and skills needed for dealing with the academic programme.
 - (c) Approved **Out-of-Faculty courses** which may contribute toward the requirements for the award of a degree.
 - (d) **Foundation courses** (see Appendix III) which are given throughout the University to augment the general education of students.
 - (e) **Co-curricular activities** approved for credit by Academic Board. A maximum of **three** credits of co-curricular activities may be included as part of the credits required for the award of a degree, but shall not be taken into account in the determination of the Cumulative GPA or the class of degree. They may not be substituted for Foundation Courses. Co-curricular credits gained in excess of **three** will be entered on the student's transcript but will not contribute toward the requirements for the degree.
6. Courses normally extend over not more than one semester, but in special cases may extend over two semesters. The contact hours for a course are expressed in terms of Credit Hours (credits) and the credit-rating of a course is determined by the Faculty which administers the course. (See Appendix IV).
7. In order to be eligible for award of the degree, candidates **must**:
- (a) have been in satisfactory attendance for a period equivalent to at least **six** semesters of full-time study from entry into Level 1;

and

- (b) have passed courses totaling a **minimum** of **93** credits from Level 1, 2 and 3 Faculty and Foundation courses for the degree as follows:

Level 1	24
Level 2 and Level 3	60
Foundation courses	<u>9</u>
	<u>93</u>

- (i) A minimum of **15** credits at Level 1 and **30** credits at Levels 2 and 3 must be taken from in-Faculty courses.
- (ii) Specific Options, or Cross-Faculty programmes, may require more than **93** credits (see Appendix VI)
- (c) have a Degree GPA of at least **2.00**.

C. REGISTRATION

8. A student pursuing a degree in the Faculty may register full-time or part-time. A student who is in full-time employment may pursue a degree on a part-time basis only.
9. Students must register for courses at the beginning of the academic year. Time limits governing changes in registration are as outlined in the student handbooks for each Campus. A student is deemed to be registered for a course only after his/her financial obligations to the University have been fulfilled.
10. Registration for any course (except audited courses) automatically implies entry for the associated examinations. A student who fails to attend the examinations without having previously withdrawn from the course (see Reg.9), or without having tendered evidence of illness at the time of the examinations, certified by a medical practitioner recognized by the University, will be deemed to have failed the course. **Medical certificates must reach the Campus Registrar no later than seven days after the date of the examination concerned.**
11. (a) A student who has passed a course will not be permitted to re-register for that course.
- (b) Likewise, students may not register for Preliminary courses in a subject which overlaps substantially with any CAPE/GCE A-Level courses (or equivalent) previously passed.

D. PROGRESS THROUGH THE PROGRAMME

12. Students admitted into the four-year degree programme (Reg.2) who have already obtained **one** CAPE/GCE A-level pass (or equivalent) in an approved science subject, may be permitted to register for up to **9** credits of Level 1 courses.
13.
 - (a) Full-time Part I students are required to register for a minimum of **twelve** credits from Faculty courses and Foundation course, per semester. A student registering for less than twelve credits will be deemed to be a part-time student.
 - (b) In order to register for Level 2 courses, a student must normally pass a minimum of **18** credits in Level 1 Faculty courses. At least **12** of these credits must be from in-Faculty courses.
 - (c) A student must not register for less than two courses in any one semester, except with the permission of the Dean.
 - (d) The normal load for a full-time student is 15 course credits per semester, plus one Foundation course ie: 33 credits over Semester I & II.
14. The maximum number of credits for which a student may register in any one semester is 18 credits, if full-time, and 11 credits, if part-time.
15.
 - (a) Students **must** make a **final** declaration of their proposed major(s) and/or minor(s) by the end of the registration period of the semester in which they intend to graduate.
 - (b) Students **must** graduate as soon as they have met the requirements for the degree for which they are registered.

E. EXAMINATIONS

16. In order to pass a course, a student must have been in satisfactory attendance at the course and must have satisfied the examiners in the associated examinations.
17. The examination associated with each course shall be conducted mainly by means of written and/or practical papers, normally taken at the end of the semester in which the candidate has registered for the courses concerned. However, oral examinations as well as performance in course work in the form of essays, in-course tests, research papers, projects, or continuous assessment of theoretical and/or practical work may contribute towards the final grade awarded in a course.
18.
 - (a) When practical papers and/or practical coursework contribute towards an examination, candidates must satisfy the examiners in both the theoretical and practical aspects of the course. On the basis of performance in the practical component of the course, a candidate may, on the recommendation of the Department

concerned, be exempted from the practical part of the examination.

(b) To obtain a pass in Computer Science and Mathematics courses, candidates must pass both coursework and final examination.

19. A candidate who marginally fails the examination associated with a Preliminary or Level 1 course may, if recommended by the relevant Department, be granted permission by the Board of Examiners to sit a Supplemental Examination. Such permission will be given on the basis of the performance of the candidate in the courses concerned.
20. A *finalist* who marginally fails a course needed for graduation, having satisfied the Departmental requirements, may, at the discretion of the Faculty Board of Examiners, be offered a Supplementary Oral. Any candidate who satisfies the examiners in a Supplementary Oral will be given the minimum passing grade in the course. No more than two Supplementary Orals may be gained. However, a third oral examination may be granted to final year students in circumstances when passing a single course is all that is required. *A Supplemental Oral precludes the student requesting a Remark.*
21. A candidate who fails the examination associated with a course may be given permission to repeat the course and the examination on a subsequent occasion.

In the event that such a candidate has satisfied the examiners in the coursework, the candidate may, on the recommendation of the relevant Department, be exempted from the coursework passed. If such a recommendation has been made, the candidate may apply to the Dean for permission to take the examination without attending the course (Exam Only).

22. The Academic Board of a candidate's Campus on the recommendation of the Faculty Board concerned, may debar the candidate from writing the examination associated with a course if the candidate has not attended and/or performed satisfactorily in the course. ***The grade for such a candidate will be recorded as Absent Fail.***

F. GPA* AND CLASS OF DEGREE

23. (a) A ***Semester grade point average*** which includes ***all*** approved courses for which the student is registered in a semester, whether passed or failed, will be calculated for the determination of academic standing.
- (b) A ***Cumulative grade point average*** which includes all courses completed ***excluding*** those taken on a Pass/Fail basis, audited courses, Preliminary courses and courses designated I or IP will be calculated and recorded on the student's transcript.

- (c) An **Degree grade point average** including all Level 2 and 3 courses, whether passed or failed, will be calculated for determination of the class of the degree. (See Appendix V for the relationship between marks, grade point average and class of degree).
- 24. All courses included in the computation of the grade point averages in Regulation 23, are weighted according to their credit rating.
- 25. All courses included in the computation of grade point averages in Regulation 23, are weighted according to their credit rating.

G. LEAVE OF ABSENCE AND VOLUNTARY WITHDRAWAL

- 26. (a) A student who wishes to be absent from the Faculty for a semester or more may apply for Leave of Absence, through the Dean, to the campus Academic Board, stating the reasons for the application.
- (b) Leave of Absence will not be granted for more than **two** consecutive semesters in the first instance. However, students may apply for an extension of leave.
- (c) Leave of Absence will not be granted for more than **four** consecutive semesters.
- (d) Applications for Leave of Absence or extension thereof should normally be submitted by the end of the registration period in the relevant semester.
- 27. A student who registers for no courses in two successive semesters without having obtained Leave of Absence will be deemed to have withdrawn from the Faculty.
- 28. A student who voluntarily withdraws from the university and who applies for re-admission within **five** years shall be granted exemption and credit for all courses previously passed unless the Department concerned declares that the material covered in a course has become outdated. All grades previously obtained except those for courses declared outdated shall be used in the determination of the GPA of such a student.

H. TIME LIMITS FOR COMPLETION & ENFORCED WITHDRAWALS

- 29. For the purposes of Regulations 29 & 30 below, any semester in which a student is registered part-time or any registration for the maximum number of credits for Summer school will be counted as half of a semester of full-time study. After the total of equivalent full-time study has been obtained in this way, it will be rounded down to a whole number.
- 30. (a) A student whose Semester Grade Point Average is less than **2.00**, will be deemed to be performing

unsatisfactorily and will be placed on Warning.

- (b) A student on Warning, whose Semester grade point average is less than **2.00**, will be Required To Withdraw from the Faculty.
31. (a) Students admitted to the programme under Reg.1 shall complete the requirements for the degree in a minimum of **six** or a maximum of **ten** semesters of full-time study.
- (b) Students admitted to the programme under Reg.2 shall complete the requirements for the degree in a minimum of **eight** or a maximum of **twelve** semesters of full-time study.
 - (c) Students who cannot complete the programme within the maximum periods given in (a) and (b) above will normally be Required To Withdraw from the Faculty at the end of the academic year in which the maximum is reached.
32. In the event that a student has exhausted the maximum periods mentioned in Reg.30 above, but still requires for the completion of the degree programme,

Either:

(a) passes in courses totaling no more than **six** credits,

or:

(b) passes in Foundation courses only,

the Faculty Board may at its discretion recommend to Academic Board an extension of the period of study by **one** or **two** semesters.

33. For the purposes of Regulations 28 to 31 above, any semester for which a student has obtained Leave of Absence from the Faculty shall not be counted (see Reg.25).
34. Notwithstanding Regulations 28 to 32 above, Academic Board may, on the recommendation of the Faculty Board, require the student to Withdraw from the Faculty at the end of any semester on grounds of persistent neglect of work and/or repeated failure in examinations.
35. A student Required To Withdraw from one Faculty:
- (a) may register immediately in another, if in the opinion of the student and the Dean of the receiving Faculty this is desirable and the student satisfies that Faculty's entry requirements;
 - (b) will be required automatically to withdraw from the University if not granted registration in another Faculty; and
 - (c) may not register in the ensuing Academic Year, for any courses in the Faculty from which (s)he had been Required To Withdraw.
 - (d) if readmitted and Required To Withdraw for a second time, will not be considered for readmission until a

minimum period of **five** years has elapsed.

36. A student who was Required To Withdraw for reasons of failure to progress may be readmitted to the Faculty on the following conditions:
- (a) A minimum of **one** year has passed since the date of withdrawal
 - (b) The Faculty is satisfied that the circumstances attending the reasons for the withdrawal have altered substantially.
 - (c) All grades previously obtained, except for courses to be repeated (having been deemed outdated), shall continue to apply for the purpose of determining the student's GPA.
 - (d) Subject to The UWI Grade Point Average Regulation 11, courses pursued at an institution other than the UWI during the period of withdrawal may be eligible for credit.
 - (e) Courses pursued in The UWI Summer School during the period of withdrawal shall be included in all relevant grade point average calculations if the student re-enters the UWI.

I. EXEMPTIONS AND TRANSFERS

37. Holders of degrees from approved universities, or candidates who have partially fulfilled the requirements of such degrees, may apply to the Board for Undergraduate Studies, through the Faculty Board of the candidate's campus, for exemption from Level 1 courses. Each such application will be considered on its own merit.
38. Students on transfer between different BSc degree programmes or from other programmes of study within the University may, on the basis of passes already obtained, and on the recommendation of the Departments concerned, be exempted from some or all of the Level 1 courses, and some of the Level 2 and/or Level 3 courses. Students exempted from all Level 1 courses may complete the degree programme in a minimum of four or a maximum of eight semesters of full-time study from the time of transfer. Students exempted from all Level 1 courses and some Level 2 and/or Level 3 courses may complete the degree programme in a minimum of two semesters of full-time study from the time of transfer.
39. (a) A student who wishes to take academic courses as an exchange/transfer student at an institution other than the UWI and to apply those credits toward the degree must obtain written approval in advance from the Dean. Failure to obtain written approval in advance may preclude the acceptance of the credits.
- (b) A student must have a minimum GPA of **3.00** by the end of Semester II to be approved as an exchange/transfer student in the following academic year.
- (c) Where the course to be taken is to be substituted for a UWI course, the content of the course must be

certified by the relevant Department as being equivalent to the UWI course. Course outlines and syllabuses must be provided by the student in order to permit the evaluation of the course content.

- (d) A student may **not** take courses for degree credit at an institution other than the UWI during the semester in which he or she completes or is expected by the Faculty to complete the requirements for graduation from the UWI.

J. AEGROTAT DEGREE

- 40. (a) A candidate who, by reason of illness, was prevented from attending examinations or part of the examinations associated with a Level 2 or 3 course in the year of anticipated graduation may apply to the Board for Undergraduate Studies through the University Registrar, for an Aegrotat pass in the course. Such an application will be granted only if all the following conditions are satisfied:
 - (i) The appropriate Head of Department reports that, on the basis of the candidate's performance during the period preceding the examinations, the candidate was expected to pass the examinations concerned and has satisfactorily completed any associated course work.
 - (ii) The application reaches the University Registrar not later than **30** days after the date of the last paper in the examination concerned.
 - (iii) The application is accompanied by a medical certificate attesting to the illness and issued by a medical practitioner recognized for this purpose by the University.
- (b) No grade will be awarded in respect of an Aegrotat pass, and a candidate having been awarded an Aegrotat pass will not be allowed to re-enter the examination for the course concerned on a subsequent occasion. An Aegrotat pass may not be used to satisfy a pre-requisite for other Level 2 and/or Level 3 courses.
- (c) A student who, having satisfactorily completed the degree programme, includes Aegrotat passes in courses counted for the degree programme, will be eligible for the award of an Aegrotat degree if both of the following conditions are satisfied:
 - (i) The courses in which Aegrotat passes have been granted (and which need to be counted toward the award of the degree) are equivalent to no more than **24** credits.
 - (ii) No more than **12** credits mentioned in (i) above arise from courses making up the candidate's major.
 - (iii) The Aegrotat degree will be awarded without Honours.

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APPENDIX I

(a) LIST OF APPROVED SCIENCE CAPE / GCE A-LEVEL SUBJECTS

Applied Mathematics *

Biology

Botany

Chemistry

Computer Science

Environmental Science

Further Mathematics *

Geography

Geology

Physics

Pure & Applied Mathematics

Pure Mathematics*

Zoology

* The following cannot be counted together:

(i) Further Mathematics with Applied Mathematics CAPE/GCE A-Level;

(ii) Mathematics (Pure and Applied) with Pure Mathematics or Applied Mathematics at CAPE/GCE A-Level.

(b) LIST OF APPROVED SCIENCE CSEC GENERAL PROFICIENCY/GCE O-LEVEL SUBJECTS:

Additional Mathematics

Biology

Chemistry

Computer Science

Geography

Information Technology (General)

Integrated Science

Physics

APPENDIX II

LIST OF MAJORS IN THE UWI SCIENCE FACULTIES:

Agriculture	Electronics *
Alternative Energy	Environmental Biology Experimental Biology
Applied Chemistry	Food Chemistry
Biochemistry *	Geology
Biology*	Information Technology *
Biotechnology	Mathematics *
Botany	Meteorology *
Chemistry *	Microbiology *
Computer Science *	Molecular Biology
Earth Science	Physics *
Ecology *	Zoology

* Offered at Cave Hill

APPENDIX III

FOUNDATION COURSES

FOUN 0100 – Fundamentals of Written English

¹FOUN 1001 – English for Academic Purposes

¹FOUN 1008 – Rhetoric II: Writing for Special Purposes

*FOUN 1101 – Caribbean Civilization

²FOUN 1210 – Science, Medicine & Technology in Society

*FOUN 1301 – Law, Governance, Economy & Society

¹ Both courses cannot be taken - students must choose one or the other

² Not normally available to Science Faculty Students

*A student may substitute one of these with a Level I Foreign Language course.

FOUN 0100 FUNDAMENTALS OF WRITTEN ENGLISH (0 Credits)

This course is required for all students entering the University who are not exempted from the Proficiency Test or have not taken it or failed it.

FOUN 1001 ENGLISH FOR ACADEMIC PURPOSES (3 Credits)

This course is designed to: equip students with the study and research skills they will need in order to get the maximum benefit from all their courses at the University; to familiarize them with the linguistic situation in the Caribbean and break down certain misconceptions they usually have about it and to introduce students to the rhetorical modes of discourse.

(Cannot be taken with FOUN1008)

FOUN 1008 RHETORIC II; WRITING FOR SPECIAL PURPOSES (3 Credits)

This course is designed to equip students across the disciplines (particularly the Social Sciences, Law, Science and Technology) with skills in business, technical and scientific writing.

(Cannot be taken with FOUN1001)

FOUN 1101 CARIBBEAN CIVILIZATION (3 Credits)

This course is designed to develop an awareness of the main process of cultural development in Caribbean societies, highlighting the factors, the problematics and the creative output that have fed the emergence of Caribbean identities; to develop a perception of the Caribbean as wider than island nations or linguistic blocs; to stimulate students' interest in, and commitment to Caribbean civilization and to further their self-determination.

FOUN 1210 SCIENCE, MEDICINE AND TECHNOLOGY IN SOCIETY (3 Credits)

The overall aim of the course is to develop the ability of the student to engage in an informed manner in public discourse on matters pertaining to the impact of science, medicine and technology on society. The course will help students to appreciate the essential characteristics of the scientific method as a mode of enquiry into nature and to understand why it provides the foundations of the technological world.

(Students in the Faculty of Science and Technology cannot take this course)

FOUN 1301 LAW, GOVERNANCE, ECONOMY AND SOCIETY (3 Credits)

This is a multi-disciplinary course of the Faculty of Social Sciences which is designed mainly for non-Social Sciences students. The course will introduce students to some of the major institutions in Caribbean society. It will expose them to both historical and contemporary aspects of Caribbean society, including Caribbean legal, political and economic systems. In addition, Caribbean culture and Caribbean social problems are discussed.

APPENDIX IV

FST CREDIT DEFINITION

The following credit definition is based on the approximate weekly contact hours for one-semester (twelve teaching weeks) courses. One credit is obtained for every hour of lecture/tutorial/problem class per week OR two hours laboratory sessions per week, for a semester. This means that 12 hours of lectures/tutorials/problem classes or 24 hours of practical classes amount to one credit. A normal full-time load in Part I is 12-15 credits per semester (excluding Foundation courses). A normal load for a student in Part II (Advanced) is 15 credits (five 3-credit courses) per semester (excluding Foundation courses).

APPENDIX V

GRADING SYSTEM

Table 1: Mark-to-Grade Conversion & Quality Points (GPA SYSTEM) Table 2: GPA to Honours Conversion

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

Table 2: GPA to Honours Conversion

Class of Honours	Cumulative GPA
First	3.60 and above
Upper Second	3.00 - 3.59
Lower Second	2.50 - 2.99
Pass	2.00 - 2.49

APPENDIX VI

OPTIONS IN CONJUNCTION WITH OTHER FACULTIES

- A. Programmes with the Faculty of Social Sciences
- B. Programmes with the Faculty of Humanities & Education

A. PROGRAMMES WITH THE FACULTY OF SOCIAL SCIENCES

Under an agreement with the Faculty of Social Sciences, a limited number of students will be allowed to pursue the following cross-Faculty programmes, subject to timetable restrictions:-

- Computer Science & Accounting
- Computer Science with Accounting
- Computer Science & Economics
- Computer Science with Economics
- Computer Science & Management
- Computer Science with Management
- Information Technology & Accounting
- Information Technology with Accounting
- Information Technology & Economics
- Information Technology with Economics
- Information Technology & Management
- Information Technology with Management
- Mathematics and Accounting
- Mathematics with Accounting
- Mathematics & Economics
- Mathematics with Economics
- Science Major & Management
- Science Major with Management

COMPUTER SCIENCE AND ACCOUNTING:

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost and Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
MGMT2023 Financial Management I

**AND Six (6) Credits from Level 2
Accounting Courses**

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis
ACCT2017 Management Accounting I
ACCT3043 Auditing I

AND One Level III COMP course

AND One Level II/III COMP course

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

**AND Six (6) Credits from Level III Accounting
Courses:**

AND

FOUNDATION COURSES

FOUN1001 English For Academic Purposes

OR

FOUN1008 Rhetoric II: Writing for Special Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COMPUTER SCIENCE WITH ACCOUNTING

LEVEL 1

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
ACCT2017 Management Accounting I

LEVEL III

COMP3100 Operating Systems
COMP 3180 Algorithm Design and Analysis
ACCT3043 Auditing I

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

AND One Level III COMP Course

AND One Level II/III COMP Course

AND Thirteen (13) Level II/III Credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Academic Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COMPUTER SCIENCE AND ECONOMICS

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
ECON2000 Intermed. Microeconomics I
ECON2001 Intermed. Microeconomics II
ECON2002 Intermed. Macroeconomics I
ECON2003 Intermed. Macroeconomics II
ECON2026 Statistical Methods II

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis
ECON3049 Econometrics I

AND One Level III COMP course

AND One Level II/III COMP course

AND Four Level II/III ECON courses

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COMPUTER SCIENCE WITH ECONOMICS

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ECON1001 Introd. to Microeconomics
ECON1002 Introd. to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
ECON2000 Intermed. Microeconomics I
ECON2001 Intermed. Microeconomics II
ECON2002 Intermed. Macroeconomics I
ECON2003 Intermed. Macroeconomics II

AND One Level II/III ECON course

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis

AND One Level III COMP course

AND One Level II/III COMP course

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COMPUTER SCIENCE AND MANAGEMENT

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost and Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
MKTG2001 Principles of Marketing
MGMT2006 Information Systems I
MGMT2008 Organizational Behaviour
MGMT2020 Managerial Economics
MGMT2023 Financial Management I
MGMT2026 Production & Operations Management

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis
MGMT3017 Human Resources Management

AND One Level III COMP course

AND One Level II/III COMP course

AND Nine (9) Credits from LEVEL III Management

Courses

AND

FOUNDATION COURSES

FOUN1001 English for Academic Purposes

OR

FOUN1008 Rhetoric II: Writing for Special Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COMPUTER SCIENCE WITH MANAGEMENT

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
MKTG2001 Principles of Marketing
MGMT2006 Management Information Systems I
MGMT2008 Organizational Behaviour
MGMT2023 Financial Management I

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis
MGMT3017 Human Resources Management

AND One Level III COMP course

AND One Level II/III COMP course

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY AND ACCOUNTING

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost and Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
MGMT2023 Financial Management I
FOUN1101 Caribbean Civilization

AND Six (6) Credits From Level II Accounting Courses

LEVEL III

FOUN1301 Law, Governance and Society
COMP3160 Database Management Studies
COMP3170 Web-Based Applications
ACCT2017 Management Accounting I
ACCT3043 Auditing I

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

AND One Level III COMP course

AND One Level II/III COMP course

AND Six (6) Credits from Level III Accounting Courses

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY WITH ACCOUNTING

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
ACCT2017 Management Accounting I
FOUN1101 Caribbean Civilization

LEVEL III

COMP3160 Database Management Studies
COMP3170 Web-Based Applications
ACCT3043 Auditing I

AND One Level III COMP course

AND One Level II/III COMP course

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

AND

Thirteen (13) Level II/III Credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY AND ECONOMICS

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2106 Object-Oriented Programming
ECON2000 Intermediate Microeconomics I
ECON2001 Intermediate Microeconomics II
ECON2002 Intermediate Macroeconomics I
ECON2003 Intermediate Macroeconomics II
ECON2026 Statistical Methods II

LEVEL III

COMP3160 Database Management Systems
COMP3170 Web-Based Applications
ECON3049 Econometrics I

AND One Level III COMP course

AND One Level II/III COMP course

AND Four Level II/III ECON courses

AND

FOUNDATION COURSES

FOUN1001 English for Academic Purposes

OR

FOUN1008 Rhetoric II: Special Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY WITH ECONOMICS

LEVEL 1

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2106 Object-Oriented Programming

ECON2000 Intermediate Microeconomics I
ECON2001 Intermediate Microeconomics II
ECON2002 Intermediate Macroeconomics I
ECON2003 Intermediate Macroeconomics II

AND One Level II/III ECON course

LEVEL III

COMP3160 Database Management Systems
COMP3170 Web-Based Applications

AND One Level III COMP course

AND One Level II/III COMP course

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN1001 English for Academic Purposes

OR

FOUN1008 Rhetoric II: Special Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY AND MANAGEMENT

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost and Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming
MKTG2001 Principles of Marketing
MGMT2006 Management Information Systems I
MGMT2008 Organizational Behaviour
MGMT2020 Managerial Economics
MGMT2023 Financial Management I
MGMT2026 Production & Operations Management

LEVEL III

COMP3160 Database Management Systems
COMP3170 Web-Based Applications
MGMT3017 Human Resources Management

AND One Level III COMP course

AND One Level II/III COMP course

AND Nine (9) Credits from Level III Management Courses

AND

FOUNDATION COURSES

FOUN1001 English for Academic Purposes

OR

FOUN1008 Rhetoric II: Writing for Special Purposes

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

INFORMATION TECHNOLOGY WITH MANAGEMENT

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming
MKTG2001 Principles of Marketing
MGMT2006 Management Inform. Systems I
MGMT2008 Organizational Behaviour
MGMT2023 Financial Management I

LEVEL III

COMP3160 Database Management Systems
COMP3170 Web-Based Applications
MGMT3017 Human Resources Management

AND One Level III COMP course

AND One Level II/III COMP course

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Academic Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

MATHEMATICS AND ACCOUNTING

LEVEL I

MATH1141 Introductory Linear Algebra and
Analytical Geometry
MATH1190 Calculus A
MATH1195 Calculus B
MATH1152 Sets and Number Systems
MATH1235 Python Programming and
Mathematical Software
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

MATH2100 Abstract Algebra
MATH2110 Linear Algebra
MATH2120 Analysis & Methods I
MATH2130 Ordinary Differential Equations
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
MGMT2023 Financial Management I

**AND Six (6) Credits From Level II
Management/Accounting Courses**

LEVEL III

ACCT2017 Management Accounting I
ACCT3043 Auditing I

AND Two Level III MATH courses

AND Two Level II/III MATH courses

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

**AND Six (6) Credits From Level III Accounting
Courses**

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Academic Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I
Foreign Language course.

MATHEMATICS WITH ACCOUNTING

LEVEL I

MATH1141 Introductory Linear Algebra and
Analytical Geometry
MATH1190 Calculus A
MATH1195 Calculus B
MATH1152 Sets and Number Systems
MATH1235 Python Programming and
Mathematical Software
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVEL II

MATH2100 Abstract Algebra
MATH2110 Linear Algebra
MATH2120 Analysis & Methods I
MATH2130 Ord. Differential Equations
ACCT2014 Financial Accounting I
ACCT2015 Financial Accounting II
ACCT2017 Management Accounting I

LEVEL III

ACCT3043 Auditing I

AND Two Level III MATH courses

AND Two Level II/III MATH courses

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advance Financial Accounting

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Academic Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

MATHEMATICS AND ECONOMICS

LEVEL I

MATH1141 Introductory Linear Algebra and
Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming and
Mathematical Software

MATH1230 Introductory Applied Statistics 1

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

LEVEL II

MATH2100 Abstract Algebra

MATH2110 Linear Algebra

MATH2120 Analysis & Methods I

MATH2130 Ord. Differential Equations

ECON2000 Intermediate Microeconomics I

ECON2001 Intermediate Microeconomics II

ECON2002 Intermediate Macroeconomics I

ECON2003 Intermediate Macroeconomics II

ECON2026 Statistical Methods II

LEVEL III

ECON3049 Econometrics I

AND Four Level II/III ECON courses

AND Two Level III MATH courses

AND Two Level II/III MATH courses

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I
Foreign Language course.

MATHEMATICS WITH ECONOMICS

LEVEL I

MATH1141 Introductory Linear Algebra and
Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming and
Mathematical Software

MATH1230 Introductory Applied Statistics 1

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

LEVEL II

MATH2100 Abstract Algebra

MATH2110 Linear Algebra

MATH2120 Analysis & Methods I

MATH2130 Ord. Differential Equations

ECON2000 Intermediate Microeconomics I

ECON2001 Intermediate Microeconomics II

ECON2002 Intermediate Macroeconomics I

ECON2003 Intermediate Macroeconomics II

AND One Level III/IV ECON course

LEVEL III

Two Level III MATH courses

AND Two Level II/III MATH courses

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I
Foreign Language course.

SCIENCE AND MANAGEMENT

LEVEL I

Required Level 1 Courses for Science Major plus

COMP1205 Computing I
MATH1152 Sets and Number Systems
MATH1230 Introductory Applied Statistics 1
ACCT1002 Introduction to Financial Accounting
ACCT1003 Cost & Management Accounting I
ECON1001 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics
MGMT1001 Introduction to Management

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for Science Major

AND

MKTG2001 Principles of Marketing
MGMT2006 Management Info. Systems I
MGMT2008 Organizational Behaviour
MGMT2020 Managerial Economics
MGMT2023 Financial Management I
MGMT2026 Production & Operations Management
MGMT3017 Human Resources Management

AND Nine (9) Credits from LEVEL III Management Courses

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

SCIENCE WITH MANAGEMENT

LEVEL I

Required Level 1 Courses for Science Major

PLUS

COMP1205 Computing I

MATH1152 Sets and Number Systems

MATH1230 Introductory Applied Statistics 1

ACCT1002 Introduction to Financial Accounting

ACCT1003 Cost & Management Accounting I

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

MGMT1001 Introduction to Management

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for Science Major

PLUS

MKTG2001 Principles of Marketing

MGMT2006 Management Information Systems I

MGMT2008 Organizational Behaviour

MGMT2023 Financial Management I

MGMT3017 Human Resources Management

AND Thirteen (13) Level II/III Credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

B. PROGRAMMES WITH THE FACULTY OF HUMANITIES & EDUCATION

Under an agreement with the Faculty of Humanities & Education, a limited number of students will be allowed to pursue the following programmes, subject to timetable restrictions:-

- Science Major & Psychology Major
- Science Major with Psychology Minor
- Science Major with Spanish Minor
- Science Major with Education Minor

The Psychology Major comprises 30 credits of specified advanced courses while the Psychology and Spanish Minor each comprise 15 credits of specified advanced courses. In addition, students must satisfy the requirements of their Science Major and complete a minimum total of 101 credits.

SCIENCE AND PSYCHOLOGY

LEVEL 1

Sixteen (16) credits from Level I Science Courses

PLUS

PSYC1003 Introduction to Psychology

PSYC1004 Introduction to Social Psychology

PSYC1012 Introduction to Developmental Psychology

PSYC1013 Introduction to Research Methods In Psychology

PSYC1015 Historical Issues in Psychology

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for Science Major

PLUS

PSYC2002 Abnormal Psychology

PSYC2003 Physiological Psychology

PSYC2004 Personality Theory I

PSYC2008 Introduction to Cognitive Psychology

PSYC2014 Statistics And Research Design II

PSYC2022 Developmental Psychology II: From Conception to Adolescence

PSYC3017 Personality Theory II

PSYC3030 Introduction to Clinical Psychology
PSYC3011 Research Paper In Psychology** (6 credits)

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

** Students registered for a Science Research Project course (eg: BIOC3950, BIOL3950, CHEM3500, CHEM3505, COMP 3910) must replace PSYC3011 by 6 credits from the electives listed above.

SCIENCE WITH PSYCHOLOGY

LEVEL I

Sixteen (16) credits from Level I Science Courses

PLUS

PSYC1003 Introduction to Psychology

PSYC1004 Introduction to Social Psychology

PSYC1013 Introduction to Research Methods In Psychology

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for Science Major

PLUS

PSYC2003 Physiological Psychology

PSYC2004 Personality Theory I

PSYC2012 Developmental Psychology

PSYC2014 Statistics And Research Design II

PSYC3016 Research Project in Psychology (Minor) (3 Credits)

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

SCIENCE WITH SPANISH

LEVEL I

Twenty-Four (24) credits from Level I Science Courses

PLUS

SPAN1001 Spanish Language IA

SPAN1002 Spanish Language IB

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for Science Major

PLUS

SPAN2001 Spanish Language IIA

SPAN2002 Spanish Language IIB

SPAN2214 Hispanic Culture

SPAN3502 International Business Spanish

SPAN3503 Spanish for Tourism

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

SCIENCE WITH EDUCATION

LEVEL I

Twenty-Four (24) credits from Level I Science Courses

PLUS

EDPS1001 Introduction to Human Development

LEVELS II & III

Thirty-two (32) credits of required Level II/III Courses for the Science Major

PLUS

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

EDSO3102 The Social Context of Education

AND One of the following:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

AND One of the following:

EDPH2016 Philosophy of Education

EDME2211 Testing, Measurement & Evaluation I

EDEA2304 Introduction to Educational Administration

EDSE2924 Introduction to Special Education

EDTK3304 Media & Technology in Education

EDTE3404 Issues in Teacher Education

AND Thirteen (13) Level II/III credits

AND

FOUNDATION COURSES

FOUN 1008 Rhetoric II: Special Purposes

OR

FOUN 1001 English for Acad. Purposes

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute one of these with a Level I Foreign Language course.

COURSES BY SEMESTER: BIOLOGICAL AND CHEMICAL SCIENCES

SEMESTER I

PRELIMINARY

CHEM0615 Preliminary Chemistry I

BIOL0051 Biology I

LEVEL I

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

CHEM1110 Introduction to Organic Chemistry

CHEM1125 Introduction to Experimental Chemistry

METE1110 Introduction to Ocean and Climate

ENSC1000 Earth and its Environment

LEVEL II

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

ECOL2461 Caribbean Island Biodiversity

MICR2260 Essential Microbiology

CHEM2010 Practical Chemistry I

CHEM2100 Inorganic Chemistry I

CHEM2200 Organic Chemistry I

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

LEVEL III

BIOC3354 Biochemistry of Human Disease

BIOL3152 Bioinformatics

ECOL3452 Behavioural Ecology

ECOL3453 Crop Ecology

MICR3258 Pathogenic Micro-organisms

MICR3252 Microbial Ecology

CHEM3100 Inorganic Chemistry II

CHEM3300 Physical Chemistry II

SEMESTER II

PRELIMINARY

CHEM0625 Preliminary Chemistry II

BIOL0052 Biology II

LEVEL I

BIOL1030 Introduction to Genetics

BIOC1015 Introduction to Biochemistry

CHEM1120 Introduction to Physical Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1130 Introduction to Inorganic Chemistry

ENSC1001 Introduction to Physical Geology; Dynamic Earth

LEVEL II

BIOC2366 Protein Biochemistry

BIOC2370 Cell Signals

BIOC2371 Molecular Techniques

BIOL2372 Plants for Caribbean Landscapes

ECOL2462 Marine Biota

MICR2261 Eukaryotic Microbes

MICR2262 Methods in Microbiology

CHEM2020 Practical Chemistry II

CHEM2300 Physical Chemistry I

CHEM2400 Analytical Chemistry I

ENSC2002 Earth's Climate

ENSC2003 Sustainable Energy Systems

LEVEL III

BIOC3254 Biochemical Plant Pathology

ECOL3423 Coral Reef Ecology

ECOL3451 Human Ecology and Conservation

MICR3251 Food Microbiology

MICR3253 Biology of Viruses

CHEM3135 Bioinorganic Chemistry

CHEM3145 Bonding in Inorganic Chemistry

CHEM3200 Organic Chemistry II

CHEM3415 Analytical Chemistry III
CHEM3500 Chemistry Project
CHEM3515 Environmental Chemistry
ERSC3001 Natural Hazards

CHEM3210 Bioorganic & Medicinal Chemistry
CHEM3500 Chemistry Project
ERSC3002 Climate Variability & Predictability

YEAR-LONG COURSES

CHEM3505 Chemistry Research Project
BIOC3950 Biochemistry Research Project
BIOL3950 Biology Research Project
ECOL3950 Ecology Research Project
MICR3950 Microbiology Research Project
ENSC3900 Environmental Science Research Project

BIOLOGICAL SCIENCES

The Department of Biological & Chemical Sciences offers Single Majors in Biochemistry, Biology, Ecology and Microbiology as well as a Double Major in Biological Sciences. Biology, Biochemistry, Ecology and Microbiology Majors may not be combined; students wishing to pursue such Double Majors must instead register for the Biological Sciences Double Major. Only the Biology or Biochemistry Major may be combined with the Chemistry Major. Only the Biology or Ecology Major may be combined with the Environmental Science (formerly Earth Science) Minor. Students wishing to combine a Biology, Biochemistry, Ecology or Microbiology Major with a Major of another discipline must seek the approval of the Dean and are advised that timetable clashes of courses may make it impossible to complete such degrees in the minimum 3 year period.

MAJOR IN BIOCHEMISTRY: [Course descriptions](#)

LEVEL I - (24 Credits)

BIOC1015 Introduction to Biochemistry
BIOL1020 Diversity of Life I
BIOL1025 Diversity of Life II
BIOL1030 Introduction to Genetics
CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry

LEVEL II - (15 Credits)

BIOL2373 Skills for Biologists
BIOC2371 Molecular Techniques
BIOC2365 Primary Metabolism
BIOC2366 Protein Biochemistry

AND 3 Credits from the following:

BIOL2166 Advanced Genetics I
BIOC2370 Cell Signals

LEVEL III - (15 Credits)

BIOC3265 Principles of Bioinformatics

AND 12 Credits from the following:

Current Level II BIOC, Level III BIOC and CHEM elective courses:

BIOC2900 Biochemistry Exchange Elective
BIOC3370 Basis of Human Disease
BIOC3260 Principles of Biotechnology
BIOC3261 Mitochondrial Bioenergetics
BIOC3990 Biochemistry Project
BIOL3025 Molecular Plant Pathology
CHEM3135 Bioinorganic Chemistry
CHEM3210 Bioorganic & Medicinal Chemistry

Notes on Biochemistry Major

Transitional students who have already passed at least one level 2 course required for the Biochemistry Major can switch to this new Major or continue under the old Major (which will also be reduced to 30 credits effective 2016/17). A list of equivalences between old and new level 2 and 3 Biological Sciences courses has been prepared to assist such transitional students in satisfying their Biochemistry Major and Minor requirements.

Transitional students using the current Major may substitute BIOC2365 Primary Metabolism for BIOC2351 Biochemistry I, BIOC2366 Protein Biochemistry for BIOC2352 Biochemistry II, BIOC2371 Molecular Techniques for BIOL2152 General Molecular Biology, BIOL2166 Advanced Genetics I for BIOL2151 Genetics I, BIOC3370 Basis of Human Disease for BIOC3354 Biochemistry of Human Disease, BIOL3025 Molecular Plant Pathology for BIOC3254 Biochemical Plant Pathology, BIOC3265 Principles of Bioinformatics for BIOL3152 Bioinformatics and any Level 3 BIOC/MICR/BIOL course or any Level 2 CHEM course for BIOC3251 Microbial Biochemistry. CHEM3135 Bioinorganic Chemistry and CHEM3210 Bioorganic & Medicinal Chemistry are 4-credit courses that are currently electives in the Biochemistry major but these will be replaced with 3-credit courses with the pending update and approval of all Chemistry courses.

MINOR IN BIOCHEMISTRY [Fifteen (15) Credits]: [Course descriptions](#)

BIOC2366 Protein Biochemistry

AND ANY TWELVE (12) Credits from:

BIOC2365 Primary Metabolism

BIOC3370 Basis of Human Disease

BIOC3260 Principles of Biotechnology

BIOC3261 Mitochondrial Bioenergetics

BIOC3990 Biochemistry Project (Minors)

BIOL3025 Molecular Plant Pathology

CHEM3135 Bioinorganic Chemistry

MAJOR IN BIOLOGY: [Course descriptions](#)

LEVEL I

BIOC1015 Introduction to Biochemistry
BIOL1020 Diversity of Life I
BIOL1025 Diversity of Life II
BIOL1030 Introduction to Genetics

LEVELS II & III (30 credits)

BOTH courses (6 credits):

BIOC2371 Molecular Techniques
BIOL2373 Skills for Biologists

Two courses (6 credits) from:

BIOC2365 Primary Metabolism
ECOL2460 Essentials of Ecology
MICR2260 Essential Microbiology

Two courses (6 credits) from:

BIOL2166 Advanced Genetics I
BIOL2370 Flowering Plant Physiology
BIOL2371 Ecophysiology of Animals

Six (6) credits from:

Level II BIOC/BIOL/ECOL/MICR courses¹
Level III BIOC/BIOL/ECOL/MICR courses²

Six (6) credits from:

Level III BIOC/BIOL/ECOL/MICR courses²

¹Level 2 Biological Sciences courses:

BIOC2365 Primary Metabolism
BIOC2366 Protein Biochemistry
BIOC2370 Cell Signals
BIOC2900 Biochemistry Exchange Elective
BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology
BIOL2371 Ecophysiology of Animals
BIOL2372 Plants for Caribbean Landscapes
BIOL2463 Sustainable Land Use
BIOL2465 Tropical Horticulture
BIOL2466 Tropical Energy and Bioprocessing
BIOL2900 Biology Exchange Elective
ECOL2460 Essentials of Ecology
ECOL2461 Caribbean Island Biodiversity
ECOL2462 Marine Biota
ECOL2900 Ecology Exchange Elective
MICR2260 Essential Microbiology
MICR2261 Eukaryotic Microbes
MICR2262 Methods in Microbiology
MICR2900 Microbiology Exchange Elective

²Level 3 Biological Sciences courses:

BIOC3260 Principles of Biotechnology
BIOC3261 Mitochondrial Bioenergetics
BIOC3370 Basis of Human Disease
BIOL3901 Multidisciplinary Project
BIOL3990 Biology Project
BIOC3265 Principles of Bioinformatics
BIOL3025 Molecular Plant Pathology
ECOL3100 Statistics for Ecologists
ECOL3460 Biology & Ecology of Coral Reefs
ECOL3461 Ecology of a Changing Planet
ECOL3462 Behaviour: an Evolutionary Approach
ECOL 3463 Tropical Crop Ecology
MICR3265 Microbiology of Food
MICR3266 Ecology of Microorganisms
MICR3267 Essential Virology
MICR3268 Microbial Pathogenesis

Transitional students who have already passed at least one Level II course required for the Biology Major can switch to this new Major or continue under the old Major (which will also be reduced to 30 credits effective 2016/17). A list of equivalencies between old and new Level II and III Biological Sciences courses has been prepared to assist such transitional students in satisfying their Biology Major and Minor requirements.

MINOR IN BIOLOGY (Fifteen (15) Credits): [Course descriptions](#)

BIOC2371 Molecular Techniques

AND

BIOL2370 Flowering Plant Physiology

OR

BIOL2371 Ecophysiology of animals

AND Three 3-credit courses (9 credits) from:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

For transitional students, effective 2016/17, the old Biology Minor will be reduced from 16 credits to 15 credits.

DOUBLE MAJOR IN BIOLOGICAL SCIENCES [Course descriptions](#)

LEVEL I

BIOC1015 Introduction to Biochemistry
BIOL1020 Diversity of Life I
BIOL1025 Diversity of Life II
BIOL1030 Introduction to Genetics

LEVELS II & III (60 credits)

ALL SEVEN courses (21 credits):

BIOC2365 Primary Metabolism
BIOC2371 Molecular Techniques
BIOL2370 Flowering Plant Physiology
BIOL2371 Ecophysiology of Animals
BIOL2373 Skills for Biologists
ECOL2460 Essentials of Ecology
MICR2260 Essential Microbiology

ONE of the following (6 credits)

BIOC3990 Biochemistry Project (6 credits)
BIOL3990 Biology Project (6 credits)
ECOL3990 Ecology Project (6 credits)
MICR3990 Microbiology Project (6 credits)
BIOL3901 Multidisciplinary Project (6 credits)

Fifteen (15) credits from:

Level II BIOC/BIOL/ECOL/MICR courses
Level III BIOC/BIOL/ECOL/MICR courses

Eighteen (18) credits from:

Level III BIOC/BIOL/ECOL/MICR courses

Transitional students who have already passed at least one Level II course required for the Biology Double Major can switch to the new Biological Sciences Double Major or continue under the old Biology Double Major (which will also be reduced to 30 credits effective 2016/17). A list of equivalencies between old and new Level II and III Biological Sciences courses has been prepared to assist such transitional students in satisfying their Biology Double Major Minor requirements.

MAJOR IN ECOLOGY: [Course descriptions](#)

LEVEL I (12 Credits)

BIOC1015 Introduction to Biochemistry*
BIOL1020 Diversity of Life I*
BIOL1025 Diversity of Life II*
BIOL1030 Introduction to Genetics*

LEVEL II (12 Credits)

BIOL2373 Skills for Biologists*
ECOL2460 Essentials of Ecology*
ECOL2461 Caribbean Island Biodiversity*
ECOL2462 Marine Biota*

LEVEL II or III (18 Credits)

Six (6) Credits:

ECOL3461 Ecology of a Changing Planet*
ECOL3100 Statistics for Ecologists*

*Required courses

**Requires METE1110 Introduction to Oceans and Climate or ERSC1000 Earth and its Environment.

***Requires MICR2260 Essential Microbiology (or MICR2251 General Microbiology) and MICR2261 Eukaryotic Microbes (or MICR2252 Eukaryotic Micro-organisms)

AND Twelve (12) Credits from the following:

Level III ECOL elective courses [Currently]:
ECOL3460 Biology & Ecology of Coral Reefs
ECOL3463 Tropical Crop Ecology
ECOL3462 Behaviour: an Evolutionary Approach
ECOL3990 Ecology Project (6 credits)

AND

ENSC2000 Essentials of Oceanography**
MICR3266 Ecology of Microorganisms***

A student wishing an Ecology Major with a marine-focus may select ENSC2000 Oceanography and ECOL 3460 Biology and Ecology of Coral Reefs. A student wishing a more terrestrial focus to their Ecology Major may select ECOL3462 Behaviour: An Evolutionary Approach and ECOL 3463 Tropical Crop Ecology. The Ecology offerings are completed by two further compulsory courses; one which exposes students to the impacts of humankind on biodiversity (ECOL3461 Ecology of a Changing Planet) and one which develops methodological and analytical skills (ECOL3100 Statistics for Ecologists).

Transitional students who have already passed at least one Level II course required for the Ecology Major can switch to this new Major or continue under the old Major (which will also be reduced to 30 credits effective 2016/17). A list of equivalencies between old and new Level II and III Biological Sciences courses has been prepared to assist such transitional students in satisfying their Ecology Major and Minor requirements.

MINOR IN ECOLOGY [Fifteen (15) Credits]: [Course descriptions](#)

BIOL2373 Skills for Biologists*

ECOL2460 Essentials of Ecology

ECOL2461 Caribbean Island Biodiversity

ECOL2462 Marine Biota

AND

ECOL3461 Ecology of a Changing Planet

OR

ECOL3100 Statistics for Ecologists

*This course will be replaced by another ECOL level III course.

For transitional students, effective 2016/17, the old Ecology Minor will be reduced from 16 credits to 15 credits.

MAJOR IN MICROBIOLOGY: [Course descriptions](#)

LEVEL I

LEVEL I (12 Credits)

BIOC1015 Introduction to Biochemistry
BIOL1020 Diversity of Life I
BIOL1025 Diversity of Life II
BIOL1030 Introduction to Genetics

LEVEL II and III (30 Credits)

Eighteen (18) Credits

BIOC2365 Primary Metabolism
BIOC2371 Molecular Techniques
BIOL2373 Skills for Biologists
MICR2260 Essential Microbiology
MICR2261 Eukaryotic Microbes
MICR2262 Methods in Microbiology

AND Twelve (12) Credits from the following:

BIOL3025 Molecular Plant Pathology
MICR2900 Microbiology Exchange Elective

Level III MICR elective courses [Currently]:
MICR3265 Microbiology of Food
MICR3266 Ecology of Microorganisms
MICR3267 Essential Virology
MICR3268 Microbial Pathogenesis
MICR3990 Microbiology Project (6 credits)

MINOR IN MICROBIOLOGY [Fifteen (15) Credits]: [Course descriptions](#)

Compulsory:

MICR2260 Essential Microbiology

AND

Twelve (12) Credits from the following:

Level II MICR courses [Currently]:

MICR2261 Eukaryotic Microbes
MICR2262 Methods in Microbiology
MICR2900 Microbiology Exchange Elective

Level III MICR courses [Currently]:

MICR3265 Microbiology of Food
MICR3266 Ecology of Microorganisms
MICR3267 Essential Virology
MICR3268 Microbial Pathogenesis
BIOL3025 Molecular Plant Pathology

Transitional students who have already passed at least one Level II course required for the Microbiology Major can switch to this new Major or continue under the old Major (which will also be reduced to 30 credits effective 2016/17). A list of equivalencies between old and new Level II and III Biological Sciences courses has been prepared to assist such transitional students in satisfying their Microbiology.

For transitional students, effective 2016/17, the old Microbiology Minor will be reduced from 16 credits to 15 credits.

Equivalencies between Old and New Biological Sciences Courses For the Purpose of Fulfilling Major and Minor Requirements.

Old Course

BIOC 2351 Biochemistry I
 BIOC 2352 Biochemistry II
 No Equivalent
 BIOC 3251 Microbial Biochemistry
 No Equivalent
 No Equivalent
 No Equivalent
 BIOC 3254 Biochemical Plant Pathology
 BIOC 3354 Biochemistry of Human Disease
 BIOC 3950 Biochemistry Research Project
 No equivalent
 BIOL 2053 Physiology of Plants & Animals²
 BIOL 2053 Physiology of Plants & Animals²
 BIOL 2058 Tropical Ornamental Plants
 BIOL 2151 Genetics I
 BIOL 2152 General Molecular Biology
 BIOL 3053 Developmental Physiology
 BIOL 3152 Bioinformatics
 BIOL 3950 Biology Research Project
 ECOL 2055 Horticulture
 ECOL 2451 Population Ecology
 ECOL 2452 Community Ecology
 ECOL 2453 Caribbean Island Biogeography
 ECOL 2454 Marine Biology
 ECOL 3423 Coral Reef Ecology
 ECOL 3451 Human Ecology and Conservation
 ECOL 3452 Behavioural Ecology
 ECOL 3453 Crop Ecology
 ECOL 3950 Ecology Research Project
 No Equivalent
 MICR 2251 General Microbiology
 MICR 2252 Eukaryotic Micro-Organisms
 No Equivalent
 MICR 3251 Food Microbiology
 MICR 3252 Microbial Ecology
 MICR 3253 Biology Of Viruses
 MICR 3258 Pathogenic Micro-Organisms
 MICR 3950 Microbiology Research Project

New Course

BIOC2365 Primary Metabolism
 BIOC2366 Protein Biochemistry
 BIOC2370 Cell Signals
 Any BIOC/CHEM/MICR Level 3 or CHEM Level 2 course
 BIOC3260 Principles of Biotechnology
 BIOC3261 Mitochondrial Bioenergetics
 BIOC3290 Biochemistry Project for Minors
 BIOL3025 Molecular Plant Pathology
 BIOC3370 Basis of Human Disease
 BIOC3990 Biochemistry Project
 BIOL2373 Skills for Biologists¹
 BIOL2370 Flowering Plant Physiology
 BIOL2371 Ecophysiology of Animals
 BIOL2372 Plants for Caribbean Landscapes
 BIOL2166 Advanced Genetics I
 BIOC2371 Molecular Techniques
 Any BIOC/BIOL/ECOL/MICR Level 2 or 3 course
 BIOC3265 Principles of Bioinformatics
 BIOL3990 Biology Project
 BIOL2465 Tropical Horticulture³
 ECOL2460 Essentials of Ecology
 Any ECOL Level 2 or 3 course
 ECOL2461 Caribbean Island Biodiversity
 ECOL2462 Marine Biota
 ECOL3460 Biology & Ecology of Coral Reefs
 ECOL3461 Ecology of a Changing Planet
 ECOL3462 Behaviour: An Evolutionary Approach
 ECOL 3463 Tropical Crop Ecology
 ECOL3990 Ecology Project
 ECOL3100 Statistics for Ecologists
 MICR2260 Essential Microbiology
 MICR2261 Eukaryotic Microbes
 MICR2262 Methods in Microbiology
 MICR3265 Microbiology of Food
 MICR3266 Ecology of Microorganisms
 MICR3267 Essential Virology
 MICR3268 Microbial Pathogenesis
 MICR3990 Microbiology Project

¹ Students following a new Major who have passed BIOL1010 Basic Skills for Biologists cannot take BIOL2373 Skills for Biologists but must substitute any BIOC/BIOL/ECOL/MICR level 2 or 3 course for the latter.

² Students who have passed BIOL2053 Physiology of Plants & Animals may use this course to substitute for either BIOL2370 Flowering Plant Physiology or BIOL2371 Ecophysiology of Animals but not both.

CHEMICAL SCIENCES

The Department of Biological & Chemical Sciences offers a Single Major, Double Major and Minor in Chemistry.

MAJOR IN CHEMISTRY: [Course descriptions](#)

LEVEL I (12 Credits)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry

LEVELS II/III

LEVEL II

CHEM2010 Practical Chemistry I (2 credits)
CHEM2020 Practical Chemistry II (2 credits)
CHEM2100 Inorganic Chemistry I
CHEM2200 Organic Chemistry I
CHEM2300 Physical Chemistry I
CHEM2400 Analytical Chemistry I

LEVEL III

CHEM3500 Chemistry Project (4 credits)*

AND Eight (8) Credits from:

CHEM3100 Inorganic Chemistry II
CHEM3200 Organic Chemistry II
CHEM3300 Physical Chemistry II

****With special permission students may be allowed to take CHEM3505 Chemistry Research Project (8 credits) in place of CHEM3500.***

MINOR IN CHEMISTRY (Sixteen (16) Credits): [Course descriptions](#)

CHEM2010 Practical Chemistry I (2 credits)
CHEM2020 Practical Chemistry II (2 credits)
CHEM2100 Inorganic Chemistry I
CHEM2200 Organic Chemistry I
CHEM2300 Physical Chemistry I

DOUBLE MAJOR IN CHEMISTRY: [Course descriptions](#)

LEVEL I (12 Credits)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry

LEVEL III/III

LEVEL II

CHEM2010 Practical Chemistry I (2 credits)
CHEM2020 Practical Chemistry II (2 credits)
CHEM2100 Inorganic Chemistry I
CHEM2200 Organic Chemistry I
CHEM2300 Physical Chemistry I
CHEM2400 Analytical Chemistry I

LEVEL III

CHEM3505 Chemistry Research Project (8 credits)

AND Thirty-two (32) credits from:

CHEM2950 Chemistry Elective
CHEM3100 Inorganic Chemistry II
CHEM3135 Bioinorganic Chemistry
CHEM3145 Bonding in Inorganic Chemistry
CHEM3200 Organic Chemistry II
CHEM3210 Bioorganic & Medicinal Chemistry
CHEM3300 Physical Chemistry II
CHEM3415 Analytical Chemistry III
CHEM3515 Environmental Chemistry

AND Three (3) Credits From:

BIO2365 Primary Metabolism
ENSC2003 Sustainable Energy Systems

ENVIRONMENTAL SCIENCE

Environmental Science is an interdisciplinary programme of the Faculty comprising individual courses as well as a Minor in Environmental Science. The Minor is restricted to students in the Faculty of Science and Technology.

MINOR IN ENVIRONMENTAL SCIENCE: [Course descriptions](#)

Level I (6 Credits)

METE1110 Introduction to Ocean and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND Fifteen (15) credits from the following:

LEVEL II

ENSC2000 Essentials of Oceanography
ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate
ENSC2003 Sustainable Energy Systems

LEVEL III

ENSC3000 Climate Variation and Change
ENSC3001 Natural Hazards and Disasters
ENSC3900 Research Project in Environmental Science (6 Credits)

The Minor in Environmental Science replaces the Minor in Earth Sciences.

For those students currently registered for a minor in Earth Sciences the Level 3 ERSC courses will run in 2016/2017 to allow the students to complete their original declaration during this time period.

Transitional students can switch to this new Minor or continue under the old Minor (which will also be reduced to 15 credits effective 2016/17). A list of equivalencies between old and new courses has been prepared to assist such transitional students in satisfying their Minor requirements.

Transitional students using the current Minor in Earth Science may substitute the equivalent new courses to complete the minor. Transitional students using the new Minor in Environmental Science may substitute the equivalent old course to complete the minor.

Equivalencies between Old Earth Sciences and New Environmental Science Courses For the Purpose of Fulfilling Major and Minor Requirements.

Old Course

METE1200 Oceans and Climate
ERSC1001 Dynamic Earth
No equivalent
ERSC2001 Earth & Life
ERSC2002 Climatology
ERSC2003 Oceanography
ERSC2004 Renewable Energy
ERSC3001 Natural Hazards
ERSC3002 Climate Variability and
ERSC3900 Earth Science Research Project

New Course

METE1110 Introduction to Ocean and Climate
ENSC1001 Introduction to Physical Geology: Dynamic Earth
ENSC1000 Earth and its Environment
ENSC2001 Introduction to the Earth-Life System
ENSC2002 Earth's Climate
ENSC2000 Essentials of Oceanography
ENSC2003 Sustainable Energy Systems
ENSC3001 Natural Hazards and Disasters
ENSC3000 Climate Variation and Change Predictability
ENSC3900 Environmental Science Research Project

All incoming students registered to take courses in the Department of Biological and Chemical Sciences must attend a Safety Seminar usually held during registration week. Students taking laboratory courses in this Department will only be allowed to perform experiments if dressed in an appropriate lab coat, lab goggles and enclosed shoes. Some exceptions may be made in the wearing of safety goggles for lab procedures where there is no risk of eye injury (eg. microscope use).

BIOLOGICAL COURSES

PRELIMINARY BIOLOGICAL COURSES

BIOL0051 - BIOLOGY I (6 Credits)

Pre-requisite: None

Syllabus: **Cellular Activities:** Subcellular organisation. Cell membrane structure and function. Biological chemistry – water and living systems, carbohydrates, lipids, proteins and amino acids, enzymes as catalysts, nucleic acids. **Genetics:** The genetic material.. Nuclear division. Patterns of inheritance. Mutation. Genetic engineering. **Reproduction Systems:** examples of bacterial and fungal reproduction and viral replication. Angiosperm sexual and asexual reproduction. Human reproduction.

Teaching: Three lectures, one tutorial and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: Two In-course tests	20%
Practical reports	20%

BIOL0052 - BIOLOGY II (6 Credits)

Pre-requisite: None

Syllabus: The organism and the environment: Acquisition of energy - autotrophic, holozoic, saprophytic and parasitic nutrition. Cellular respiration - glycolysis, the Krebs cycle, anaerobic respiration. Ecosystems - structure, function, population interactions. Environmental change & evolution – variation in populations, evolution and natural selection. Human ecology - biodiversity and its value, anthropogenic pollution. Systems and their maintenance: Exchanges with the environment – respiratory gas exchange and excretion. Plant and animal transport systems. Chemical coordination in plants and animals. Nervous coordination in mammals – nervous tissue, conduction and transmission of nerve impulses, the CNS. Support and movement - supporting tissue in plants and tropisms, skeletal diversity and movement in animals.

Teaching: Three lectures, one tutorial and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: Two In-course tests	20%
Practical reports	20%

LEVEL I BIOLOGICAL COURSES

BIOC1015 - INTRODUCTION TO BIOCHEMISTRY (3 Credits)

Pre-requisite: CAPE Chemistry Unit 1 (or CHEM0615) and CAPE Chemistry Unit 2 (or CHEM0625)
or an approved equivalent

Anti-requisite: BIOC1351 Introductory Biochemistry

Syllabus: Water and acid/base chemistry: properties of water and aqueous solutions, ionization of water, weak acids and bases, buffers, Henderson-Hasselbach equation. Structure and function of biological molecules: lipids, carbohydrates, amino acids and proteins. Cell biology: structure and function of bacterial, plant and animal cells, and membrane transport. Cell fractionation: differential and sucrose centrifugation. Thermodynamics/bioenergetics: free energy, energy changes in redox reactions, ATP, substrate-level phosphorylation. Electron transport-based phosphorylation: oxidative phosphorylation in mitochondria, photophosphorylation in chloroplasts, chemiosmotic theory. Biochemical techniques: chromatography, electrophoresis. Carbohydrate metabolism: glycolysis and TCA cycle.

Teaching: 21 lectures (1h each), 6 tutorials (1h each) and 6 practical sessions (3h each),

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course tests and assignments	25%
Practical reports	25%

BIOL1020 - DIVERSITY OF LIFE I (3 Credits)

Pre-requisite: CAPE Biology Unit 1 (or BIOL0051) and CAPE Biology Unit 2 (or BIOL0052)

OR

CAPE Environmental Science Units 1 & 2 and CSEC Biology

Anti-requisite: BIOL1051 Biodiversity I

Syllabus: Evolution: Evolutionary theories, mechanisms. The fossil record. Ecology: Introduction to ecology. Major terrestrial and aquatic ecosystems. Trophic structure, energy flow and nutrient cycling in ecosystems. The biodiversity concept. Two-species interactions. Classification: Cataloguing biodiversity. Principles of classification and taxonomy. Microbial diversity: Microscopy: theoretical and practical aspects. *Bacteria*, *Archaea*, eukaryotic microorganisms, viruses. Plant diversity: What is a plant? Green algae: diversity of form, life cycles and sexual reproduction. Mosses & liverworts: key features, life cycle, spore dispersal mechanisms. Ferns & Fern allies: key features, life cycles. Evolution of seeds. Cycads & conifers: key features, life cycles. Angiosperms: unique attributes, floral trends, adaptations.

Teaching: 24 lectures (1h each) and 8 practical sessions (3h each).

Method of Examination:

Theory: final examination (2 hours)	50%
Theory: in-course test(s)	10%
Practical: reports, quizzes	30%
Practical: final practical test	10%

BIOL1025 - DIVERSITY OF LIFE II (3 Credits)

Pre-requisite: CAPE Biology Unit 1 (or BIOL0051) and CAPE Biology Unit 2 (or BIOL0052)

OR

CAPE Environmental Science Units I & 2 and CSEC Biology

Anti-requisite: BIOL1052 Biodiversity II

Syllabus: Sponges – cell aggregate body plan; filter feeding. Cnidarians and ctenophores - diploblastic, blind sac, radially symmetrical body plan; polymorphism. Flatworms – acoelomate, triploblastic, bilaterally symmetrical blind sac body plan; comparison of parasitic and free-living. Nematodes and rotifers – pseudocoelomate tube-within-a-tube body plan; eutely; parthenogenesis; life cycles. Molluscs – soft-bodied coelomates with a shell; adaptive radiation. Annelids – segmented worms. Arthropods - factors responsible for their success. Echinoderms – their unique features. The invertebrate chordates. Fish - evolution of bone, jaws and paired fins; adaptations to life in water. Amphibians - challenges to life on land and how these were met. Amniotes – the amniote egg; comparisons of amniote integuments. Birds – adaptations for flight. Mammals - reproductive patterns.

Teaching: 24 lectures (1h each) and 12 practical sessions (2 h each).

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course tests	10%

Practical: quizzes, lab reports, and lab test 40%

BIOL1030 - INTRODUCTION TO GENETICS (3 Credits)

Pre-requisite: CAPE Biology Unit 1 (or BIOL0051) and CAPE Biology Unit 2 (or BIOL0052)

OR

CAPE Environmental Science Units 1 & 2 and CSEC Biology

Anti-requisite: BIOL1151 Introductory Genetics

Syllabus: Heredity: Mendelism, epistasis and linkage. The Nature of the Genetic Material: Experimental evidence implicating the nucleic acids. DNA structure - experimental evidence & theory. DNA conformation. Organisation of eukaryotic chromatin. DNA Replication and Assortment: Semi-conservative replication. Modes of replication. The cell cycle. Mitosis and meiosis. The Genetic Material as an Information Carrier: The Central Dogma. Colinearity. Transcription and translation in prokaryotes & eukaryotes. Gene, chromosomal and genomic mutation. Population Genetics: Gene pools; Transmission of genes between generations; Hardy-Weinberg (2 and 3 alleles); Selection pressures; selection against a recessive allele; mutation and migration. Molecular Biology: Restriction enzymes, RFLP.

Teaching: 18 lectures (1h each), 6 tutorials (1h each) and 8 practical sessions (3h each).

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course test(s) and assignments	25%
Practical: Quizzes, exercises and reports	25%

LEVEL II BIOLOGICAL COURSES

BIOC2365 PRIMARY METABOLISM (3 Credits)

Pre-requisites: BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOC2351 Biochemistry I

Syllabus: Glycolysis and TCA cycle; emphasis on thermodynamic favourability and regulation of pathways. Catabolism of hexoses other than glucose: disaccharides, glycogen and starch. Gluconeogenesis. Biosynthesis of sucrose, starch and glycogen. Glyoxylate shunt. Pentose phosphate pathways. Photosynthetic carbohydrate synthesis. Oxidation of fatty acids in mitochondria, peroxisomes, and glyoxysomes. Oxidation of unsaturated and odd-chain fatty acids. Ketone bodies. Fatty acid biosynthesis, including long chain and unsaturated fatty acids. Overview of amino acid catabolism. Nitrogen excretion and the urea cycle. Biosynthesis of amino acids. Nitrogen fixation and assimilation. Amino acids as biosynthetic precursors. DNA replication. Protein synthesis: transcription and translation. Regulation of prokaryotic gene expression, e.g. *lac* operon, *trp* operon and eukaryotic gene expression. Selected examples of water-soluble vitamins and lipid-soluble vitamins.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical:	25%

BIOC2366 - PROTEIN BIOCHEMISTRY (3 Credits)

Pre-requisites: BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOC2352 Biochemistry II

Syllabus: Membrane proteins: structure and function. Protein purification. Definition, structure, mechanism and function of enzymes. Mathematical concepts related to the calculation of enzyme kinetics. Protein post-translational modifications and use of methods to determine protein structure and identity. Protein folding, mis-folding and mechanisms of protein degradation and turnover. Function of protein-protein interaction and suitable methods for investigating these.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical:	25%

BIOC2370 - CELL SIGNALS (3 Credits)

Pre-requisites: BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOC3053 Cell Signalling

Syllabus: Overview of endocrine organs and systems. Overview of the mechanisms of Endocrine hormonal (second messengers) action including receptors (nuclear and transmembrane receptors) and second messengers. Regulatory systems of hormonal responsiveness including cross-talk. Mechanisms of hormones and receptors and modulation of hormone levels. Plant hormones and examples of their molecular mode of action. Signals involved in the plant disease mechanisms- Systematic acquired response and the hypersensitive response

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical:	25%

BIOC2371 - MOLECULAR TECHNIQUES (3 Credits)

Pre-requisites: BIOL1030 Introduction to Genetics (or BIOL1151 Introductory Genetics)

Restrictions: Not to be taken by persons who have passed BIOL2152 General Molecular Biology

Syllabus: Isolation, detection and quantification of DNA, RNA and proteins. Gel electrophoresis and blotting techniques. Restriction and modification systems. Restriction mapping. Hybridization techniques. Gene and protein sequencing. Cloning and expression vectors. Cloning strategies. Construction of Gene libraries. Gene transfer systems. In vitro mutagenesis. Vector systems and detection tools. Selected new generation molecular techniques used in research.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical:	25%

BIOC2900 - BIOCHEMISTRY EXCHANGE ELECTIVE (3 Credits)

Pre-requisites: Depends on Institution offering course

Syllabus: This course provides an administrative mechanism for a UWI student on exchange at another approved institution to take an elective course in Biochemistry which has no UWI equivalent. The course content will depend on the specific course delivered at the host institution.

Teaching: The teaching methodologies will be determined by the host institution.

Method of Examination:

The course assessment methods will be determined by the host institution.

BIOL2166 - ADVANCED GENETICS I (3 Credits)

Pre-requisites: BIOL1030 – Introduction to Genetics (or BIOL1151 – Introductory Genetics) AND BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOL2151 Genetics I

Syllabus: **Mutation and DNA repair:** Review of point mutations and their effects. Chromosomal mutations, their significance and consequences in selected diseases. Genomic mutations their origins, consequences and uses in agriculture. Modes of action of selected mutagens. Uses of mutagens in mutation analysis. Mechanisms of DNA repair. Disease effects of mutations in DNA repair systems. **Gene and genome structure, gene expression:** The complementation test, procedure and analysis of results. Structure and functions of promoters, leader, introns & exons, enhancers, trailers. Structure and functions of features of eukaryotic genome. The C-value paradox and its interpretation. Inheritance, detection and consequences of genes in extranuclear genomes (chloroplasts and mitochondria). Processes in RNA processing: 3'-polyadenylation, 5'-capping, and intron splicing. **Genetic mapping in bacteriophages and bacteria:** Lytic and lysogenic infection in bacteriophages. Mixed infections, two- and three-point crosses. Mechanisms of horizontal transfer in bacteria. Genetic mapping in bacteria by transduction. Generalised and specialised transduction, co-transduction, three-factor transduction. Genetic mapping in bacteria by transformation. Genetic mapping in bacteria by conjugation.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practical

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: Quizzes, exercises and reports	25%

BIOL2370 - FLOWERING PLANT PHYSIOLOGY (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity 1) AND BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed BIOL2053 Physiology of Plants & Animals or BIOL3053 Developmental Physiology.

Syllabus: Functional anatomy: plant cell types, tissues, primary and secondary growth. Water movement: water potential, xylem structure and function. Mineral nutrition: nutrient classification, ion movement. Gas exchange: guard cell structure and function. Photosynthesis: plastids, pigments, light reactions, C3/C4/CAM comparison. Translocation: phloem structure & function. Major stages in plant development: germination to senescence. Plant movements: nutation, tropisms and nasties. Phytohormones: major classes, roles in development. Practical experimental design and data analysis.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practical.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical:	30%

BIOL2371 - ECOPHYSIOLOGY OF ANIMALS (3 Credits)

Pre-requisites: BIOL1025 Diversity of Life II (or BIOL1052 Biodiversity II)

Restrictions: Not to be taken by persons who have passed BIOL2053 Physiology of Plants & Animals or BIOL3053 Developmental Physiology.

Syllabus: The need for energy. Digestive systems. Acquisition of oxygen. Respiratory surfaces and ventilation in animals. Carriage of oxygen, respiratory pigments, oxygen dissociation curves. Components of circulatory systems; right to left shunting. Renal and extra-renal organs. Osmoregulation and nitrogenous excretion in marine and freshwater animals. The challenge of maintaining water balance on land. Heat transfer between animals and the environment. Ectothermy and endothermy. Adaptations to cold and to hot, dry environments. Experimental design and data analysis.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Laboratory/Field work	30%

BIOL2372 - PLANTS FOR CARIBBEAN LANDSCAPES (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity I)

Restrictions: Not to be taken by persons who have passed BIOL2058 Tropical Ornamental Plants

Syllabus: Current plant classification, focusing on angiosperms. Basal Angiosperms, Monocots and Eudicots. Descriptive botanical terminology. Features of key Basal Angiosperm, Monocot and Eudicot families of the tropics with examples from the Caribbean garden flora. Classification of ornamental plants according to horticultural usage. Natives vs. exotics in horticulture. CITES & plant importation.

Teaching: Eighteen (18) hours of lectures; six (6) hours of tutorials; twenty-four (24) hours of practical/field work.

Method of Examination:

Theory: Final Examination (2 hours)	40%
Theory: In-course Test(s)/Assignment(s)	10%
Practical: Laboratory/Field work	50%

BIOL2373 - SKILLS FOR BIOLOGISTS (3 Credits)

Pre-requisites: 15 credits of level-1 courses including 6 credits from Level 1 BIOC/BIOL courses. Restricted to students majoring or minoring in Biology, Ecology, Microbiology or Biochemistry.

Restrictions: Not to be taken by persons who have passed BIOL1010 Basic Skills for Biologists.

Syllabus: **Scientific enquiry, data handling and simple statistics:** The scientific method. Developing a research plan. Simple experimental design. Categorical and continuous variables. Mode, median, mean, range, quartiles, variance and standard deviation. Hypothesis testing using *p*-values and confidence intervals. Frequency analysis (chi-square, odds ratio, relative risks). Separation of groups: Parametric tests (t-tests, ANOVA and LSD post-hoc test). Correlation analysis: Parametric (Pearson), Non-parametric (Spearman). Regression analysis (simple linear regression, multiple linear regression).

Use of computer software tools for data analysis and presentation of results e.g. EXCEL, Genstat, R, SPSS. Data handling and graph preparation in Excel. Excel applications useful for descriptive statistics.

Dealing with numbers and simple mathematical relationships: Scientific notation, decimal places, significant figures. Simple calculations with number in scientific notation. Precision and accuracy. SI units and prefixes. The rules of exponents and logarithms. Simple calculations involving these. **Scientific writing:** The format of scientific reporting - Abstract, Introduction, Material and Methods, Results, Discussion, References. Finding relevant information on a topic using electronic and non-electronic sources. Citing and referencing sources. Understanding plagiarism. Common knowledge. Quotations. Use of text matching software, e.g. Turnitin.

Teaching: Twenty-four (24) hours of interactive lectures/tutorials AND Twelve (12) hours tutorials/assessments.

Method of Examination:

Coursework	100%
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BIOL2463 - SUSTAINABLE LAND USE (3 Credits)

Pre-requisite: Permission of the Department

Restrictions: Not to be taken by persons who have passed BIOL2050 Sustainability & Land Use

Syllabus: Trade Policy Impact on Land Use and Food Security in the Caribbean; The State of Agriculture Today; Alternative Agricultural Systems; Agricultural Production in the Humid Tropics; Importance of Livestock in Tropical Agriculture; The Status of Animal Production in the Tropics; Livestock Production and Sustainability; Animal Productivity in the Tropics.

Teaching: The course will be taught intensively over four weeks in the summer, typically 3 days per week as part of the McGill-UWI BITS Programme. Lectures will be given during each of the morning sessions and labs/field trips will be held in the afternoon sessions.

Method of Examination:

Coursework	40%
Final examination (2 hours)	60%

BIOL2465 - TROPICAL HORTICULTURE (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity 1)
AND BIOL1025 Diversity of Life II (or BIOL1052 Biodiversity 2)

Restrictions: Not to be taken by persons who have passed ECOL2055 Horticulture

Syllabus: The importance of horticulture. Principles and practices of plant propagation. Impact of environmental, agronomic and cultural factors on growth and development of plants; protected agriculture technology. Growing media characteristics. Water and nutrient management. Crop protection: management of biotic stresses (weeds, pests and diseases). Production, post-harvest handling and value chain elements of select tropical fruits, vegetables and cut-flowers. Turf establishment and management. Tree establishment and management. Introduction to the international framework for global trade in horticultural species.

Teaching: Twenty-four (24) hours of lectures and thirty-six (36) hours of laboratory work /field trips.

Method of Examination:

Final Examination (2 hours)	50%
Coursework (incl. field work, practicals, quizzes)	50%

BIOL2466 - TROPICAL ENERGY AND BIOPROCESSING (3 Credits)

Pre-requisite: Permission of the Department

Restrictions: Not to be taken by persons who have passed BIOL2055 Bioprocessing & Tropical Energy.

Syllabus: Tropical energy issues and approaches – Energy vs food debate; Introduction to the scope of bioprocessing industries – definitions, technology and products; Basic biofuel processing concepts; Economics of bioenergy, including economics of conservation and biofuels on reduction of CO₂ generation; Basic principles of industrial utilization of raw food materials for production of bio-products. Characterisation of raw material and products for biotechnological conversion; Utilisation of food residues for the production of bio-products including sugars, antibiotics, amino acids, peptides; Bioprocessing for production of drug therapeutics, nutraceuticals and functional foods.

Teaching: The course will be taught intensively over four weeks in the summer, typically 3 days per week as part of the McGill-UWI BITS Programme. Lectures will be given during each of the morning sessions and labs/field trips will be held in the afternoon sessions.

Method of Examination:

Coursework	40%
Final examination (2 hours)	60%

BIOL2900 - BIOLOGY EXCHANGE ELECTIVE (3 Credits)

Pre-requisites: Depends on Institution offering course.

Syllabus: This course provides an administrative mechanism for a UWI student on exchange at another approved institution to take an elective course in Biology which has no UWI equivalent. The course content will depend on the specific course delivered at the host institution.

Teaching: Depends on Institution offering course.

Method of Examination:

Depends on Institution offering course.

ECOL2460 - ESSENTIALS OF ECOLOGY (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity I) AND BIOL1025 Diversity of Life II (or Biodiversity II)

Restrictions: Not to be taken by persons who have passed ECOL2051 Population Ecology

Syllabus: **Individuals:** Coping with environmental variation. **Populations:** Life history, Population distribution and abundance and Population dynamics. **Interactions among organisms:** Competition, Predation and herbivory, Parasitism, Mutualism and commensalism. **Communities:** The nature of communities, Changes in communities and Species diversity in communities. **Ecosystems:** Production, Energy flow and food webs, Nutrient supply and cycling.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical:	30%

ECOL2461 - CARIBBEAN ISLAND BIODIVERSITY (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity I) AND BIOL1025 Diversity of Life II (or BIOL1052 Biodiversity II)

Restrictions: Not to be taken by persons who have passed ECOL2453 Caribbean Island Biogeography

Syllabus: Plate tectonics and Caribbean island formation. Spatial and temporal climate variability in the Caribbean region. Major terrestrial and freshwater habitat types of the Caribbean. Typical plant and animal communities associated with these habitats. Natural and anthropogenic threats to Caribbean biota. Identification of species in the field using morphological and behavioural characteristics. Basic field survey methodology.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)	10%
Practical: Field journal/assignments	40%

ECOL2462 - MARINE BIOTA (3 Credits)

Pre-requisites: ECOL2460 Essentials of Ecology (or ECOL2451 Population Ecology)

Restrictions: Not to be taken by persons who have passed ECOL2454 Marine Biology

Syllabus: The abiotic environment. Plankton and productivity. Adaptations to life in the epipelagic. Cephalopods and fish. Marine turtles, mammals and seabirds - diversity, distribution, adaptations for feeding and reproduction, key Caribbean species and conservation status. Life in the deep sea. Tropical coastal communities.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Laboratory/Field Work	30%

ECOL2900 - ECOLOGY EXCHANGE ELECTIVE (3 Credits)

Pre-requisites: Depends on Institution offering course.

Syllabus: This course provides an administrative mechanism for a UWI student on exchange at another approved institution to take an elective course in Ecology which has no UWI equivalent. The course content will depend on the specific course delivered at the host institution.

Teaching: Depends on Institution offering course

Method of Examination:

Depends on Institution offering course

MICR2260 - ESSENTIAL MICROBIOLOGY (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity I) AND BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed MICR2251 General Microbiology

Syllabus: An overview of microbial life. Pathways of discovery in microbiology. Microbial systematics. Microscopy. Microorganisms & their natural environments. Impact of microorganisms in human affairs. Cell structure and function. Microbial growth. Microbial control. Microbial diversity. The domain of *Bacteria*. The domain of *Archaea*. Laboratory culture of microorganisms.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical Coursework: Reports, quizzes, tests	30%

MICR2261 - EUKARYOTIC MICROBES (3 Credits)

Pre-requisites: BIOL1020 Diversity of Life I (or BIOL1051 Biodiversity I) AND BIOC1015 Introduction to Biochemistry (or BIOC1351 Introductory Biochemistry)

Restrictions: Not to be taken by persons who have passed MICR2252 Eukaryotic Microorganisms

Syllabus: Phylogeny of eukaryotic microorganisms. Archaeplastida. Protists: structure & functions. Protists: reproduction, behaviour & ecology. Amoebozoa. Excavata. SAR: Stramenopiles. SAR Alveolata. SAR: Rhizaria. Incertae sedis Eukaryota. Fungi: General characteristics. Opisthokonta: Ascomycota. Opisthokonta: Basidiomycota. Opisthokonta: Glomeromycota, Mycorrhizae. Opisthokonta: Zygomycota.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials; Twenty-four (24) hours of practical/field work).

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: Laboratory/Field work	25%

MICR2262 - METHODS IN MICROBIOLOGY (3 Credits)

Pre-requisites: MICR2261 Essential Microbiology (or MICR2251 General Microbiology)

Syllabus: Best laboratory practice. septic techniques. Levels of biosafety. Preparing a lab book. Microbiological media. Sampling methods. Standard methods for microbial identification. Methods for enumeration of micro-organisms. Characterization of microbes. Antimicrobial sensitivity testing. Molecular techniques for microbial identification and characterization. Reporting practical work.

Teaching: Twelve (12) hours of lectures/tutorials; forty-eight (48) hours of practical/field work).

Method of Examination: This will be 100% Coursework

Laboratory assessments/Field Work	80%
Tutorials	20%

MICR2900 - MICROBIOLOGY EXCHANGE ELECTIVE (3 Credits)

Pre-requisites: Depends on Institution offering course

Syllabus: This course provides an administrative mechanism for a UWI student on exchange at another approved institution to take an elective course in Microbiology which has no UWI equivalent. The course content will depend on the specific course delivered at the host institution.

Teaching: Depends on Institution offering course.

Method of Examination:

Depends on Institution offering course.

LEVEL III BIOLOGICAL COURSES

BIOC3254 - BIOCHEMICAL PLANT PATHOLOGY (4 Credits)

Pre-requisites: MICR2251 General Microbiology or BIOL2152 General Molecular Biology.

Syllabus: Penetration of plants by pathogens. Role of pathogen-produced cell-wall degrading Enzymes and toxins in pathogenesis. Disease-induced changes in host metabolism and Physiology. Growth regulator imbalance in plant diseases. Crown gall tumor formation. Mechanisms of disease resistance. Specificity of plant-pathogen interactions.

Teaching: Two lectures, one tutorial and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

BIOC3352 - BIOCHEMISTRY III (4 Credits)

Pre-requisites: BIOC2351 Biochemistry I & BIOC2352 Biochemistry II

Syllabus: The areas of study may vary from year to year but will usually include;-Clinical biochemistry and techniques, biological membranes and transport, food biochemistry, protein structure and function, molecular chaperones.

Teaching: Two one-hour lectures and one three hour practical every week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

BIOC3354 - BIOCHEMISTRY OF HUMAN DISEASE (4 Credits)

Prerequisite: BIOC2351 Biochemistry I

Syllabus: The areas of study will focus on a variety of human diseases such as: HIV/AIDS, cardiovascular disease, diabetes, obesity, various cancers, liver disease, kidney disease, various syndromes and deficiencies including in-born errors of metabolism. Various aspects of the biochemistry will be studied for the

diseases, with a highlight of the latest ground-breaking research in the area. The areas studied will include specific biochemical pathways, key proteins and enzymes that play a role in the disease, and linkage of these pathways with the presentation of the symptoms of the disease.

Teaching: Two lectures, one tutorial and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

BIOC3950 - BIOCHEMISTRY RESEARCH PROJECT (8 Credits)

Pre-requisites: BIOL2151 Genetics I, BIOL2152 General Molecular Biology, BIOC2351 Biochemistry I and BIOC2352 Biochemistry II

Restrictions: Not to be taken with BIOL3950 Biology Research Project, BIOL3901 Multidisciplinary Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology or CHEM3505 Research Project

Syllabus: A practical project in Biochemistry carried out under the supervision of a staff member. Students will be allocated one of the available research topics and are expected to spend not less than 144 hours in field/ laboratory studies. The project will be presented both orally in the form of a short seminar and in a written report. Three typed and bound copies of the written report must be presented.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

BIOC3260 – PRINCIPLES OF BIOTECHNOLOGY (3 Credits - Offered from 2017/18)

Pre-requisite: BIOC2371 Molecular Techniques (or BIOL2152 General Molecular Biology)

Syllabus: Biotechnology applications to medicine, e.g. animal and human cell, tissue and organ culture. Medical/pharmaceutical products of animal cell culture. Biotechnology applications to agriculture e.g. plant cell and tissue culture. Plant based production of biofuels, molecular markers. Applications of biotechnology to environmental solutions e.g., monitoring, and remediation of contaminated soils. New and emerging biotechnologies e.g. RNAi, CRISPR, gene therapy, and synthetic biology among other new techniques.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: reports	25%

BIOC3261 - MITOCHONDRIAL BIOENERGETICS (3 Credits - Offered from 2017/18)

Pre-requisite: BIOC2365 Primary Metabolism (or BIOC2351 Biochemistry I) **AND** BIOC2371 Molecular Techniques (or BIOL2152 General Molecular Biology)

Syllabus: Definitions of PMF, $\Delta\psi$ and ΔpH . Mitochondrial respiration and its measurement. Proton leak, mitochondrial uncoupling and uncoupling proteins. Types of ROS, production sites and experimental and physiological conditions. ROS detoxification systems and mechanisms. Comparison of bioenergetics of specific cells types. Free radical theory of aging. Mitochondrial diseases: MERRF, Leigh syndrome, PDCD, beta-oxidation defects.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	30%

BIOC3265 - PRINCIPLES OF BIOINFORMATICS (3 Credits - Offered from 2017/18)

Pre-requisite: BIOC2371 Molecular Techniques (or BIOL2152 General Molecular Biology)

Restrictions: Not to be taken by persons who have passed BIOL3152 Bioinformatics

Syllabus: Descriptive terminology in Bioinformatics and basic computer programming; Biological algorithms; Pairwise and Multiple sequence alignments; Global and Local sequence alignment; BLAST and FASTA searches; Secondary structure analyses in molecular data e.g. domain and motif searches; Introduction to key software and databases including MEGA, MEME, NCBI, EBI, and DDBJ databases; Phylogenetic and basic cluster analysis methods; Genome projects, e.g. the Human genome; Microbiome and cancer genome projects as well as plant genome projects.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practicals.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	30%
Practical: reports	20%

BIOC3290 - BIOCHEMISTRY PROJECT (MINORS) (3 Credits - Offered from 2017/18)

Pre-requisites: BIOL2373 Skills for Biologists AND 6 credits from Level II BIOC/BIOL/ECOL/MICR courses. Only available to final year students minoring in Biochemistry.

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOL3990 Biology Project, MICR3990 Microbiology Project, ECOL3990 Ecology Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project.

Syllabus: Research question. Summary of scientific literature. Collection of data. Analysis of data. Concise report. Poster presentation. Topics that address real Biochemical questions, whether pure or applied. Research ethics. Suggestions for specific topics may be considered from students but final proposed topics must come from the prospective supervisor and the Department must have the resources to execute the research.

Method of Examination:

Project report	60%
Poster Presentation	25%
Supervisor assessment	15%

BIOC3370 - BASIS OF HUMAN DISEASE (3 Credits - Offered from 2017/18)

Prerequisite: BIOC2371 Molecular Techniques AND BIOC2370 Cell Signals

Restrictions: Not to be taken by persons who have passed BIOC3354 Biochemistry of Human Disease

Syllabus: Characteristics of the selected diseases/syndromes. Overview of the immune system. Endocrine organs and systems relevant to the selected disease states. Mechanisms of hormones and receptors relevant to the selected disease states. Modulation of hormone levels in healthy and in disease states. System regulators and errors contributing to the disease state. Clinical presentation and progression of the selected diseases/symptoms. The linkage of the symptoms with system errors. Overview of diagnostic

tools, drugs and therapies. Disease management. Applications of biochemical techniques used in biomedical research and forensic sciences.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practical.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: reports	25%

BIOC3990 - BIOCHEMISTRY PROJECT (6 Credits - Offered from 2017/18)

Pre-requisites: BIOL2373 Skills for Biologists AND 12 credits from Level II BIOC/BIOL/ECOL/MICR courses. Only available to final year students majoring in Biochemistry.

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOL3990 Biology Project, MICR3990 Microbiology Project, ECOL3990 Ecology Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: Research question. Review of the scientific literature. Research proposal. Collection of data. Analysis of data. Report and illustrated summary. Oral presentation. Topics that address real Biochemical questions, whether pure or applied. Research ethics. Suggestions for specific topics may be considered from students but final proposed topics must come from the prospective supervisor and the Department must have the resources to execute the research.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

BIOL 3152 - BIOINFORMATICS (4 Credits)

Pre-requisite: BIOL2152 General Molecular Biology

Syllabus: Common types of genomic and proteomic data including DNA and protein sequences, motifs, domains, patterns, secondary structure and folding classes, tertiary structure. DNA and protein sequence analysis including analysis of homology, identification of motifs and domains, pair-wise and multiple alignments including global and local alignments. Dynamic programming algorithms for sequence alignment, prediction of secondary structure, prediction of gene structure. Methods of phylogenetic analysis. The

distribution of data through public databases, data formats, and end-user applications for manipulation and analysis including use of PAM250 scoring matrix, BLOSUM 62, scoring matrix, FASTA, BLAST, PSI-BLAST, PHI-BLAST, PSSM, Smith-Waterman dynamic Programming.

Teaching: Two lectures, one tutorial, and three hours of practical per week

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

BIOL3901 - MULTIDISCIPLINARY PROJECT (6 Credits)

Pre-requisite: Permission of Department

Restrictions: Not to be taken with BIOC3990 Biochemistry Project, BIOL3990 Biology Project, MICR3990 Microbiology Project, ECOL3990 Ecology Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: A lab and/or field project carried out under the supervision of a member of staff as part of the McGill UWI BITS Programme. Projects will address real-world problems related to food, nutrition or energy at the local, regional or international level. Development of a hypothesis suitable for investigation. Experimental work to support or refute this hypothesis. Analysis and communication of results obtained.

Teaching: Duration of the course is 14 weeks in the summer period, with approximately 2 days per week devoted to individual project work.

Method of Examination:

Written proposal plus an interim report:	20%
Final report, illustrated summary, poster and oral presentation:	80%

BIOL3950 - BIOLOGY RESEARCH PROJECT (8 Credits)

Pre-requisites: 16 credits from Level II Biological courses.

Only available to final year students majoring in Biology.

Restrictions: Not to be taken with BIOC3950 Biochemistry Research Project, BIOL3901 Multidisciplinary Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology or CHEM 3505 Research Project

Syllabus: A practical project in Biology carried out under the supervision of a staff member. Students will be allocated one of the available research topics and are expected to spend not less than 144 hours in field/ laboratory studies. The project will be presented both orally in the form of a short seminar and in a written report. Three typed and bound copies of the written report must be presented.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

BIOL3025 – MOLECULAR PLANT PATHOLOGY (3 Credits - Offered from 2017/18)

Pre-requisites: BIOL 1020- Diversity of Life II and 3 credits from any Level II BIOC/ECOL/MICR courses

Restrictions: Not to be taken by persons who have passed BIOC3254 Biochemical Plant Pathology

Syllabus: Physical attachment and entry of pathogens to host - viruses, bacteria and fungi; appresoria, haustoria infection peg. Host plant interactions - molecules at the interface and cell wall penetrating molecules e.g. enzyme and proteins. HR and SAR disease resistance mechanism, epidemiology, disease diagnosis, bio-control mechanisms of plant pathogens, disease management.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials and Twenty-four (24) hours of practical.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: reports	25%

BIOL3990 - BIOLOGY PROJECT (6 Credits - Offered from 2017/18)

Pre-requisites: 16 credits from Level II Biological courses. Only available to final year students majoring in Biology.

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOC3990 Biochemistry Project, ECOL3990 Ecology Project, MICR3990 Microbiology Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: Elements of scientific research. Research questions. Research ethics. Review of the scientific literature. Research proposal. Collection of data. Analysis of data. Project report writing. Oral presentation. Selection of a topic that addresses real biological questions, whether pure or applied. Suggestions for specific topics may be considered from students but final proposed topics must come from the prospective supervisor and the Department must have the resources to execute the research.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

ECOL3423 - CORAL REEF ECOLOGY (4 Credits)

Pre-requisites: ECOL2452 Community Ecology & ECOL2454 Marine Biology

Syllabus: Environmental conditions required for coral reef formation, geological history of Caribbean reef formation and types of reefs. Dynamics of reef structure formation & erosion; Scleractinian coral biology, including taxonomy, anatomy, endosymbiosis with zooxanthellae, growth (calcification & skeletal morphology), nutrition, reproduction and recruitment; Ecology of coral communities, including reef community structure, zonation and dynamics, diversity/stability relationships, keystone species, algal-herbivore and predator-prey interactions, inter-specific competition, succession, disturbance, and linked systems from mangroves to deep sea; overview of the major taxonomic groups of reef-associated organisms, including other coelenterates, poriferans, echinoderms, fishes, and algae with attention to their ecological function; value and uses of Caribbean coral reef ecosystems, including coral reef fisheries, tourism and recreation, biodiversity and marine products, and ecosystem services; The threats and future challenges to Caribbean coral reefs, including natural disturbances and anthropogenic activities. Current trends in coral reef research.

Teaching: Two lectures, one tutorial and three hours of practical per week.

Method of Examination:

Final Examination (3 hours)	60%
Project report/Essay	40%

ECOL3451- HUMAN ECOLOGY AND CONSERVATION (4 Credits)

Pre-requisites: ECOL2452 Community Ecology.

Syllabus: Human population growth – Historical trends, the momentum of population growth, population projections, carrying capacity. Conservation - Conservation as sustainable exploitation of natural resources. Conservation as avoidance of environmental deterioration. Caribbean case studies of pollutants and land use and coastal zone practices as sources of environmental deterioration. Global trends in environmental deterioration. Conservation as maintenance of biological diversity - endangered habitats, endangered species.

Teaching: Two lectures and three hours of practical per week.

Method of Examination:

Final Examination (3 hours)	70%
Project report/Essay	30%

ECOL3452 - BEHAVIOURAL ECOLOGY (4 Credits)

Pre-requisites: ECOL2452 Community Ecology

Syllabus: Environmental and genetic effects on behaviour. Individual and group selection. Group living and social systems. Territoriality and dominance hierarchies. Kin and reciprocal altruism. Contest behaviour and evolutionary stable strategies. Mate choice and sexual selection. Parent-offspring conflict. Interspecific comparisons of parental investment.

Teaching: Two lectures and three hours of practical per week.

Method of Examination:

Final Examination (3 hours)	70%
Project report/Essay	30%

ECOL3453 - CROP ECOLOGY (4 Credits)

Pre-requisites: ECOL2452 Community Ecology and BIOL1151 Introductory Genetics

Syllabus: Autecology of selected crop species and their evolution, propagation and breeding. Interactions of crop species with weed, pest, disease and beneficial organisms in the agroecosystem. Control of weeds, diseases and pests by cultural, chemical and biological means. Integrated pest management.

Teaching: Two lectures, one tutorial and three hours of practical per week.

Method of Examination:

Final Examination (3 hours)	60%
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Project report	20%
Essay	20%

****ECOL3454 - FISHERIES BIOLOGY (4 Credits)**

Pre-requisites: ECOL2452 Community Ecology and ECOL2454 Marine Biology

Syllabus: Global trends in fisheries yields and consumption patterns. Caribbean fisheries and current legislation. Methods for determining stock structure, migration and stock abundance. Indices of abundance. Stock dynamics, Stock-recruitment relationships. Surplus production and yield per recruit models for predicting fishery yields.

Teaching: Two lectures and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	70%
Theory: In-course Test(s)/Assignment(s)	10%
Practical: reports	20%

**This course is not offered this academic year.

ECOL3950 - ECOLOGY RESEARCH PROJECT (8 Credits)

Pre-requisites: ECOL2452 Community Ecology and ECOL2453 Caribbean Island Biogeography

Restrictions: Not to be taken with BIOL3950 Biology Research Project, BIOL3901 Multidisciplinary Project, MICR3950 Microbiology Research Project, BIOC3950 Biochemistry or CHEM3505 Research Project

Syllabus: A practical project in Ecology carried out under the supervision of a staff member(s). Students will be allocated one of the available research topics and are expected to spend not less than 144 hours in field/ laboratory studies. The project will be presented both orally in the form of a short seminar and in a written report. Three typed, and bound copies of the written report must be presented.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

ECOL3100 - STATISTICS FOR ECOLOGISTS (3 Credits - Offered from 2017/18)

Pre-requisites: ECOL2460 Essentials of Ecology

Syllabus: **The statistical background:** Probability; permutations; populations and samples; descriptive versus inferential statistics; the normal distribution and confidence intervals; null and alternative hypotheses; alpha and beta error; data types. **The planning stage:** Formulation of ideas; background research; hypothesis formulation; experimental design (e.g. sampling procedures); identification of data needs; identification of relevant statistical tests: Tests for differences (from one to multiple samples), and Tests for linking data. **The recording stage:** configuration of datasets for analysis. **The analysis stage:** Data exploration and visualization; hypothesis testing; selection of parametric versus non-parametric statistical tests; evaluation of model fits. **The reporting stage:** Choice and production of graphics and summary statistic outputs.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:	Coursework	100%
	Theory	30%
	Practical	70%

ECOL3460 - BIOLOGY & ECOLOGY OF CORAL REEFS (3 Credits - Offered from 2017/18)

Pre-requisites: ECOL2462 Marine Biota (or ECOL2454 Marine Biology). Students **must** be able to swim and snorkel competently.

Restrictions: Not to be taken by persons who have passed ECOL3423 Coral reef Ecology

Syllabus: Distribution of coral reefs. Reef types. Reef formation and erosion. Anatomy and morphology of scleractinian corals. Calcification. Coral nutrition and reproduction. Ecology of coral communities, including reef community structure, zonation and dynamics; productivity and nutrient cycling; functional diversity and redundancy in coral reefs; sponge-algae-coral interactions; key trophic interactions; reef resilience and phase shifts. Major taxonomic groups of reef-associated organisms and their ecological function. The value and uses of Caribbean coral reef ecosystems. Threats to Caribbean coral reefs. Current trends in coral reef research.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:	Final Examination (2 hours)	50%
	Coursework: Theory	20%
	Coursework: Practical	30%

ECOL3461 - ECOLOGY OF A CHANGING PLANET (3 Credits - Offered from 2017/18)

Pre-requisites: ECOL2460 Essentials of Ecology or ECOL 2451 Population Ecology

Restrictions: Not to be taken by persons who have passed ECOL3451 Human Ecology & Conservation

Syllabus: Human population growth and migration patterns. Impacts of human colonization on biodiversity in previously uninhabited lands. Impacts of conversion of land to agriculture and increased water extraction on biodiversity. Accidental and deliberate introductions of invasive species and their ecological impacts on native biodiversity. Methods to prevent introduction and/or manage invasive terrestrial and marine species. How cultural value systems affect biodiversity use. The role of overexploitation in species declines and the strategies that have been used in species recovery. Location and protection of biodiversity hotspots. Size, shape and connectedness of protected areas for species conservation. Observed and predicted impacts of climate change on the biology and ecology of terrestrial and marine biodiversity. Conservation goals for the 21st century.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Final Examination (2 hours)	60%
Coursework	40%

ECOL3462 - BEHAVIOUR: AN EVOLUTIONARY APPROACH (3 Credits - Offered from 2017/18)

Pre-requisites: ECOL2460 Essentials of Ecology or ECOL 2451 Population Ecology

Restrictions: Not to be taken by persons who have passed ECOL3452 Behavioural Ecology

Syllabus: Observing and measuring behaviour. Behaviour development and expression. Optimal foraging theory. Benefits and costs of sociality. Reproduction and mate choice. Parental investment and parental care. Applications of behavioural ecology to animal husbandry and conservation.

Teaching: Twenty-four lectures/tutorials and twenty-four hours of practical per semester.

Method of Examination:

Final Examination (2 hours)	60%
Coursework	40%

ECOL 3463 - TROPICAL CROP ECOLOGY (3 Credits - Offered from 2017/18)

Pre-requisites: ECOL2460 Essentials of Ecology (or ECOL2451 Population Ecology) AND BIOL1030 Introduction to Genetics (or BIOL1151 Introductory Genetics).

Restrictions: Not to be taken by persons who have passed ECOL3453 Crop Ecology

Syllabus: Introduction: Tropical crop productions systems and agro-ecosystems; Physical and biological environments of crops; Social constraints to crop production; Conventional vs. Alternative agriculture. Crop evolution, distribution, propagation and breeding of tropical crops. Soil factors; Physical and Chemical properties of soil; Root room; tilth, aeration; pH; Salinity; Tolerance mechanisms; Management under tropical conditions. Mineral nutrition; Deficiency/Toxicity effects; Tolerance mechanisms; Mineral balance of plants and plant communities; Management options in the tropics. Radiation distribution in tropical crops; Photosynthesis & bio-productivity; High and low irradiance tolerance; Carbon balance of crops; Management options. Physiological effects of temperature; Heat tolerance; Energy balance and evapotranspiration; Management options (1 lecture). Crops and water; Water injury (drought/flood); Tolerance mechanisms; Water balance of plants and plant communities; Management options in the tropics. Tropical crop diseases; Integrated management. Tropical crop pests; Biological control; Integrated management. Weeds; Integrated management in the tropics. Tropical agroforestry cropping systems. Course Review.

Teaching: Two lectures, one tutorial and three hours of practical per week.

Method of Examination:

Final Examination (2 hours)	60%
Coursework	40%

ECOL3990 - ECOLOGY PROJECT (6 Credits - Offered from 2017/18)

Pre-requisites: BIOL2373 Skills for Biologists AND 12 credits from Level II or III ECOL courses. Students with a GPA of 3.00 or above are preferred.

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOL3990 Biology Project, MICR3990 Microbiology Project, BIOC3990 Biochemistry Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: Elements of scientific research. Research questions. Research ethics. Review of the scientific literature. Research proposal. Collection of data. Analysis of data. Project report writing. Oral presentation. Selection of a topic that addresses real ecological questions, whether pure or applied. Suggestions for specific topics may be considered from students but final proposed topics must come from the prospective supervisor and the Department must have the resources to execute the research.

Method of Examination:

Project report	70%
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Seminar	15%
Supervisor assessment	15%

MICR3251 - FOOD MICROBIOLOGY (4 Credits)

Pre-requisites: MICR2251 General Microbiology

Syllabus: Factors regulating the development of food microorganisms and methods to control these factors. Food pathogens and microorganisms deteriorating the major food types. Good practices in alimentary transformations. Food contamination and intoxications.

Teaching: Two lectures, one tutorial and three hours of practical per week.

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	30%

MICR3252 - MICROBIAL ECOLOGY (4 Credits)

Pre-requisites: MICR2251 General Microbiology

Syllabus: Ecology and evolution. Ecology of individuals. Microbial population and community ecology. Biofilms. Biogeochemical cycles. Species interactions.

Teaching: Two lectures, one tutorial and three hours of practical per week.

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course Test(s)/Assignment(s)	15%
Practical: reports	35%

MICR3253 - BIOLOGY OF VIRUSES (4 Credits)

Pre-requisites: MICR2251 General Microbiology AND BIOL1030 Introduction to Genetics (or BIOL1151 Introductory Genetics)

Syllabus: The nature of viruses. Structure of viruses. Viroids. Prions. Medical virology – viral diseases of humans, mode of transmission, symptoms, pathogenesis, control measures, vaccination, antiviral drugs,

interferon, Plant viruses – disease symptoms, control measures. Molecular virology: entry and exit of viruses from host cells; RNA virus replication; DNA virus replication, viral oncogenesis. Medical virology; viral diseases of humans; modes of transmission, symptoms: pathogenesis, control measures. Laboratory techniques used in the study, detection and identification of viruses.

Teaching: Two lectures, one tutorial and three hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: report(s)	30%

MICR3258 - PATHOGENIC MICRO-ORGANISMS (4 Credits)

Pre-requisites: MICR2251 General Microbiology AND BIOL1030 Introduction to Genetics (or BIOL1151 Introductory Genetics)

Syllabus: The normal microbial flora of the human body. Opportunistic infections. The pathogenesis of infectious diseases. Special properties of pathogenic micro-organisms. Virulence determinants - aggressins, impedins. Identification of pathogenic microbes and laboratory diagnosis of infectious diseases. Epidemiology and control of infections. Principles of anti-microbial chemotherapy.

Teaching: Two lectures and one tutorial per week and three hour practicals including attachment to a Medical Laboratory.

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course Test(s)/Assignment(s)	35%
Practical: reports	15%

MICR3950 - MICROBIOLOGY RESEARCH PROJECT (8 Credits)

Pre-requisites: MICR2251 General Microbiology, BIOL2151 Genetics I, BIOC2351 Biochemistry I and MICR2252 Eukaryotic Micro-organisms

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: A practical project in Microbiology carried out under the supervision of a staff member. Students will be allocated one of the available research topics and are expected to spend not less than 144 hours in field/ laboratory studies. The project will be presented both orally in the form of a short seminar and in a written report. Three typed and bound copies of the written report must be presented.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

MICR3265 - MICROBIOLOGY OF FOOD (3 Credits - Offered from 2017/18)

Pre-requisites: MICR2260 Essential Microbiology (or MICR2251 General Microbiology)

Restrictions: Not to be taken by persons who have passed MICR3251 Food Microbiology

Syllabus: Microorganisms associated with foods. Factors affecting microbial growth in foods. Food spoilage. Food Preservation. Fermented foods. Food Microbiology and Public Health. Food hazards and food borne illness. Microbial agents of food borne illness. Principle of food safety and management systems. Microbiological quality of foods. Microbiological examination of foods.

Teaching: Twenty-four (24) lectures/tutorials and twenty-four (24) hours of practical per semester.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Laboratory/Field work	30%

MICR3266 - ECOLOGY OF MICROORGANISMS (3 Credits - Offered from 2017/18)

Pre-requisites: MICR2260 Essential Microbiology (or MICR2251 General Microbiology), AND MICR2261 Eukaryotic Microbes (or MICR2252 Eukaryotic Micro-organisms)

Restrictions: Not to be taken by persons who have passed MICR3252 Microbial Ecology

Syllabus: Introduction to microbial ecology. Role of microorganisms in ecology and evolution. Microbial habitats. Methods used in microbial ecology. Microbe-microbe interactions. Microbe-plant interactions. Microbe-animal interactions. Microbial communities. Biogeochemical cycles. Biomineralisation. Microbial weathering. Microbial decomposition of natural compounds. Bioremediation.

Teaching: Eighteen (18) hours of lectures; Six (6) hours of tutorials; Twenty-four (24) hours of practical/field work.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	15%
Practical: Laboratory/Field work	35%

MICR3267 - ESSENTIAL VIROLOGY (3 Credits - Offered from 2017/18)

Pre-requisites: MICR2260 Essential Microbiology (or MICR2251 General Microbiology) AND BIOL1030 Introduction to Genetics (or BIOL1151 Introductory Genetics).

Restrictions: Not to be taken by persons who have passed MICR3253 Biology of Viruses

Syllabus: The nature of viruses, viroids and prions. Structure of viruses. The Baltimore classification scheme. Entry and exit of viruses from host cells. Virus replication strategies. Viral pathogenesis. Viral oncogenesis. Evolution of viruses: new and re-emerging viruses. Control of virus infections: vaccination, antiviral drugs, interferon. Plant viruses: disease symptoms, control measures. Beneficial viruses: gene therapy, bacteriophage therapy, oncolytic. Viruses. Laboratory techniques used in the study, detection and identification of viruses.

Teaching: Twenty-four (24) hours of lectures/tutorials; Twenty-four (24) hours of practical.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical assignment(s)	25%

MICR3268 - MICROBIAL PATHOGENESIS (3 Credits - Offered from 2017/18)

Pre-requisites: MICR2260 Essential Microbiology (or MICR2251 General Microbiology) AND BIOL1151 Introductory Genetics.

Restrictions: Not to be taken by persons who have passed MICR3258 Pathogenic Microorganisms

Syllabus: Introduction to the concept of pathogenicity. Normal microbial flora of the human body. Establishment of infectious disease. Immune response to microbial infection. Spread of pathogens within the host. The damage-response framework. Pathogenesis and virulence. Pathogen survival within the human host. Specific infectious diseases by body system. Opportunistic infections.

Identification of pathogenic microbes and laboratory diagnosis of infectious disease. Control of infectious diseases: antimicrobial chemotherapy and vaccination. Antimicrobial resistance.

Teaching: Twenty-four (24) hours of lectures/tutorials; Twenty-four (24) hours of practical.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	35%
Practical: Assignment(s)	15%

MICR3950 - MICROBIOLOGY PROJECT (6 Credits - Offered from 2017/18)

Pre-requisites: MICR2260 Essential Microbiology (or MICR2251 General Microbiology), MICR2262 Methods in Microbiology, BIOL2373 Skills for Biologists AND 9 credits from Level II BIOC/BIOL/ECOL/MICR courses. Only available to final year students majoring in Microbiology.

Restrictions: Not to be taken with BIOL3901 Multidisciplinary Project, BIOL3990 Biology Project, ECOL3990 Ecology Project, MICR3990 Microbiology Project, BIOC3990 Biochemistry Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, ECOL3950 Ecology Research Project or CHEM 3505 Research Project

Syllabus: Research question. Research ethics. Review of the scientific literature. Research proposal. Collection of data. Analysis of data. Report and illustrated summary. Oral presentation. Topics that address real Microbiological questions, whether pure or applied. Suggestions for specific topics may be considered from students but final proposed topics must come from the prospective supervisor and the Department must have the resources to execute the research.

Method of Examination:

Project report	70%
Seminar	15%
Supervisor assessment	15%

CHEMISTRY COURSES

PRELIMINARY CHEMISTRY COURSES

CHEM0615 - PRELIMINARY CHEMISTRY I (6 Credits)

Pre-requisite: None

Co-requisite: CHEM0625 Preliminary Chemistry II or equivalent.

Syllabus: A course of about 39 lectures, associated tutorials and a maximum of 39 hours of laboratory work on the Fundamentals of Chemistry and Physical Chemistry. **Fundamentals of Chemistry:** Review of basic concepts and definitions. The mole concept and its applications. Chemical equations and stoichiometry. Atomic theory of matter. Electron configuration of the elements: The periodic Table. Properties of isolated atoms. Energetics of bond formation. Bonding in covalent molecule: hybridization, valence bond theory and Valence Shell Electron Pair Repulsion (VSEPR) Theory. Classification of bonds. Interactions between molecules. **Physical Chemistry:** Properties of gases and solutions. Energy changes and chemical bonds. Hess's law and its applications. Bond dissociation energies. Bomb calorimetry. Dynamic and Ionic Equilibria. Buffers. Solubility Product. Kinetics. Principles of electrochemistry.

Teaching: Three lectures, one tutorial and three hours of practical work per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

CHEM0625 - PRELIMINARY CHEMISTRY II (6 Credits)

Pre-requisite: None

Co-requisite: CHEM0615 (Preliminary Chemistry I) or its equivalent.

Syllabus: A course of about 39 lectures, associated tutorials and a maximum of 39 hours of laboratory work on elementary Organic Chemistry and Inorganic Chemistry. **Organic Chemistry:** Structures, formulae and nomenclature of organic compounds. Introduction to reaction mechanisms. Functional groups and their reactions: hydrocarbons, halides, alcohols, amines, carbonyl compounds, carboxylic acids and their derivatives, including aliphatic and aromatic systems. Polymers. **Inorganic Chemistry:** Periodicity. Properties and reaction of main group elements and their compounds: hydrogen, Group 1 and 2, Al, C and Si, N and P, O and S and the halogens. First row transition metals and coordination complexes. Rusting. Industrial processes and environmental considerations.

Teaching: Three lectures, one tutorial and three hours of practical work per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: reports	20%

LEVEL I CHEMISTRY COURSES

CHEM1110 - INTRODUCTION TO ORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course covers the basic and fundamental principles of organic chemistry and exposes students to the concepts of chemical bonding in organic molecules, functional groups, nomenclature, stereochemistry and reaction mechanisms. Electron pushing formalism will be emphasized in an attempt to discourage rote learning and to allow students to better understand the language of organic chemistry. Students will be expected to apply their knowledge to interpret reactions based on their patterns of reactivity and hence predict and explain unknown reactions.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM11130 - INTRODUCTION TO INORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to equip biological and chemical sciences students with knowledge of the fundamental principles of inorganic chemistry including atomic and molecular structures and properties, the chemistry of the main group and transition elements, including industrial and commercial applications, coordination compounds and the packing arrangements of ionic structures. These areas will be used as the basis for advanced inorganic chemistry courses required for the major/minor in chemistry.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1120 - INTRODUCTION TO PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course seeks to provide students with knowledge of the fundamental principles of physical chemistry with an emphasis on thermodynamics, energetics, chemical kinetics, electrochemistry and the fundamentals of spectroscopy. The aim is to provide 1st year (i.e. fully matriculated) students with a theoretical foundation for the more advanced and specialised 2nd and 3rd year physical chemistry courses.

Teaching: Two one-hour lectures and a one-hour tutorial per week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

CHEM1125- INTRODUCTION TO EXPERIMENTAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM0615 and CHEM0625; or CAPE CHEMISTRY UNITS 1 and 2; or EQUIVALENT

Co-requisite: None

Syllabus: This course is a yearlong 3-credit experimental chemistry course with 84 hours of experimental work in which students are exposed to concepts and laboratory skills associated with Organic, Inorganic, Analytical and Physical Chemistry. Students will hone their critical thinking and analytical skills through a series of discussions and experiments designed to improve experimental skills and prepare them for more advanced laboratory techniques.

Teaching: Seven-six (76) hours for practical skills and eight (8) hours for data analysis skill set.

Method of Examination:

Coursework:	100%
Laboratory Reports	80%
Exercises	20%

LEVEL II CHEMISTRY COURSES

CHEM2010 - PRACTICAL CHEMISTRY I (2 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of sixty (60) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Five hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2020 – PRACTICAL CHEMISTRY II (2 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of sixty (60) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Five hours of practical classes per week.

Method of Examination:

Practical work	60%
In-course Test(s)/Assignment(s)	40%

CHEM2100 - INORGANIC CHEMISTRY I (4 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials, surveying the chemistry of the main group and transition elements. Main Group Chemistry: A survey of the structures, properties and reactions of the s and p-block elements, and their compounds, including hydrides, oxides, halides, polymers and technologically important materials. Transition Metals: A survey of the properties and reactions of the first row transition metals and their compounds, with emphasis on the effects of the non-degeneracy of the d-orbitals in complexes and on technologically important materials.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM2200 - ORGANIC CHEMISTRY I (4 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials on the essential areas of Organic Chemistry.

Stereochemistry: Stereoisomerism and chirality. Fischer convention. Conformation and stereochemistry of ring compounds. Dynamic stereochemistry. Spectroscopy: The application of spectroscopic techniques in elucidating the structures of organic molecules. **Aromatics:** Aromatic and heteroaromatic chemistry. Electrophilic and nucleophilic substitution. Polynuclear aromatic hydrocarbons (PAH's). Radical halogenations and oxidation of alkyl benzenes. **Synthesis:** Principles of organic synthesis: carbanions and their use in carbon-carbon bond formation. Organometallic reagents in organic synthesis.

Reaction mechanisms: Energetics, kinetics and the investigation of mechanisms. Substitution, elimination and addition reactions. Linear free energy relationships.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM2300 - PHYSICAL CHEMISTRY I (4 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials, surveying thermodynamics, properties of matter, molecular spectroscopy and electrochemistry

Teaching: Three lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM2400 - ANALYTICAL CHEMISTRY I (4 Credits)

Pre-requisite: CHEM1010 Fundamentals of Chemistry and CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials, surveying the essential areas of analytical chemistry, statistical methods applying to the analytical measurements, sampling techniques and methodology. The course discusses the instrumental methods of analysis including basic instrumentation and principles of spectroscopic methods viz. UV/Visible, FTIR, fundamentals of AAS, AES, use of electrochemical methods and comprehensive discussion of Chromatographic methods (GC, HPLC), and detailed description about the detectors, standardization method and derivatization of the samples.

Teaching: Three lectures and one tutorial per week

Method of Examination:

Theory: Final Examination (2 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM2950 - CHEMISTRY ELECTIVE (4 Credits)

Pre-requisites: None

Syllabus: An advanced course in Chemistry taken as an exchange student at an approved institution and pre-approved by the Dean.

LEVEL III CHEMISTRY COURSES

CHEM3100 - INORGANIC CHEMISTRY II (4 Credits)

Prerequisites: CHEM2100 Inorganic Chemistry I

Syllabus: This final year inorganic chemistry course covers topics in the applications of group theory to problems in bonding and spectroscopy, the use of spectroscopic techniques in Inorganic Chemistry, organometallic chemistry of main group and transition elements and rates and mechanisms of inorganic reactions. The course requires a sound grounding in descriptive inorganic chemistry.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM3135 - BIOINORGANIC CHEMISTRY (4 Credits)

Pre-requisites: CHEM2100 Inorganic Chemistry I or CHEM2115 Main Group Chemistry and CHEM3115 Transition Metal Chemistry I

Syllabus: Importance of metal ions in the environment. Basic concepts of ions in aqueous solutions. Determination of hydration numbers by NMR spectroscopy. Redox potentials of cations. Acidity and polymerization of aquocations. The chemical and physical factors controlling the elements of life energy in biological systems and hydrogen biochemistry, the role of biological macromolecules and polymers. The roles of some individual elements in biology and medicine. Molybdenum enzymes, cofactors and model systems. The chemistry of cobalt and iron complexes and their role in biological systems with respect to electron transfer reactions in aqueous media.

Teaching: Two lectures, one tutorial and four hours of practicals per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM3145 - BONDING IN INORGANIC CHEMISTRY (4 Credits)

Pre-requisites: CHEM3100 Inorganic Chemistry II

Syllabus: Laws of groups and their application to symmetry elements and symmetry operations, character tables, irreducible and reducible representations, LGO/MO approach to bonding in small molecules including examples with pi bonding and with bridging atoms and transition metal complexes. Applications of group theory to spectroscopy. Bonding dissociation energies. Electronegativity and its effects, Van Arkel-Ketelaar bond triangle. Use of d-orbitals in bonding by main group elements. Charge distribution in molecules and complex ions: methods of calculation. Group electronegativities.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM3200 - ORGANIC CHEMISTRY II (4 Credits)

Pre-requisites: CHEM2200 Organic Chemistry I or CHEM2215 Basic Organic Chemistry

Syllabus: This course aims to develop an understanding of the basic synthesis reactions used in organic Synthesis. Students will be taught to identify advantages and limitations associated with generally applied methodologies of compound classes and to propose mechanisms for the general reactions covered in the course. General principles of retrosynthetic analysis will be used to design simple synthetic schemes for synthesis of target molecules, including important natural products and drug targets. The teaching approaches used will include lectures, tutorials and student presentations.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Final Examination (3 hours)		60%
In-course test(s)/Assignment(s)	20%	
Weekly assignments		10%
Presentations		10%

CHEM3210 - BIOORGANIC & MEDICINAL CHEMISTRY (4 Credits)

Pre-requisites: CHEM2200 Organic Chemistry I or CHEM2215 Basic Organic Chemistry

Restrictions: Not available to persons who have passed CHEM3225 Natural Products Chemistry or CHEM3235 Bio-organic Chemistry

Syllabus: The aim of this course is to give students an understanding of the basic principles used in the synthesis of compounds of biological importance, an overview of the major classes of secondary metabolites found in nature, and an introduction to medicinal chemistry. The advantages and disadvantages of different approaches to the synthesis of the biologically important compounds will be discussed, while modern methods for the study of natural products and medicinal chemistry will be emphasized.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Final Examination (2 hours)		60%
In-course test(s)/Quizzes		20%
In-course assignments		20%

CHEM3300 - PHYSICAL CHEMISTRY II (4 Credits)

Pre-requisites: CHEM2300 Physical Chemistry I or CHEM2315 Physical Chemistry II

Syllabus: This final year physical chemistry course covers topics in advanced spectroscopy and fundamental theoretical aspects of chemical kinetics, quantum mechanics and statistical Thermodynamics. This course also requires a sound grounding in basic mathematics as well as calculus.

Teaching: Three lectures and one tutorial per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

CHEM3415 - ANALYTICAL CHEMISTRY III (4 Credits)

Pre-requisites: CHEM2400 Analytical Chemistry I

Syllabus: A survey of advanced instrumental techniques, applications, and data analysis, selected from the following: chromatographic methods, including gas chromatography; mass spectrometry, high performance liquid chromatography (HPLC); Atomic absorption spectroscopy (AAS) and atomic emission spectroscopy (AES); use of the diode array spectroscopy, including Fourier transform infrared (FTIR) and Raman spectroscopy; electrochemical methods, including potentiometric, conductometric, biochemical methods, including enzymatic protein sequencing, and fluorescence; thermogravimetric methods and differential scanning calorimetry; fundamentals of crystallography, including origin of systematic absences, intensity of diffraction, and comparison of monochromatic and Laue methods, fluorescence, including energy transfer, quenching and fluorescence anisotropy statistics; multiplexing; experimental design; use of computers to analyse data. Students will complete an instrumentation related project worth 15% of the course grade. The project will include approximately 20 hours of lab work.

Teaching: Two lectures, one tutorial and a three hour practical per week.

Method of Examination:

Final Examination (2 hours)	60%
In-course test(s)/Assignment(s)	10%
Practicals	15%
Project	15%

CHEM3500 - CHEMISTRY PROJECT (4 Credits)

Pre-requisites: CHEM2100 Inorganic Chemistry I, CHEM2200 Organic Chemistry I, CHEM2300 Physical Chemistry I, CHEM2400 Analytical Chemistry I, CHEM2010 Practical Chemistry I and CHEM2020 Practical Chemistry II

Restrictions: For chemistry majors only or with permission of the Department. Not to be taken with CHEM3505 Chemistry Research Project

Syllabus: The course consists of a research project carried out under the supervision of a member of staff. Students will be directed to an initial survey of relevant literature and will present brief outlines of their planned research. Duration of the project is one semester, and students are expected to spend at least 72 hours on laboratory and/or computational work. Each student will be required to give a seminar on completion of the project and submit two copies of a typed report.

Method of Examination:

Practical Assessment	30%
Seminar	15%
Project Report	55%

CHEM3505 - CHEMISTRY RESEARCH PROJECT (8 Credits)

Pre-requisites: CHEM2100 Inorganic Chemistry I, CHEM2200 Organic Chemistry I, CHEM2300 Physical Chemistry I, CHEM2400 Analytical Chemistry I, CHEM2010 Practical Chemistry I and CHEM2020 Practical Chemistry II

Restrictions: For Chemistry Double Majors only or with permission of the Department. Not to be taken with CHEM3500 Chemistry Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, ECOL3950 Ecology Research Project or MICR3950 Microbiology Research Project.

Description: A practical project carried out under the supervision of a member of staff. The project will run throughout the academic year and students are expected to spend at least 144 hours on laboratory work. Each student will be required to give a seminar on completion of the project as well as submit two typed and bound copies of a written report. Enrolment will be limited to those students who have demonstrated good practical skills and an aptitude for research.

Method of Examination:

Supervisor's Assessment	15%
Seminar	15%
Project Report	70%

CHEM3515 - ENVIRONMENTAL CHEMISTRY (4 Credits)

Prerequisites: CHEM2010 Practical Chemistry I, CHEM2020 Practical Chemistry II and CHEM2400 Analytical Chemistry I

Description: This course explores the chemistry of the environment encompassing the atmosphere, hydrosphere, pedosphere, and biosphere. The course intends to provide an understanding of the earth's natural chemical processes in air, water, and soil, with special attention to the chemical aspects of environmental disturbances that humans have provoked in the natural environment. The emphasis of the course is on important chemical principles and reactions that determine the balance of the molecular species that exist in the environment and how humans affect this balance. Environmental issues include air pollution, ozone depletion, greenhouse gases, water quality, pollution and treatment of water resources, toxic metals and persistent organic pollutants. Students who are interested in broadening their understanding of chemistry and its application to real world problems, or in gaining further experience of standard laboratory practices and sampling methodology, or who have an interest in working in an analytical, forensic or environmental field, or wishing to improve their critical evaluation and deduction skills should undertake this course.

Teaching: Two lectures, one tutorial and one three hour practical sessions per week.

Method of Examination:

Theory: Final Examination (3 hours)	60%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Reports	20%

ENVIRONMENTAL SCIENCE COURSES

LEVEL I ENVIRONMENTAL SCIENCE COURSES

METE1110 - INTRODUCTION TO OCEANS AND CLIMATE (3 Credits)

Pre-requisites: None

Co-requisites: METE1000: Introduction to Physical Meteorology and Weather Observations (or 3 credit equivalent)
METE1100: Introduction to Dynamic Meteorology and Analysis (or 3 credit equivalent)
(for Meteorology Majors and Minors ONLY)

Syllabus: This course is intended for students wishing to gain the essentials of climatology and oceanography. It is available to scientists and non-scientists alike. The course will provide information regarding the science of climate, the structure of the oceans, and the interaction of the ocean and the atmosphere as a driver of climate. Topics to be covered include the global radiation budget; heat and moisture transfer on the earth; the composition of the ocean; the chemical composition of the ocean; and ocean circulations

Teaching: One (1) lecture; one (1) tutorial and two (2) hours of labs per week.

Method of Examination:

Theory: Final Examination (2 hours)	60%
Theory: In-course Test(s)/Assignment(s)	15%
Labs/Assignments	25%

ENSC1000 - EARTH AND ITS ENVIRONMENT (3 Credits)

Pre-requisites: None

Syllabus: This course facilitates students' access to geographical knowledge of the world, including physical features such as the location of continents, countries, oceans and oceanic currents, mountains, deserts, seas, human population. Cartography and map analysis sessions will be used to visualize specific features of the Earth system. The course intends to train students to interpret and look at the Earth System as a holistic system to understand the connections between its different elements.

Teaching: Thirty-six (36) hours of interactive lectures tutorials.

Method of Examination:

Weekly worksheet assignment (s)	100%
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ENSC1001 - INTRODUCTION TO PHYSICAL GEOLOGY: DYNAMIC EARTH (3 Credits)

Pre-requisites: None

Syllabus: This course introduces geology, the study of the solid earth; its structure, composition and the internal and surface processes that combine to form the planet upon which we live. The driving force behind these processes is plate tectonics the “unifying theory” which explains many of the phenomena observed in the solid Earth. The course will also examine how the study of earthquakes has been crucial in developing an understanding of the Earth’s internal structure. At a more local level, the role that plate tectonics has played in the geological formation and development of Barbados and the other islands of the Lesser Antilles will be also studied.

Teaching: One (1) hour of lecture; one (1) hour of tutorial each week, and a maximum of five (5) hours of practical class every other week.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	25%
Practical: practical test/field trip	25%

LEVEL II ENVIRONMENTAL SCIENCE COURSES

ENSC2000 - ESSENTIALS OF OCEANOGRAPHY (3 Credits)

Pre-requisites: METE1110 Introduction to Ocean and Climate **OR** ERSC1001 Earth and its Environment **OR** METE1200 Oceans and Climate

Syllabus: Oceanography is the scientific study of all aspects of the marine environment. This course is designed to provide a working knowledge of important ocean processes by integrating relevant aspects of physical, chemical and biological oceanography. It will provide the student with tools to assess information on the major geographic features of the ocean basins and their origin, the chemistry of the ocean and its role in regulating climate and productivity, the origins and dynamics of wind waves, tsunamis, tides and coastal processes, and marine pollution problems. The lectures/tutorials will focus on the description and explanation of the ocean as an integrated system, whilst wet and dry practical sessions (including field exercises) will deal with application to working scenarios to underpin the theory provided. Laboratory exercises will emphasize problem solving, and data analysis and interpretation, leading to a working knowledge of oceanographic processes.

Teaching: Twenty-four (24) hours of lectures/tutorials; twenty-four (24) hours of practical exercises/fieldwork.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical/field work	30%

ENSC2001- INTRODUCTION TO THE EARTH LIFE SYSTEM (3 Credits)

Pre-requisites: ENSC1001 An Introduction to Physical Geology: Dynamic Earth **OR** ERSC1001 Dynamic Earth; **AND** METE1110 Introduction to Oceans and Climate **OR** METE1200 Oceans and Climate **OR** ERSC1000 Earth and Its Environment.

Syllabus: This course provides a more integrated approach, summarizing the history of the significant environmental changes that have taken place during the past four-and-a-half billion years of the Earth's history, illustrating the effects of those changes on life and the influence of life in effecting change. The lectures will explain Earth-system processes and provide supporting evidence for environmental change from the geological record and numerical models. Assignments will focus on problem solving, analysis and interpretation of tabular, graphical and numerical data.

Teaching: Two (2) hour lectures and one (1) hour of tutorial.

Method of Examination:

Theory: Final Examination (2 hours)	60%
Theory: In-course Test(s)/Assignment(s)	40%

ENSC2002 - EARTH'S CLIMATE (3 Credits)

Pre-requisites: ENSC1000 Earth and its Environment **OR** METE1110 Introduction to Ocean and Climate **OR** METE1200 Oceans and Climate

Syllabus: This course provides a detailed description of the earth's climate from seasonal to annual time scales based on a geographical approach. The global distribution of climate parameters and their fluctuation through the year are explained in detail in conjunction with the sun-earth relationship, atmospheric and oceanic global circulation, latitudinal and longitudinal effects, and topography. The topics cover the seasonal cycle of temperature and rainfall and the atmospheric and oceanic circulation at global and regional scales. The course also points out the interrelations between the different components of the earth's system, and explains the different mechanisms involved in the climate system. The regional climate and their classification will be presented with an introduction of the Caribbean climate. The students will be assessed on their ability to relate the different climate parameters and to explain why

such a climate is observed in a given area. This course is part of the minor in Environmental Science and will also benefit students in Ecology and Meteorology.

Teaching: Twenty-four (24) hours of interactive lecture/tutorials.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Lab tests	30%

ENSC2003 - SUSTAINABLE ENERGY SYSTEMS (3 Credits)

Pre-requisites: Fifteen (15) Level 1 Faculty of Science & Technology (FST) credits

Syllabus: This course is an elective on the Environmental Science minor and will provide an opportunity for students to gain an understanding of the wider implications of human interaction with our environment. This course will first explain how societies traditionally source their energy for electricity production and the impact that this is having on our environment, before providing an introduction to sustainable energy resources and the technologies that can be used to take advantage of them. At the heart of this course is a look at how a Caribbean small island state can transition from an energy system dominated by fossil fuels, towards one that is based on 100% clean, economically viable, indigenous sustainable energy sources. The subject matter for this course is interdisciplinary in nature and has been designed for all FST students. It is recommended to those students interested in pursuing careers/further study in the expanding field of sustainable energy systems.

Teaching: Twenty-four (24) lectures/tutorials and twenty-four (24) hours of practical work.

Method of Examination:

Theory: Final Examination (2 hours)	50%
In-course test(s):	25%
Laboratory report:	10%
Group presentation:	10%
Online discussion forum and field trip reports:	5%

LEVEL III ENVIRONMENTAL SCIENCE COURSES

ERSC3001 – NATURAL HAZARDS (4 Credits)

Pre-requisites: ERSC1001 The Dynamic Earth **AND** ERSC2003 Oceanography **OR** ERSC2002 Climatology

Syllabus: Hazard, risk and disaster. The role of plate tectonics in natural hazards. Earthquakes distribution, magnitude, intensity, hazard assessment and mitigation. Tsunami causes, speed, amplitude, hazards and mitigation. Volcanoes distribution, eruptive styles, hazards monitoring and mitigation. Flooding and drought. Mass wasting. Subsidence. Severe weather events. Hurricanes distribution, structure, hazards intensity and mitigation. Coastal processes waves, vulnerable regions, coastal erosion, mitigation. Climate and climate change. The economic and human cost of disaster. The assessment and management of natural hazard risks. Reducing the impact of disaster. The human response to hazard.

Teaching: Two lectures, one tutorial and three hours of research/practical work each week.

Method of Examination:

Final Examination (3 hours)	60%
In-course & practical work	40%

ERSC3002 – CLIMATE VARIABILITY & PREDICTABILITY (4 Credits)

Pre-requisites: ERSC2002 Climatology

Syllabus: Climate system and variability, mean state, cycle, trend; concepts of variability, solar radiation and the role of aerosols on climate processes. Data used in climate analysis: observation, reconstruction, modeling. Model simulation and limitations of the climate models. Skill, robustness and reliability of the climate models. Climate response to external and internal forcings. North Atlantic Oscillation and sea surface temperature forcing. ENSO and climate predictability in the north Atlantic region. Oscillations in the climate system. Monthly and seasonal predictability. Past climate variability. Short term and Long term climate prediction.

Teaching: Two lectures, one tutorial and three hours of labs per week.

Method of Examination:

Final Examination (3 hours)	60%
Laboratory	20%
In-course assignments/tests	20%

ERSC3900 - EARTH SCIENCE RESEARCH PROJECT (8 Credits)

Pre-requisites: ERSC1001: The Dynamic Earth, METE1200: Oceans and Climate, 12 credits from the following second level 4 credit courses: ERSC2001: Earth and Life, ERSC2002: Climatology, ERSC2003: Oceanography ERSC2004: Renewable Energy Resources

Syllabus: This course consists of a research project in Earth Science carried out under the supervision of a member (or members) of staff. Students will be allocated one of the available research projects and are expected to spend not less than 144 hours in field/laboratory/theoretical studies. The project will be presented in the form of a short seminar and a written report.

Teaching: Students will be involved in regular meeting/ discussions with their supervisor(s) who will provide training in relevant laboratory/ field methods/skills and guide the student in experimental design, data collection and the analysis and interpretation of the data collected.

Method of Examination:

Supervisor's Assessment	15%
Seminar	15%
Project Report	70%

ENSC3000 - CLIMATE VARIATION AND CHANGE (3 Credits) to run in 2017/18

Pre-requisites: ENSC2002 Earth's Climate

Syllabus: Climate variations have always influenced the geographical location of flora and fauna and the settlement of the populations on Earth. The recent observed warming of the earth represents a "real time" example of these interactions. Therefore this course provides physical explanations on how and why the climate has varied since the last 400 000 years with an emphasis on the Holocene period and the post-industrial period. The course will provide the students with keys and tools to assess the past, present and future climate variations. Hence the role of the radiative forcing, feedback and physical processes in the variations of the climate at global and regional scale will be demonstrated. The impact of the climate variation on the environment will be also demonstrated. The last part of the course focuses the Caribbean climate. The impacts of the climate change on the environment are studied in this course. The lectures will focus on the description and explanation of the processes involved in climate's variations while the practical sessions will provide the tools to analyze and interpret such variations.

Teaching: Twenty-four (24) lectures/tutorials, and twelve (12) 2-hour practical sessions.

Method of Examination:

Theory: Final Examination (2 hours)	50%
Theory: In-course Test(s)/Assignment(s)	20%
Practical: Lab test and/or report	30%

ENSC3001 - NATURAL HAZARDS AND DISASTERS (3 Credits) to run in 2017/18

Pre-requisites: ENSC1001: An Introduction to Physical Geology: Dynamic Earth **AND** ENSC2002: Earth's Climate

Syllabus: Natural disasters of one form or another occur almost daily and such events can be extremely costly both in human lives and financial terms. The islands of the Caribbean are vulnerable to a variety of natural hazards due to a combination of their tropical climate and geographical location. This course builds on the knowledge acquired from ENSC1001 An Introduction to Physical Geology: Dynamic Earth and ENSC2002 Earth's Climate in order to explain the physical processes that lead to natural disasters, the impact of those disasters on communities and the ways in which the risks of such disasters can be reduced.

Teaching: Twenty-four (24) lectures and twelve (12) tutorials.

Method of Examination:

Theory: Final Examination (3 hours)	50%
Theory: In-course Test(s)/Assignment(s)	50%

ENSC3900 - RESEARCH PROJECT IN ENVIRONMENTAL SCIENCE (6 Credits) to run in 2017/18

Pre-requisites: A minimum of 6 credits from ERSC level II or III courses. The students must be in their final year and projects will be awarded at the discretion of the supervisor.

Restrictions: Any other 6 credit research project offered within the Department of Biological and Chemical Sciences

Syllabus: This course provides an opportunity to involve students in practical research in environmental science fields. It provides the opportunity for students to further develop their practical and analytical skills acquired in the level II and III environmental science courses. The course is developed around a research project defined and supervised by a member(s) of the Faculty of Science and Technology. A research project will be assigned to students who show interest in such a course and who have already demonstrated some abilities in environmental sciences. Students are expected to spend a total of 144 hours of work on the project across both semesters/summer, meeting weekly with their supervisor(s).

Teaching: Students will be involved in weekly meeting/discussions with their supervisor(s) who will provide training in relevant laboratory/field methods/skills and guide the student in experimental design, data collection and the analysis and interpretation of the data collected. A library session for students to assist them in developing their skills in searching online databases for relevant resources will be provided.

Method of Examination:

Supervisor's Assessment	15%
Seminar	15%
Project Report	70%

COURSES BY SEMESTER: COMPUTER SCIENCE, ELECTRONICS, MATHEMATICS AND PHYSICS:

SEMESTER I

PRELIMINARY (6 credits)

COMP0001 Preliminary Computer Science I
MATH0101 Preliminary Mathematics I
PHYS0070 Preliminary Physics I

LEVEL I (3 credits)

COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientist
COMP1180 Mathematics for Computer Science
ELET1205 Computer Aided Design
ELET1210 Digital Electronics I
ELET1220 Introduction to Electronics
MATH1190 Calculus A
MATH1141 Introductory Linear Algebra & Analytical
Geometry
MATH1235 Python Programming & Mathematical
Software
PHYS1200 Physics I: Mechanics of Translational
Motion
PHYS1205 Physics II: Rotation, Waves and
Thermodynamics

LEVEL II (4 credits)

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
COMP2150 Computer Networks I
COMP2155 Building Web Applications
COMP2160 Object-Oriented Programming
ELET2100 Microprocessors I
ELET2110 Circuit Simulation
ELET2130 Digital Communications I
MATH2110 Linear Algebra

SEMESTER II

PRELIMINARY (6 credits)

COMP0002 Preliminary Computer Science II
MATH0102 Preliminary Mathematics II
PHYS0071 Preliminary Physics II

LEVEL I (3 credits)

COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
COMP1180 Mathematics for Computer Science I
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
MATH1195 Calculus B
MATH1152 Sets and Number Systems
MATH1230 Introductory Applied Statistics I
PHYS1210 Physics III: Electric Fields, Currents and
Circuits (3 cr)
PHYS1220 Physics IV: Magnetism, Electromagnetic Waves
and Optics

LEVEL II (4 credits)

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
COMP2150 Computer Networks I
COMP2160 Object-Oriented Programming
ELET2120 Discrete Device Electronics
ELET2140 Medical Instrumentation
ELET2150 Automation Technology
MATH2100 Abstract Algebra
MATH2130 Ordinary Differential Equations
MATH2150 Mathematical Statistics
PHYS2102 Solid State Physics
PHYS2103 Classical Mechanics

MATH2120 Analysis and Methods
MATH2140 Probability Theory
PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics and Special Relativity
PHYS2102 Solid State Physics
PHYS2106 Advanced Physics/Technology Lab. I
PHYS2107 Advanced Physics/Technology Laboratory II

LEVEL III (4 credits)

COMP3100 Operating Systems
COMP3125 Artificial Intelligence
COMP3180 Algorithm Design and Analysis
COMP3210 Electronic Commerce
COMP3260 Computer Graphics I
COMP3910 Computer Science Research Project
COMP3920 Computer Science Major Research Project*
COMP3930 Computer Science Group Research Project
ELET3110 Control and Instrumentation
ELET3130 Introduction to DSP
ELET3160 Electronics Research Project
MATH3160 Number Theory
MATH3190 Matrix Analysis
MATH3450 Statistical Theory I
MATH3300 Research Project
PHYS3100 Quantum Mechanics
PHYS3102 Optics and Lasers
PHYS3106 Physics Research Project
PHYS3107 Fundamental of Photovoltaic Physics

* 8 credits

PHYS2106 Advanced Physics/Technology Laboratory I
PHYS2107 Advanced Physics/Technology Laboratory II
ENSC2003 Sustainable Energy Systems

LEVEL III (4 credits)

COMP3115 Information Systems
COMP3155 Computer Networks II
COMP3160 Database Management Systems
COMP3165 Software Quality Assurance
COMP3170 Web-based Applications
COMP3230 Network & Computer Security
COMP3920 Computer Science Major Research Project*
ELET3041 Microcontrollers & Applications
ELET3120 Communication Circuits
ELET3151 Digital Communications II
ELET3210 Sensors & Actuator Technology
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3300 Research Project
MATH3460 Statistical Theory II
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics

COURSES BY SEMESTER: METEOROLOGY

SEMESTER I

LEVEL I

METE1110 Introduction to Oceans and Climate (3 credits)
METE1000 Intro. To Physical Meteorology & Weather
Observations

LEVEL II

METE2000 Physical Meteorology I

SEMESTER II

LEVEL I

METE1100 Intro to Dynamic Met & Weather Syst
METE1300 Climate Change, Edu. & Awareness

LEVEL II

METE2001 Physical Meteorology II

METE2100 Dynamic Meteorology I
METE2300 Hydrometeorology

LEVEL III

METE3100 Dynamic Meteorology II
METE3200 Synoptic Meteorology II

METE2200 Synoptic Meteorology I

LEVEL III

METE3300 Tropical Meteorology
METE3400 Weather Radars and Satellites

COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

The Department of Computer Science, Mathematics & Physics offers a Major, Double Major and Minor in Computer Science and a Major and Minor in Information Technology. In association with the Faculty of Social Sciences, the Options of a Double Major combining Computer Science or Information Technology with Accounting or Management are also offered to select students (See Appendix VI, Options in conjunction with other Faculties).

It is a requirement of the discipline that, to pass any Computer Science course, students must pass both Coursework and Final exam.

MAJOR IN COMPUTER SCIENCE: [Course descriptions](#)

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I

LEVEL III

COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis

AND Eight (8) Credits (including at least one Level III courses) from:

COMP2150 Computer Networks I
COMP2155 Building Web Applications
COMP2160 Object-Oriented Programming
COMP2950 Computer Science Elective
COMP3115 Information Systems
COMP3125 Artificial Intelligence
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3155 Computer Networks II
COMP3160 Data Base Management Systems
COMP3170 Web-Based Applications
COMP3190 Special Topics in Computer Science
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3230 Network and Computer Security
COMP3260 Computer Graphics I
COMP3910 Computer Science Research Project
COMP3920 Computer Science Major Research Project
COMP3930 Computer Science Group Research Project

MINOR IN COMPUTER SCIENCE [Sixteen (16) Credits]: [Course descriptions](#)

At Least Eight (8) Credits From:

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis

AND At Most Eight (8) Credits from:

COMP2150 Computer Networks I
COMP2155 Building Web Applications
COMP2160 Object-Oriented Programming
COMP2950 Computer Science Elective
COMP3115 Information Systems
COMP3125 Artificial Intelligence
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3155 Computer Networks II
COMP3160 Data Base Management Systems
COMP3165 Software Quality Assurance
COMP3170 Web-Based Applications
COMP3190 Special Topics in Computer Science
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3230 Network and Computer Security
COMP3260 Computer Graphics I
COMP3910 Research Project
COMP3920 Computer Science Major Research Project
COMP3930 Computer Science Group Research Project

N.B: Students are not allowed to take both COMP3115 Information Systems and MGMT3011 Management Information Systems II for credit.

MAJOR IN INFORMATION TECHNOLOGY: Course descriptions

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming

LEVEL III

COMP3160 Database Management Systems
COMP3170 Web-Based Applications

AND Eight (8) Credits (including at least one Level III course) from:

COMP2125 Computer Architecture
COMP2150 Computer Networks I
COMP2155 Building Web Applications
COMP2950 Computer Science Elective
COMP3100 Operating Systems
COMP3115 Information Systems
COMP3125 Artificial Intelligence
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3155 Computer Networks II
COMP3165 Software Quality Assurance
COMP3180 Algorithm Design and Analysis
COMP3190 Special Topics in Computer Science
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3230 Network and Computer Security
COMP3260 Computer Graphics I
COMP3910 Computer Science Research Project
COMP3920 Computer Science Major Research Project
COMP3930 Computer Science Group Research Project

MINOR IN INFORMATION TECHNOLOGY [Sixteen (16) Credits]: [Course descriptions](#)

At Least Eight (8) Credits From:

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming
COMP3160 Database Management Systems
COMP3170 Web-Based Applications

AND At Most Eight (8) Credits From:

COMP2125 Computer Architecture
COMP2150 Computer Networks I
COMP2155 Building Web Applications
COMP2950 Computer Science Elective
COMP3100 Operating Systems
COMP3115 Information Systems
COMP3125 Artificial Intelligence
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3155 Computer Networks II
COMP3165 Software Quality Assurance
COMP3180 Algorithm Design and Analysis
COMP3190 Special Topics in Computer Science
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3230 Network and Computer Security
COMP3260 Computer Graphics I
COMP3910 Research Project
COMP3920 Computer Science Major Research Project
COMP3930 Computer Science Group Research Project

N.B: Students are not allowed to take both COMP3115 Information Systems and MGMT3011 Management Information Systems II for credit.

DOUBLE MAJOR IN COMPUTER SCIENCE: [Course descriptions](#)

LEVEL I

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 UNIX
COMP1170 Entrepreneurship for Computer Scientists

LEVEL II

COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
COMP2150 Computer Networks I
COMP2160 Object-Oriented Programming
AND at most Eight (8) Credits From:
COMP2950 Computer Science Elective
ELET2100 Microprocessors I
ELET2130 Digital Communications I

LEVEL III

COMP3100 Operating Systems
COMP3155 Computer Networks II
COMP3160 Database Management Systems
COMP3180 Algorithm Design and Analysis

AND

COMP3910 Computer Science Research Project
Four (4) level II-III credits from Computer science

OR

COMP3920 Computer Science Major Research Project

OR

COMP3930 Computer Science Group Research Project
Four (4) level II-III credits from Computer science

AND at least Eight (8) Credits From:

COMP2155 Building Web Applications
COMP3115 Information Systems
COMP3125 Artificial Intelligence
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3165 Software Quality Assurance
COMP3170 Web-Based Applications
COMP3190 Special Topics in Computer Science
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3230 Network and Computer Security
COMP3260 Computer Graphics I
ELET3151 Digital Communications II

Equivalencies between Old and New Computer Science Courses For the Purpose of Fulfilling Major and Minor Requirements.

Old Course

COMP1105 Computer Programming I
COMP1115 Computer Programming II
MATH1101 Basic Mathematics I/
MATH1100 Basic Mathematics
COMP1125 Introduction to Unix

New Course

COMP1205 Computing I
COMP1210 Computing II
COMP1180 Mathematics for Computer Science I
COMP1215 Unix

ELECTRONICS

The Department of Computer Science, Mathematics & Physics offers a Major and Minor in Electronics.

MAJOR IN ELECTRONICS: [Course descriptions](#)

LEVEL I

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

MATH1190 Calculus A

And 30 Credits from Level II & III Electronics courses as indicated below.

LEVEL II

At Least Twelve (12) Credits From:

ELET2100 Microprocessors I

ELET2110 Circuit Simulation

ELET2120 Discrete Device Electronics

ELET2130 Digital Communications I

ELET2140 Medical Instrumentation

ELET2150 Automation Technology

LEVEL III

At Most Twenty (20) Credits (Five Courses) From:

ELET3041 Microcontrollers & Applications

ELET3110 Control and Instrumentation

ELET3120 Communication Circuits

ELET3130 Intro. to Digital Signal Processing (DSP)

ELET3151 Digital Communications II

ELET3152 Mobile Communications and Applications

ELET3160 Electronics Research Project

ELET3210 Sensor and Actuator Technology

MINOR IN ELECTRONICS [Sixteen (16) Credits]: [Course descriptions](#)

Sixteen (16) Credits (Four Courses) From:

ELET2100 Microprocessors I

ELET2110 Circuit Simulation

ELET2120 Discrete Device Electronics

ELET2130 Digital Communications I

ELET2140 Medical Instrumentation

ELET2150 Automation Technology

ELET3041 Microcontrollers & Applications

ELET3110 Control and Instrumentation

ELET3120 Communication Circuits

ELET3130 Intro. to Digital Signal Processing (DSP)

ELET3151 Digital Communications II

ELET3152 Mobile Communications and Applications
ELET3160 Electronics Research Project
ELET3210 Sensor and Actuator Technology

MINOR IN MEDICAL ELECTRONICS [Sixteen (16) Credits]: [Course descriptions](#)

ELET2120 Discrete Device Electronics
ELET2140 Medical Instrumentation
ELET3041 Microcontrollers & Applications
ELET3210 Sensor and Actuator Technology

A student with a Minor in Medical Electronics cannot count any of these courses as part of their Major or Minor in Electronics

Equivalencies between Old and New Electronics Courses For the Purpose of Fulfilling Major and Minor Requirements.

Old Course

ELET1100 Circuit Analysis
ELET1110 Digital Electronics
No Equivalent
ELET1120 Basic Electronics
No Equivalent

New Course

ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics
ELET1205 Computer Aided Design

MATHEMATICS

The Department of Computer Science, Mathematics & Physics offers a Double Major, Major and Minor in Mathematics.

It is a requirement of the discipline that, to pass any Mathematics course, students must pass both Coursework and Final exam.

MAJOR IN MATHEMATICS: [Course descriptions](#)

LEVEL I

MATH1141 Introductory Linear Algebra & Analytical
Geometry
MATH1152 Sets and Number Systems
MATH1190 Calculus A
MATH1195 Calculus B
MATH1235 Python Programming & Mathematical
Software

LEVEL II

MATH2100 Abstract Algebra
MATH2110 Linear Algebra
MATH2120 Analysis & Methods I
MATH2130 Ordinary Differential Equations

LEVEL III

**Sixteen (16) Credits from Levels II and III courses
(including AT LEAST two Level III courses) from:**

MATH2140 Probability Theory
MATH2150 Mathematical Statistics
MATH3100 Multivariate Analysis
MATH3110 Design of Experiments
MATH3120 Numerical Analysis
MATH3130 Optimization Theory
MATH3140 Fourier Analysis and PDE
MATH3150 Complex Variables I
MATH3160 Number Theory
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3220 Sampling Theory
MATH3300 Mathematics Research Project
MATH3450 Statistical Theory I
MATH3460 Statistical Theory II
MATH3375 Discrete and Computational Geometry

MINOR IN MATHEMATICS [Sixteen (16) Credits]: [Course descriptions](#)

LEVEL II

MATH2100 Abstract Algebra
MATH2120 Analysis & Methods I

AND Eight (8) Credits From:

MATH2110 Linear Algebra
MATH2130 Ordinary Differential Equations
MATH2140 Probability Theory
MATH2150 Mathematical Statistics
MATH3100 Multivariate Analysis
MATH3110 Design of Experiments
MATH3120 Numerical Analysis
MATH3130 Optimization Theory

MATH3140 Fourier Analysis and PDE
MATH3150 Complex Variables I
MATH3160 Number Theory
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3220 Sampling Theory
MATH3375 Discrete and Computational Geometry
MATH3450 Statistical Theory I
MATH3460 Statistical Theory II

MINOR IN STATISTICS [Sixteen (16) Credits]: [Course descriptions](#)

MATH 2140 Probability Theory
MATH 2150 Mathematical Statistics
MATH 3100 Multivariate analysis
MATH 3460 Statistical Theory II

DOUBLE MAJOR IN MATHEMATICS: [Course descriptions](#)

LEVEL I

MATH1141 Introductory Linear Algebra & Analytical
Geometry
MATH1152 Sets and Number Systems
MATH1190 Calculus A
MATH1195 Calculus B
MATH1230 Introduction to Applied Statistics 1
MATH1235 Python Programming & Mathematical
Software

LEVEL II

MATH2100 Abstract Algebra
MATH2110 Linear Algebra
MATH2120 Analysis & Methods I
MATH2130 Ordinary Differential Equations

LEVEL III

**Forty-eight (48) Credits from Levels II and III
courses:**

MATH2140 Probability Theory
MATH2150 Mathematical Statistics
MATH3100 Multivariate Analysis
MATH3120 Numerical Analysis
MATH3130 Optimization Theory
MATH3140 Fourier Analysis and PDE
MATH3150 Complex Variables I
MATH3160 Number Theory
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3300 Mathematics Research Project
MATH3450 Statistical Theory I
MATH3460 Statistical Theory II

**Equivalencies between Old and New Mathematics Courses For the Purpose of Fulfilling Major and Minor
Requirements.**

Old Course

MATH1101 Basic Mathematics I
MATH1102 Basic Mathematics II
MATH1110 Applied Statistics
MATH1120 Calculus I
MATH1130 Calculus II
No equivalent

New Course

MATH1152 Sets and Number Systems
MATH1141 Introductory Linear Algebra & Analytical
Geometry
MATH1230 Introductory Applied Statistics I
MATH1190 Calculus A
MATH1195 Calculus B
MATH1235 Python Programming & Mathematical
Software

METEOROLOGY

Through our affiliate institution, the Caribbean Institute for Meteorology & Hydrology, a Major and Minor in Meteorology are offered.

MAJOR IN METEOROLOGY: [Course descriptions](#)

LEVEL I

METE1000 Introduction to Physical Meteorology & Weather Observations
METE1100 Introduction to Dynamic Meteorology & Weather Systems
METE1110 Introduction to Oceans & Climate
MATH1190 Calculus A
MATH1195 Calculus B

LEVEL II

METE2000 Physical Meteorology I
METE2001 Physical Meteorology II
METE2100 Dynamic Meteorology I
METE2200 Synoptic Meteorology I

LEVEL III

METE3100 Dynamic Meteorology II
METE3200 Synoptic Meteorology II
METE3300 Tropical Meteorology

AND Four (4) Credits from:

METE2300 Hydrometeorology
METE3400 Weather Radar and Satellites
METE3500 Bioclimatology

MINOR IN METEOROLOGY [Sixteen (16) Credits]: [Course descriptions](#)

METE2100 Dynamic Meteorology I
METE2200 Synoptic Meteorology I

AND Four (4) Credits from:

METE2000 Physical Meteorology I
METE2001 Physical Meteorology II

AND Four (4) Credits from:

METE3100 Dynamic Meteorology II
METE3200 Synoptic Meteorology II
METE3300 Tropical Meteorology

Equivalencies between Old and New Meteorology Courses For the Purpose of Fulfilling Major and Minor Requirements

Old Course

METE1200 Oceans and Climate

New Course

METE1110 Introduction to Ocean and Climate

PHYSICS

The Department of Computer Science, Mathematics & Physics offers a Major and Minor in Physics.

MAJOR IN PHYSICS: [Course descriptions](#)

LEVEL I

PHYS1200 Physics I: Mechanics of Translational Motion

PHYS1205 Physics II: Rotation, Waves and
Thermodynamics

PHYS1210 Physics III: Electric Fields, Currents and
Circuits

PHYS1220 Physics IV: Magnetism, Electromagnetic
Waves and Optics

MATH1190 Calculus A

MATH1195 Calculus B

LEVEL II

PHYS2100 Mathematical Methods in Physics

PHYS2101 Quantum Mechanics & Special Relativity

PHYS2103 Classical Mechanics

PHYS2106 Advanced Physics/Technology Laboratory I

PHYS2107 Advanced Physics/Technology Laboratory II

LEVEL III

PHYS3100 Quantum Mechanics

PHYS3101 Electrodynamics

PHYS3105 Statistical Mechanics

AND Four (4) Credits From:

ELET2100 Microprocessors I

ELET2110 Circuit Simulation

ELET2120 Discrete Device Electronics

ELET2130 Digital Communications I

ELET2140 Medical Instrumentation

PHYS2102 Solid State Physics

PHYS2105 Computational Physics I

PHYS2950 Physics Elective

ELET3041 Microcontrollers and Applications

ELET3110 Control and Instrumentation

ELET3120 Communication Circuits

ELET3130 Introd. to Digital Signal Processing (DSP)

ELET3151 Digital Communications II

ELET3152 Mobile Communication & Applications

ELET3160 Electronics Research Project

ELET3210 Sensors & Actuator Technology

PHYS3102 Optics and Lasers

PHYS3103 Astrophysics

PHYS3106 Physics Research Project

PHYS3107 Fundamentals of Photovoltaic Physics

MINOR IN PHYSICS (Sixteen (16) Credits): [Course descriptions](#)

At Least Eight (8) Credits From:

PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics & Special Relativity
PHYS2103 Classical Mechanics
PHYS2106* Advanced Physics/Technology Laboratory I
PHYS2107* Advanced Physics/Technology Laboratory II
PHYS3100 Quantum Mechanics
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics

AND at Most Eight (8) Credits From:

PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics & Special Relativity
PHYS2102 Solid State Physics
PHYS2103 Classical Mechanics
PHYS2105 Computational Physics I
PHYS2106 Advanced Physics/Technology Laboratory I
PHYS2107 Advanced Physics/Technology Laboratory II
PHYS2950 Physics Elective
PHYS3100 Quantum Mechanics
PHYS3101 Electrodynamics
PHYS3103 Astrophysics
PHYS3102 Optics and Lasers
PHYS3105 Statistical Mechanics
PHYS3106 Physics Research Project
PHYS3107 Fundamentals of Photovoltaic Physics

* Students should note that PHYS2106 and PHYS2107 are Practical Courses that are worth Two (2) Credits each.

Equivalencies between Old and New Physics Courses For the Purpose of Fulfilling Major and Minor Requirements.

Old Course

PHYS1100 Mechanics

PHYS1101 Electricity & Magnetism

PHYS1102 Optics, Thermodynamics & Modern
Physics

New Course

PHYS1200 Physics I: Mechanics of Translational Motion

PHYS1210 Physics III: Electric Fields, Currents and Circuits

PHYS1205 Physics II: Rotation, Waves and Thermodynamics

COMPUTER SCIENCE & INFORMATION TECHNOLOGY COURSES

PRELIMINARY COMPUTER COURSES

COMP0001 - PRELIMINARY COMPUTER SCIENCE (6 Credits)

Pre-requisite: None

Syllabus: Fundamentals of Information Technology; Relating IT and other Computing disciplines. Distinguish between data and information; Fundamentals of Computer Architecture The components of computer-based systems; Functional components of a computer system (characteristics, performance and interactions Problem Solving with Computers; The problem solving process The development and use of algorithms.

Teaching: Four (4) lectures, One (1) tutorial, One (1) 2-hour laboratory per week

Method of Examination:

In-course Test(s)/Assignment(s)	20%
Laboratory Exercises	20%
Final Theory Examination (2 hrs)	60%

COMP0002 - PRELIMINARY COMPUTER SCIENCE II (6 Credits)

Pre-requisite: None

Syllabus: Data structures; Using abstract data types (ADTs); Basic algorithms for sorting and Searching; Software engineering; The software development life cycle Methods, processes, tools and techniques used in software engineering Operating systems and networks; Functions of operating systems Incorporation of networking technology and applications in operating systems Use of information technology tools; Using productivity tools to solve real-life problems Presenting information in an appropriate manner.

Teaching: Four (4) lectures, One (1) tutorial, One (1) 2-hour laboratory per week

Method of Examination:

In-course Test(s)/Assignment(s)	20%
Laboratory Exercises	20%
Final Theory Examination (2 hrs)	60%

LEVEL I COMPUTER SCIENCE COURSES

COMP1205 - COMPUTING I (3 Credits)

Pre-requisite: None

Anti-requisite: COMP1105 Computer Programming I

Syllabus: Problem solving (top-down, bottom-up, stepwise refinement). Algorithms (pseudocode & flowcharts). Object-oriented concepts (Encapsulation, inheritance, polymorphism, classes, objects, methods, message passing). Integrated Development Environments (editors, compilers, debuggers and libraries). Program anatomy (primitives, data types, objects, variables & constants). Formatted I/O. Operators (assignment, arithmetic, relational, Boolean, precedence rules). Control structures (sequences, selection, repetition). Objects & classes (attributes, methods, interfaces, services, pass-by-value, pass-by-reference, scope rules). Data structures: arrays (linear, multi-dimensional and parallel), array list, aggregate data structures (enumerations). Memory Concepts and Number Systems. Software testing.

Teaching: Two (2) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination	60%

COMP1210 - COMPUTING II (3 Credits)

Pre-requisite: COMP1205: Computing I or COMP1105 Computer Programming I

Anti-requisite: COMP1115 Computer Programming II

Syllabus: Introduction to Objects and Classes, Fundamental Algorithms for Searching and Sorting, Randomness and Recursion, Data Types, Data Structures, Abstract Data Types, File Processing.

Teaching: Two (2) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination	60%

COMP1180 - MATHEMATICS FOR COMPUTER SCIENCE I (3 Credits)

Pre-requisite: None

Anti-requisite: MATH1101 Basic Mathematics I

Syllabus: Predicate calculus - Propositions, propositional functions, truth tables, universal and existential quantifiers, logical equivalences, rules of inference, DeMorgan's law. Introduction to Mathematical Induction. Sets - Basic properties, Venn diagrams, algebra of sets, Cartesian product, binary operations on set, countable sets, power set, computer representation of sets. Relations - reflexive, symmetric, transitive, equivalence relation. Functions - basic properties, types (Injection, surjection, bijection, inverse), composition, inverse. Number systems - general laws of associativity, commutativity, distribution. Sequences - Arithmetic and Geometric Progressions. Number Theory - division of integers, Euclidean algorithm. Matrices - basic operation.

Teaching: Two (2) hours of lectures and one (1) hour of tutorial per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination	60%

COMP1215 - UNIX (3 Credits)

Pre-requisite: None

Anti-requisite: COMP1125 Introduction to UNIX

Syllabus: Overview of UNIX - A short history of UNIX and why UNIX. Getting Started - Logging on and off, passwords, overview of the shell, command and utility syntax, issuing commands. Files and directories management - creating, viewing, removing, renaming and securing. Job and process management - Scheduling and monitoring both jobs and processes. Text editors - ed, edit, ex and vi. Basic Account maintenance - shell configuration file, configuration with environmental variables, aliases and shell functions. UNIX utilities - sed, at, nawk, grep. Shell script programming.

Teaching: Two (2) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination	60%

COMP1170 – ENTREPRENEURSHIP FOR COMPUTER SCIENTISTS (3 Credits)

Pre-requisite: None

Anti-requisite: COMP1130 Web Technology Fundamentals

Syllabus: Entrepreneurship. The importance of technology entrepreneurship. Life stories of successful technology entrepreneurs. How the Internet and e-business applications have changed the way that we

communicate and provide entrepreneurial opportunities. How the use of e-business has improved the efficiency of business processes. Privacy, security and legal issues associated with the Internet and entrepreneurship. Market research. Techniques and statistical methods for market research analysis. Pricing strategies. Determining the best price. MS Office tools. Document formatting, table of contents and creating templates. Spreadsheets. Presentation software. Tools for Statistical Analysis. SPSS, Excel or others. HTML and HTML5. Marking up text. Creating links, elements, attributes, forms. Adding images. HTML5 elements and attributes. Audio and video with HTML5. CSS for presentation. Formatting text, floating and positioning. Page layout. The box model. Introduction to JavaScript: variables, conditional statements, loops, functions, events, the browser object. Server-side scripting: Accessing and manipulating form data, Storing form data in a database, Displaying data from the server in a browser.

Teaching: Two (2) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination	60%

LEVEL II COMPUTER SCIENCE COURSES

COMP2105 - DISCRETE MATHEMATICS (4 Credits)

Pre-requisite: MATH1100 Basic Mathematics OR MATH1101 Basic Mathematics I

Syllabus: Predicate Calculus (Universal and existential quantifiers, proofs, logical equivalences and inferences), Asymptotic Analysis and Notation (O , θ and Ω), Recurrence Relations (Homogeneous, non-homogeneous, change of variable), Mathematical induction, Elementary Combinatorics (permutations and combinations, Binomial Theorem, Pigeonhole principle), Elementary Graph Theory (Paths, cycles and connectivity, classes of graphs, trees, minimum spanning trees, depth-first and breath-first traversals, adjacency and incident matrices), Finite State Machines, (State graphs/tables, regular sets, recognizers, Kleene's theorem, machine minimization)

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination (2 hrs)	60%

COMP2115 INFORMATION STRUCTURES (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

Syllabus: Abstract Data Types (Lists, queues, stacks, trees), Indices (Open /closed hash tables, hash functions, collision resolution schemes), Dictionaries (Binary search trees, AVL-trees, splay trees, B-trees), Graphs (Adjacency matrices/lists, mapping functions), Sets (Forest, path compression, weighted unions)

Teaching: Three (3) lectures, one tutorial and two (2) hours of labs per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination (2 hrs)	60%

COMP2125 - COMPUTER ARCHITECTURE (4 Credits)

Pre-requisites: [COMP1115 Computer Programming II & MATH1101 Basic Mathematics I] or [COMP1115 Computer Programming II & MATH1100 Basic Mathematics] or ELET1110 Digital Electronics

Syllabus: Instruction Sets and Execution, Pipelining, Addressing Modes, Memory Hierarchies, Caching, RISC vs CISC Architecture, Interrupt Processing, I/O Processing.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination (2 hrs)	60%

COMP2145 - SOFTWARE ENGINEERING I (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

Syllabus: Software Development (Requirements analysis, specifications, Design, implementation, validation and verification, maintenance), Product and Project Documentation (user manuals, internal documentation), Software Development Approaches (e.g. prototyping, agile development), Testing Strategies (black box, white box, usability).

Teaching: Three (3) lectures and one laboratory per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
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Final Theory Examination (2 hrs) 60%

COMP2150 - COMPUTER NETWORKS I (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

Syllabus: Data Communication Fundamentals, The ISO References Model, Transmission Media, Interface Standards, Asynchronous and Synchronous Transmission, Communications Control Devices, Data Compression, Error Detection Methods, Framing Methods, Flow Control, Network Topology, LAN Technologies – including Wireless LANs.

Teaching: Three (3) hours of lectures and two (2) hours of laboratory per week.

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination (2 hrs)	60%

COMP2155 - BUILDING WEB APPLICATIONS (4 Credits)

Pre-requisite: COMP1115 - Computer Programming II

Syllabus: Overview of Web Technologies; HTML, XHTML and HTML5; Cascading Style Sheets; Server configuration for Web application delivery; Browser compatibility; Client-side programming; Introduction to the single- and two-tier application architectures; Server-Side Scripting; Introduction to Web usability.

Teaching: Three (3) hours of lectures and two (2) hours of labs each week

Method of Examination:

In-course Test(s)/Assignment(s)	40%
Final Theory Examination (2 hrs)	60%

COMP2160 - OBJECT-ORIENTED PROGRAMMING (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

Syllabus: Fundamental Concepts (Encapsulation, information hiding, classes and objects, inheritance, polymorphism, dynamic binding), Fundamentals of Class Design (Inheritance vs composition relationships, constructors and destructors, copy constructors, selectors, modifiers) Design by Contract

(Exception handling, assertions), Advanced Concepts (Abstract and concrete classes, frame-works and design patterns), Applications using Class Libraries.

Teaching: Three (3) lectures, one tutorial and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP2950 - COMPUTER SCIENCE ELECTIVE (4 Credits)

Pre-requisites: None

Syllabus: An advanced course in Computer Science taken as an exchange student at an approved institution and pre-approved by the Dean.

LEVEL III COMPUTER SCIENCE COURSES

COMP3100 - OPERATING SYSTEMS (4 Credits)

Pre-requisites: COMP2115 Information Structures & COMP2125 Computer Architecture

Syllabus: Evolution of Operating Systems Characteristics of Modern Operating systems Process Management (Processes and threads, process synchronization, Scheduling, deadlock), Memory Management (Memory partitioning, paging, virtual memory segmentation), File Management (File organization, file system implementation, example file systems), Device Management (I/O devices, device drivers, I/O design issues, disk-scheduling), Security (Security threats, protection mechanisms, trusted systems).

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3115 - INFORMATION SYSTEMS (4 Credits)

Pre-requisite: COMP2145 Software Engineering I

Restriction: Not available to students who have passed MGMT3011 – Management Information Systems II

Syllabus: Evolution of Information Technology, Impact of Information Technology on Business, Information and Information Systems, Systems Planning, Development and Implementation, Delivery of Information Services.

Teaching: Three (3) lectures and two hours of Lab per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3125 - ARTIFICIAL INTELLIGENCE (4 Credits)

Pre-requisites: COMP2105 Discrete Mathematics & COMP2115 Information Structures

Syllabus: Problems and Search (Problem spaces, heuristic search), Knowledge Representation (Predicate logic, rule-based systems, Reasoning, slot-and-filler), Advanced Topics (Game playing, natural language, planning, learning), Applications (Expert systems, software agents, programming-by-example) Software Development Approaches (e.g. prototyping, agile development), Testing Strategies (black box, white box, usability).

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3135 - PROGRAMMING LANGUAGES (4 Credits)

Pre-requisite: COMP2115 Information Structures

Syllabus: Imperative Programming (Basic Semantics, data types control structures), Object- Oriented Programming (Objects, classes and methods, Inheritance, polymorphism), Functional Programming (Referential transparency, recursion, types and Polymorphism, lambda calculus) Logic Programming (Predicate calculus and logical deduction, unification and resolution, non determinism and back-tracking), Scripting Languages (Regular expressions) Concurrent Programming (Communication and synchronization).

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3140 - SOFTWARE ENGINEERING II (4 Credits)

Pre-requisite: COMP2145 Software Engineering I

Syllabus: Application of Project Management to Software Projects, Approaches to Project Management, Project Selection and Feasibility Analysis, Project Cost Estimation, Planning and Resource Scheduling, Control Techniques, Quality Assurance, Team Management.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3155 - COMPUTER NETWORKS II (4 Credits)

Pre-requisite: COMP2150 Computer Networks I

Syllabus: The ISO Reference Model – layer 3 and above, Internetworking with TCP/IP, WAN Technologies e.g. ATM, Frame Relay Quality of Service in Communications Networks, Network Security, Network Design, Network Performance, Network Management.

Teaching: Three (3) hours of lectures and Two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3160 - DATABASE MANAGEMENT SYSTEMS (4 Credits)

Pre-requisite: COMP2115 Information Structures

Syllabus: Principles of Database Design (Logical and Physical schemas, Data independence, entity-relationship model), Relational Database Systems (Data normalization, data Description Languages, query languages), Advanced Database Concepts(Distributed databases, object-oriented Databases, data warehousing).

Teaching: Three (3) lectures, one tutorial and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3165 SOFTWARE QUALITY ASSURANCE (4 Credits)

Pre-requisite: COMP2145 Software Engineering I

Syllabus: What Is Software System Quality; Software Development Process Models; Fundamentals in Measurement Theory; Software Quality Product and Process Metrics; Applying the Seven Basic Quality Tools in System Development; Defect Removal Effectiveness; The Rayleigh Model; Models for Pre- and Post-Release Quality Management; Measuring and Analyzing Customer Satisfaction Fundamentals; Testing as Measurement of System Quality

Teaching:

Method of Examination:

Coursework	40%
Final Theory Examination (2 hours)	60%

COMP3170 - WEB-BASED APPLICATIONS (4 Credits)

Pre-requisite: COMP2160 Object-Oriented Programming

Syllabus: Overall Client-Server Model, Client Side Programming (Development of browser software, Client side scripting), Networking (TCP/IP, HTTP, sockets, data grams, routing issues), Server Side Programming (GFI, server side scripting, web services), Database Connectivity (Server to database connectivity issues), Security (Policy development, physical security, securing web applications), Design Issues (User interface factors, hardware issues).

Teaching: Three (3) lectures, one tutorial and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3180 - ALGORITHM DESIGN AND ANALYSIS (4 Credits)

Pre-requisites: COMP2105 Discrete Mathematics & COMP2115 Information Structures

Syllabus: Analysis of Algorithms: computational models, time and space; Complexities worst-case and expected complexities, lower and upper bounds; Techniques for designing efficient algorithms: recursion, divide-and-conquer, balancing, dynamic programming, and branch-and-bound; Problems on sets and sequences including sorting and selection; string matching; Matrix and Boolean matrix multiplication; Graph algorithms; The classes of P, NP and NP-Complete problems.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3190 - SPECIAL TOPICS IN COMPUTER SCIENCE (4 Credits)

Pre-requisite: Restricted to Finalists majoring in Computer Science.

Syllabus: Topics will be drawn from the principles of programming languages, operating systems, information systems, graphics, artificial intelligence, software engineering, networks, logic, computability and complexity theory, algorithms, program verification, discrete mathematics and any other area of current interest.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3210 - ELECTRONIC COMMERCE (4 Credits)

Pre-requisite: COMP2160 Object-Oriented Programming

Syllabus: Internet concepts and technology, Economic foundation of electronic commerce, Storefronts, shopping carts and Landing pages, Order processing, Pricing and payment processing, Security issues, Shipping and handling, Products, Internet marketing and legal issues.

Teaching: Three (3) lectures and two hours of Lab per week.

Method of Examination:

In-course Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

COMP3220 - HUMAN-COMPUTER INTERACTION (4 Credits)

Pre-requisites: COMP2115 Information Structures & COMP2145 Software Engineering I

Syllabus: Historical overview of human-computer interaction, Current and future developments in the area of human-computer interaction, Relationship to computer science and software engineering. Influences on interface design. General models and guidelines, Methods of designing interfaces, Software and hardware interface implementation, Mechanisms of evaluation.

Teaching: Three (3) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments:	40%
Final Theory Examination (2 hours):	60%

COMP3230 - NETWORK AND COMPUTER SECURITY (4 Credits)

Pre-requisites: COMP2105 Discrete Mathematics & COMP2150 Computer Networks I

Syllabus: Introduction to cryptography, Symmetric-key encryption and authentication, Public-key encryption and authentication, Cryptographic hash functions, Message authentication codes and digital signatures, Key distribution and certification, Authorization and access control, Security protocols, Storage security, Web security, Payment systems. Email security, Digital rights management, Social issues such as usability, privacy and risk assessment.

Teaching: Three (3) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments:	40%
Final Theory Examination (2 hours):	60%

COMP3260 - COMPUTER GRAPHICS I (4 Credits)

Pre-requisites: COMP2115 - Information Structures & COMP2105 - Discrete Mathematics

Syllabus: Output primitives, 2-dimensional transformations and clipping, 3-dimensional display techniques, Representations and transformations, Projection algorithms, 2D Raster Graphics Algorithms, Illumination and color models, Hidden-surface elimination, Bézier and B-Spline curves.

Teaching: Three (3) hours of lectures and two (2) hours of labs per week.

Method of Examination:

In-course Tests/Assignments:	40%
Final Theory Examination (2 hours):	60%

COMP3910 - COMPUTER SCIENCE RESEARCH PROJECT (4 Credits)

Pre-requisite: Restricted to Finalists majoring in Computer Science.

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Computer Science. The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and research effort. The project should contain some originality in material and evidence of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of Semester II and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in Semester II. N.B. Enrolment will be limited to those students who have demonstrated a sound academic background and an aptitude for research.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Oral Presentation	20%
Written Report	60%
Proposal and Literature Review	20%

COMP3920 - COMPUTER SCIENCE MAJOR RESEARCH PROJECT (8 Credits)

Pre-requisite: Restricted to finalists majoring in Computer Science or Information Technology and by permission of the Computer Science discipline

Syllabus: This course provides students with the opportunity to complete a major project utilizing classroom knowledge to solve a real world or research-based problem. Students are required to realize a significant software application from inception through to implementation or proof of concept. The project runs throughout the academic year (semesters I and II) giving students the needed time to

thoroughly research and solve a problem that can produce usable outcomes with either commercial or research applications.

Teaching: Students are required to meet with their supervisors at least once a week.

Method of Examination:

Proposal Report	10%
Proposal Presentation	10%
Final Presentation	15%
Demonstration	15%
Final Report	50%

COMP3930 - COMPUTER SCIENCE GROUP RESEARCH PROJECT (4 Credits)

Pre-requisite: COMP2115, COMP2145 and restricted to finalists majoring in Computer Science or Information Technology and by permission of the Computer Science discipline

Syllabus: This course provides groups comprised of 2-4 students with the opportunity to implement a substantive software system under the supervision of a staff member. The software may address a problem in any domain, but must meet the minimum standards of design and functionality, appropriate for a Computer Science or Information Technology major.

Teaching: Students are required to meet with their supervisors at least once a week.

Method of Examination:

Mid-term presentation	10%
Final project presentation	15%
Product Demonstration	15%
Web Page	10%
Report	50%

Project Restrictions: Students can only receive credits for one project course.

ELECTRONICS

LEVEL I ELECTRONICS COURSES

ELET1200 – BASIC CIRCUIT ANALYSIS (3 Credits)

Pre-requisites: CAPE Physics or CAPE Mathematics and CSEC Physics or equivalents

Anti-requisite: ELET1100 – CIRCUIT ANALYSIS

Syllabus: Direct Current (DC) voltage and current notations, Alternating Current (AC) voltage and current notations, Sinusoids, Phasors, Complex notation, Applications of phasors and complex notation. Mesh Current analysis, Node Voltage analysis, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer, Applications of analysis theorems. Impedance, Mutual inductance, Resonance, Transient Response, Bode plots. Applications of frequency response in AC circuits. Op-Amp operation, Op-Amp biasing, Op-Amp circuits (amplifiers, integrators, differentiators, adders, subtractors).

Teaching: Two (2) lectures and Two (2) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		60%
In course test(s) / Assignment(s)	20%	
Laboratory		20%

ELET1205 – COMPUTER AIDED DESIGN (3 Credits)

Pre-requisites: None

Anti-requisite: None

Syllabus: Definition of a Dynamic Simulation, Definition of Stress Analysis, Techniques of Performing Dynamic Simulations, Techniques of Performing Stress Analysis, Applications of Dynamic Simulations and Stress Analysis. Drawing elevations; 2D and 3D drawings, Design and Analysis Software, Application of Drawing Techniques. Definition of a Sketch, Definition of a Part, Definition of a Feature, Sketch Creation, Part Creation, Feature Creation, Applications. Definition of an Assembly, Object Assembly Techniques, Applications of Assemblies.

Teaching: One (1) lecture and Four (4) hours laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		40%
In course test(s) / Assignment(s)	10%	
Laboratory		50%

ELET1220 – INTRODUCTION TO ELECTRONICS (3 Credits)

Pre-requisites: CAPE Physics or CAPE Mathematics and CSEC Physics or equivalents

Anti-requisite: ELET1120 – BASIC ELECTRONICS

Syllabus: Resistors; Capacitors; Inductors; Characteristics of discrete components; Application of discrete components in simple circuits. Diodes; Bipolar Junction Transistors (BJT); Silicon Controlled Rectifiers (SCR); Diodes for Alternating Current (DIAC); Triode for alternating current (TRIAC); Characteristics of discrete components; Applications. Power supply components; Regulator components; Characteristics of simple power supplies and regulators; Applications.

Teaching: Two (2) lectures and Two (2) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		60%
In course test(s) / Assignment(s)	20%	
Laboratory		20%

ELET1210 – DIGITAL ELECTRONICS I (3 Credits)

Pre-requisites: CAPE Physics or CAPE Mathematics and CSEC Physics or equivalents

Anti-requisite: ELET1110 – Digital Electronics

Syllabus: The implementation of logical functions using electronic gates and the importance of minimization, using various methods. Binary arithmetic; Number systems; Floating point representation; Binary codes and code conversion; Encoders and Decoders. Digital Building Blocks (flip-flops, counters, data selectors and demultiplexers, binary adders). Logic Families (Bipolar, TTL, FET, MOS, CMOS) and their family characteristics (propagation delay, fan out, power dissipation, noise immunity and packing density). Finite State Device (FSD) design and construction.

Teaching: Two (2) lectures and Two (2) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		60%
In course test(s) / Assignment(s)	20%	
Laboratory		20%

ELET1215 – DIGITAL ELECTRONICS II (3 Credits)

Pre-requisites: ELET1210 – Digital Electronics I

Anti-requisite: None

Syllabus: Shift registers, latches and word clocks. Monostable pulse generators and sequencers. Schmitt trigger. Types of Analog to Digital (ADC) and Digital to Analog (DAC) circuits. Design of Asynchronous Sequential Circuits and hazard analysis. Combining functional blocks together to produce complex, non-programmable devices.

Teaching: Two (2) lectures and Two (2) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		60%
In course test(s) / Assignment(s)	20%	
Laboratory		20%

LEVEL II ELECTRONICS COURSES

ELET2100 - MICROPROCESSORS I (4 Credits)

Pre-requisite: ELET1110 Digital Electronics

Syllabus: Architecture of 8-bit CPU's e.g. INTEL 8085, Instruction set, Registers and their uses, Operation, Busses, Addressing, Data flow, Control section, Interrupts, Stack, Branching, Subroutines, Loops, Serial I/O, Interfacing, Port and memory mapping, Polling, Handshaking, Parallel ports, Serial communications (RS-232), A/D and basic D/A interfacing, device control with simple examples, comparison with other 8-bit CPU's, Introduction to advanced microprocessors.

Teaching: Two (2) lectures four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments		20%
Laboratory		20%

ELET2110 - CIRCUIT SIMULATION (4 Credits)

Pre-requisite: ELET1100 Circuit Analysis

Syllabus: Introduction to SPICE, Language syntax, netlists, Source specification and passive element models, Active device modeling, macro models, AC, DC, transient, frequency and Monte Carlo analysis, Issues of convergence and stability.

Teaching: Two (2) contact hours and four (4) laboratory hours per week

Method of Examination:

Final Theory Examination (2 hour)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET2120 - DISCRETE DEVICE ELECTRONICS (4 Credits)

Pre-requisite: ELET1120 Basic Electronics

Syllabus: Hybrid & hybrid-pi equivalent circuits. Difference & Cascode amplifiers. Darlington configuration, complementary symmetry amplifiers. Types of feedback & their effects. High & low frequency response of RC coupled amplifiers. Tuned amplifiers, oscillators.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET2130 - DIGITAL COMMUNICATIONS I (4 Credits)

Pre-requisite: MATH1120 Calculus I and ELET1110 Digital Electronics

Syllabus: Fundamentals of digital communications, Fourier analysis, Energy and power spectral density, frequency response, Analog to Digital conversion, Information Theory, Baseband Transmission, Error Control Coding (Block).

Teaching: Two (2) 1-hour lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET2140 - MEDICAL INSTRUMENTATION (4 Credits)

Pre-requisite: ELET1110 Digital Electronics

Syllabus: The following topics and concepts will be discussed during the course: Introduction to Anatomy and Physiology Overview of Medical Electronics Equipments Preparation of Biosensor Types of Biosensors and their Applications Electrodes Bio-Medical Recorders Patient Monitoring Systems Safety Aspects of Medical Instruments

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	40%
In-course Tests/Assignments	20%
Laboratory/Mini-project	40%

ELET2150 - AUTOMATION TECHNOLOGY (4 Credits)

Pre-requisites: ELET2100: Microprocessors I

Syllabus: Microcontroller systems and architectures, Programming languages, Language syntax, Integrated modules, Basic terminologies, Interfacing to external devices. Programmable Logic Controllers (PLC) and Field-Programmable Gate Arrays (FPGA) architectures and systems, Programming Languages and Language syntax. Industrial Network Topologies, Wiring termination, Communication protocols, RS-485, Ethernet, CAN, Profibus and Error detection and recovery. Distributed Control Systems (DCS) and applications, Introduction to DCS terminology, Networking of microcontrollers, PLCs and FPGAs and bus redundancy. Supervisory Control And Data Acquisition (SCADA) systems and their applications, Introduction to SCADA terminology, user interface creation and modification, Data storage and security and Basic data analysis.

Teaching: Two (2) lectures and Four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In course test(s) / Assignment(s)	20%
Laboratory	20%

ELET2950 - ELECTRONICS ELECTIVE (4 Credits)

Pre-requisites: None

Syllabus: An advanced course in Electronics taken as an exchange student at an approved institution and pre-approved by the Dean.

LEVEL III ELECTRONICS COURSES

ELET3041 - MICROCONTROLLERS AND APPLICATIONS (4 Credits)

Pre-requisite: ELET2100 Microprocessors I

Syllabus: A Microcontroller Framework – hardware architecture, instruction set, addressing modes, program memory, register file structure and uses, simple program operations. The Assembler and Its Use – application code source file, list, hex, and object file generation, table use, macros, subroutines, directives. Input and Output Peripherals - ports, displays, buttons, keypads, sensors, actuators, relays, interrupts, timers, counters, pre-scalars, A/D, D/A, motors, PWM, serial communication Protocols. Memory – RAM, ROM, PROM, EPROM, EEPROM, Flash, and Error Correction. Applications – a variety of applications from consumer electronics to research instruments

Teaching: Two hours of lectures, one hour of tutorial and three hours of laboratory each week.

Method of Examination:

Final Theory Examination (2 hours)	50%
In-course Tests/Assignments	20%
Laboratory/Mini-Project	30%

ELET3110 - CONTROL & INSTRUMENTATION (4 Credits)

Pre-requisite: ELET2120 Discrete Device Electronics

Syllabus: Block diagrams, signal flow graphs, frequency response, stability, steady state and transient response. Transducers, controllers and control systems for level, temperature, speed and position control. Sampled systems. Introduction to computer control and robotics.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET3120 - COMMUNICATION CIRCUITS (4 Credits)

Pre-requisite: ELET2120 Discrete Device Electronics

Syllabus: High frequency transistors, transformers and filters. HF construction techniques. RF amplifiers, oscillators and frequency synthesisers. Mixers, IF amplifiers. Circuits for modulation and demodulation. Simulating communication circuits.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET3130 - INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP) (4 Credits)

Pre-requisite: ELET2130 Digital Communications I

Syllabus: Sampling, Z-Transforms, discrete convolution, DFT, FFT, DCT and related transforms. IIR and FIR digital filters. Approximations to analog filters. Practical implementation of digital filters.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET3151 - DIGITAL COMMUNICATIONS II (4 Credits)

Pre-requisite: ELET2130 Digital Communications I

Syllabus: Signals and Spectra, Bandpass Transmission, Error Control Coding (Convolutional), Satellite Communications, Wireless Communications.

Teaching: Two (2) 1-hour lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	20%
Laboratory	20%

ELET3152 - MOBILE COMMUNICATION & APPLICATIONS (4 Credits)

Pre-requisite: ELET2130 Digital Communications I or COMP2150 Computer Networks I

Syllabus: Radio basics, Electromagnetic energy, frequency and wavelength, Spectrum management, Information theory, Coding theory, Core wireless communications, technologies and standards, FSK, PSK, QAM, TDMA, FDMA, OFDM, CDMA, SDMA, GSM, UMTS, HSPA, LTE, Wi-Fi, WiMAX, Bluetooth, Wireless Networking, Network design, Cellular infrastructure, WAN, MAN, LAN, PAN, HRAN, Mobile Internet and the protocol Stack, Circuit and packet switching TCP/IP, mobile IPv4, mobile IPv6, Technological convergence and multi-purpose mobile computing, SMS, MMS, VoIP, Video conferencing, Geolocation, Mobile operating systems, Symbian, Microsoft, iPhone, Android, Mobile application development, Mobile application environment, Context-aware mobile applications

Teaching: Two lectures & Four hours of Lab work per week

Method of Examination:

Final Theory Examination (2 hours)	60%
Course & Lab work	40%

ELET3160 - ELECTRONICS RESEARCH PROJECT (4 Credits)

Pre-requisite: Restricted to Finalists Majoring in Electronics

Syllabus: Students will be given a problem for which they must develop a workable electronics solution which should preferably be of commercial interest. The developed solution should be of sufficient breadth and depth to make it equivalent to a 4-credit advanced course in electronics. Solution may include Mathematics and Computer Software but an electronic circuit component is required.

Method of Examination:

Proposal and Literature Review	20%
Oral Presentation	20%
Final Written Project Report	60%

ELET3210 - SENSORS & ACTUATOR TECHNOLOGY (4 Credits)

Pre-requisite: ELET1110 Digital Electronics

Syllabus: Measurement Systems, Measurements of Displacement and Strain, Force and Torque Measurement, Pressure Measurement, Flow Measurement, Measurement of Temperature, Measurement of other non electrical quantities, Transducer Theory, construction and use of various transducers, Temperature, Magnetic, Electrical, Mechanical, Acoustic, Optical, Chemical, Image, and Bio sensors. Electrical, Mechanical, Pneumatic, Hydraulic, Piezoelectric, and Polymer Actuators.

Teaching: Two lectures, one tutorial, 3 hours of Practical per week

Method of Examination:

In course test(s) / Assignment(s)	20%
Laboratory/ Mini-Project	40%
Final Theory Examination (2 hrs)	

MATHEMATICS

PRELIMINARY MATHEMATICS COURSES

MATH0101 - PRELIMINARY MATHEMATICS I (6 Credits)

Pre-requisite: CXC Mathematics or equivalent.

Syllabus: Algebra: Sets. Cartesian Product, functions, operations, the integers, mathematical induction, algebraic operations on polynomials and rational quadratics, step functions, modulus function. Geometry: Coordinate geometry, trigonometrical functions and identities, complex numbers, Argand diagram; vectors. Calculus: Limits, continuity, intermediate value theorem, gradient of a tangent, differentiation, Mean value theorem and its consequences (motivation, but no proof), curve sketching, integration as inverses of differentiation, fundamental theorem of calculus, techniques of integration, numerical techniques.

Teaching: Five (5) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (3 hours)	80%
In-course Tests/Assignments	20%

MATH0102 PRELIMINARY MATHEMATICS II (6 Credits)

Pre-requisite: CXC Mathematics or equivalent

Syllabus: Sequences and Series: Use of Σ notation, arithmetic and geometric progressions, binomial theorem. Special functions: Exponential and logarithmic functions as solutions of initial value problems, definition of arbitrary exponential, coordinate transformations, differential and integral calculus applied to transcendental functions. Elementary first and second order differential equations: Classification, techniques of solution, linear ordinary differential equations with constant coefficients. Combinatorics and Matrices: Elementary combinatorics, matrices of arbitrary size, determinants. Mathematical modeling; Ordinary differential equations of Physics, Biology, Economics, applications of Mathematics.

Teaching: Five (5) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (3 hours)	80%
In-class Tests/Assignments	20%

LEVEL I MATHEMATICS COURSES

MATH1141 – INTRODUCTORY LINEAR ALGEBRA & ANALYTICAL GEOMETRY (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent

Anti-requisite: None

Syllabus: VECTORS IN THE EUCLIDEAN PLANE: algebraic definition and geometric interpretation of a vector; norm; triangle inequality; scalar product; projects; parallel and perpendicular vectors.

VECTORS IN 3-DIMENSIONAL SPACE: norm; scalar product and projections; vector product and its geometric interpretation; (parametric) equations of lines & planes; intersections and parallel lines & planes; skew lines; shortest distances between skew lines and points and planes.

SYSTEMS OF LINEAR EQUATIONS: the general case of m linear equations in n unknowns; consistent, inconsistent and over determined systems; Gaussian Elimination; row echelon form.

MATRIX ALGEBRA: addition, scalar and matrix multiplication; square matrices and non-singular matrices; transpose of a matrix; diagonal and triangular matrices; inverse of a matrix.

DETERMINANTS: properties, evaluation and recursive definition of determinants; elementary row and column operation; adjoint matrix; Cramer's rule.

COMPLEX NUMBERS: geometric interpretation of algebraic operations; Argand diagram; roots of polynomials.

CONIC SECTIONS: circles, ellipses, parabolas hyperbolas: construction and equations.

Teaching: Two (2) hours of lectures and one (1) tutorial session.

Method of Examination:

In-course Test(s)/Assignment(s)	50%
Final Theory Examination	50%

MATH1190 – CALCULUS A (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent

Anti-requisite: None

Syllabus: LIMIT OF A SEQUENCE: limit of a sequence of real numbers; sum, product and quotient of convergent sequences

INFINITE SERIES: partial sum of a series real numbers; definition of a convergent series, and examples of convergent and divergent series; comparison and ratio tests for convergence of a series

LIMITS OF FUNCTIONS: basic properties of limits; limit of $\sin(x)/x$ as x tends to zero; limit as x tends to infinity; evaluating the limits of functions

CONTINUITY: definition of continuity at a point; examples of (dis)continuous functions; intermediate value theorem and its use to find roots of equations

DERIVATIVE: definition of the derivative as the limit, as $h \rightarrow 0$, of $(f(x+h)-f(x))/h$; calculating the derivative of simple functions using the definition; derivation of the derivative of the sum, product and quotient of functions; Leibniz's formula; chain rule;

hyperbolic functions; Maclaurin and Taylor series expansions of functions using the definition; derivation of the derivative of the sum, product and quotient of functions; Leibniz's formula; chain rule; hyperbolic functions; Maclaurin and Taylor series expansions of functions

INTEGRATION: the definite integral as the limit of a sum; evaluating the (Riemann) integral of simple functions from the definition; statement and use of the fundamental theorem of calculus; evaluation of integrals by standard techniques; length of a curve.

FUNCTIONS OF TWO VARIABLES: functions of two variables and their graphs; functions of several variables; definition and calculation of the partial derivative of a function of several variables; maxima and minima of functions of two variables

Teaching: Two (2) hours of lectures and one (1) tutorial session.

Method of Examination:

In-course Test(s)/Assignment(s)	50%
Final Theory Examination	50%

MATH1152 – SETS AND NUMBER SYSTEMS (3 Credits)

Pre-requisite: Math1141 Introductory Linear Algebra & Analytical Geometry

Anti-requisite: None

Syllabus: LOGIC AND SET THEORY: statements in mathematics; negation, conjunction, disjunction and implication; illustration of logical statements; proof and validity of arguments; definition of a set; subsets, unions and intersections; set algebra and de Morgan's laws

RELATIONS: Cartesian product of sets; functions; injectivity and surjectivity; inverse of a function and inverse image; reflexive, symmetric and transitive relations; equivalence relations and partitions of sets; binary operations: commutative, associative and distributive operations

NATURAL NUMBERS: principle of mathematical induction; permutations and combinations; sequences

INTEGERS: divisibility; greatest common divisor and the Euclidean algorithm; infinitude of primes; fundamental theorem of arithmetic

RATIONAL NUMBERS: field axioms; is irrational

REAL NUMBERS: solution of linear and non-linear inequalities; absolute value and triangle inequality; sum of simple infinite series of real numbers (without tests for convergence)

COMPLEX NUMBERS: real and imaginary parts of a complex number; complex conjugates; modulus and argument of a complex number; triangle inequality; polar forms of a complex number

Teaching: Two (2) hours of lectures and one (1) tutorial session.

Method of Examination:

In-course Test(s)/Assignment(s)	50%	
Final Theory Examination		50%

MATH1195 – CALCULUS B (3 Credits)

Pre-requisite: MATH1190 Calculus A

Anti-requisite: None

Syllabus:

LIMITS OF FUNCTIONS: intervals, neighborhoods and bounds of a function (of a single variable);

ϵ/δ definition of a limit; properties/theorems of limits (with associated proofs); directed (left-hand and right-hand) limits; asymptotes.

CONTINUITY: continuity, removable and essential discontinuities; properties/theorems of continuous functions; intermediate value theorem; squeeze theorem; extreme value theorem.

DERIVATIVES: derivative of a function (definition, differentiability & continuity, left & right-hand derivatives); Rolle's theorem; mean value theorem (including Cauchy's mean value theorem); evaluating indeterminate

forms $\frac{0}{0}$ & $\frac{\infty}{\infty}$ using l'Hôpital's rule; other

indeterminate forms: $0(\infty)$, $\infty - \infty$, 0^0 , ∞^0 , 1^∞

INTEGRATION AND DOUBLE INTEGRALS: reduction formulae; introduction to the double integral as a double sum; double integral as an iterated integral; transformations in double integration

Teaching: Two (2) hours of lectures and one (1) tutorial session.

Method of Examination:

In-course Test(s)/Assignment(s)	50%
Final Theory Examination	50%

MATH1235 PYTHON PROGRAMMING & MATHEMATICAL SOFTWARE (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent.

(No prerequisite programming knowledge is necessary for this course.)

Anti-requisite: None

Syllabus: INTRODUCTION TO SAGE & SAGEMATHCLOUD: using Sage as a calculator; functions; matrices; solving problems symbolically; differentiation and integration in Sage

PYTHON PROGRAMMING: loops and conditional expressions; lists, tuples, dictionaries and arrays; subroutines; program flow and good practice in programming

PLOTTING IN SAGE: graphing functions & integrals; axes labeling; contour plots and level sets; parametric plots; loglog plots

ELEMENTARY STATISTICS USING R: descriptive statistics; data visualization; interaction of R and Sage

ELEMENTS OF GEOGEBRA: Toolbar, simple construction, measurements, classical triangle centers (medians, centroid, altitudes, orthocenter)

ADVANCED TECHNIQUES IN GEOGEBRA: Check boxes, Pythagorean theorem

Teaching: Two (2) hours of lectures and one (1) tutorial session

Method of Examination:

In-course Test(s)/Assignment(s) 100%

MATH1230 INTRODUCTORY APPLIED STATISTICS 1 (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent.

Anti-requisite: None

Syllabus:

OVERVIEW AND DESCRIPTIVE STATISTICS: population, samples and processes; pictorial and tabular methods in descriptive statistics; measures of location and measures of variability components

PROBABILITY: sample spaces and events; axioms, interpretations and properties of probability; counting techniques and conditional probability

DISCRETE RANDOM VARIABLES AND PROBABILITY DISTRIBUTION: random variables; probability distributions for discrete random variables; binomial probability distribution; hypergeometric, negative binomial distribution and Poisson probability distribution

CONTINUOUS RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS: continuous random variables and probability density functions; cumulative distribution functions and expected values; normal distribution

POINT ESTIMATION: some basic general concept of point estimation

STATISTICAL INTERVALS BASED ON A SINGLE SAMPLE: basic properties of confidence intervals; large-sample confidence intervals for a population mean and proportion; intervals for a population mean and proportion; intervals based on a normal population distribution; confidence intervals for the variance and standard deviation of a normal population

TESTS OF HYPOTHESES BASED ON A SINGLE SAMPLE: hypotheses and test procedures; test about a population mean; tests concerning a population proportion; P-values and some comments on selecting a test procedure

INFERENCE BASED ON TWO SAMPLES: Z-tests and confidence intervals for a difference between two population means; two sample t-test and confidence interval; analysis of paired data; inferences concerning a difference between population proportions and inferences concerning two population variances

THE ANALYSIS OF VARIANCE: single-factor ANOVA

SIMPLE LINEAR REGRESSION AND CORRELATION: simple linear regression model; estimating model parameters; inferences about the slope parameter; prediction of future Y values and correlation

Teaching: Two (2) hours of lectures and one (1) tutorial session.

Method of Examination:

In-course Test(s)/Assignment(s)	50%
Final Theory Examination	50%

LEVEL II MATHEMATICS COURSES

MATH2100 - ABSTRACT ALGEBRA (4 Credits)

Pre-requisite: MATH1101 Basic Mathematics and MATH1102 Basic Mathematics II

Syllabus: Elements of logic. Elements of set theory. Relations and functions. Finite permutations. Isomorphisms. Elementary theory of groups, rings and fields.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	30%
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Final Theory Examination (2 hours) 70%

MATH2110 - LINEAR ALGEBRA (4 Credits)

Pre-requisite: MATH1101 Basic Mathematics I & MATH1102 Basic Mathematics II

Syllabus: Elements of sets and functions. Vector spaces, Linear forms. Linear transformations Matrices and determinants. Systems of linear equations. Quadratic forms.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	30%
Final Theory Examination (2 hours)	70%

MATH2120 - ANALYSIS & METHODS I (4 Credits)

Pre-requisite: MATH1101 Basic Mathematics I, MATH1102 Basic Mathematics II, MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: The real number system. Countability and topology of the real line; Continuity and differentiability. The Riemann integral. Infinite series and power series.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	30%
Final Theory Examination (2 hours)	70%

MATH2130 - ORDINARY DIFFERENTIAL EQUATIONS (4 Credits)

Pre-requisite: MATH1101 Basic Mathematics I, MATH1102 Basic Mathematics II, MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: Techniques of solution, applications, and theory of first-order differential equations. Theory and methods of solution for higher order linear equations. Applications of second-order linear equations from the sciences and engineering. Power series methods for solutions to linear equations. Laplace transform theory, techniques and applications.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	30%
Final Theory Examination (2 hours)	70%

MATH2140 - PROBABILITY THEORY (4 Credits)

Pre-requisite: MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: Basic probability theory: Combinational Methods, Laws of probability, conditional probability, independence. Bayes formula; random variables, discrete and continuous distributions, expectations, moments, moment generating functions, functions of random variables, jointly distributed random variable. Special distributions: binomial, geometric, negative binomial, Poisson, hypergeometric, uniform, exponential, gamma, normal, bivariate normal. Law of large numbers, the central limit theorem.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	30%
Final Theory Examination (2 hours)	70%

MATH2150 - MATHEMATICAL STATISTICS (4 Credits)

Pre-requisite: MATH2140 Probability Theory

Syllabus: Sampling distributions including chi-square, t, order statistics. Estimation of parameters, likelihood, Sufficiency, significance tests. Simple linear regression and correlation. Analysis of Variance. Non-Parametric procedures, elementary principles of experimental design.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examinations:

In-class Tests/Assignments	30%
Final Theory examination (2 hours)	70%

MATH2950 - MATHEMATICS ELECTIVE (4 Credits)

Pre-requisites: NONE

Syllabus: An advanced course in Mathematics taken as an exchange student at an approved institution and pre approved by the Dean.

LEVEL III MATHEMATICS COURSES

MATH3100 - MULTIVARIATE ANALYSIS (4 Credits)

Prerequisites: MATH2110 Linear Algebra and MATH2140 Probability Theory.

Syllabus: Notions of multivariate distributions, Bivariate normal distributions, conditional distribution and multiple correlation coefficients, moments. Estimation of the mean vector and covariance matrix of the multivariate normal distributions; Inferences concerning the mean vector. Introduction to the T2 statistics and its uses. Discriminant analysis and its applications. Principal components analysis. Cluster analysis.

Teaching: Three lectures and one tutorial per week.

Method of Examinations:

Coursework	40%
One 2-hour written paper	60%

MATH3120 - NUMERICAL ANALYSIS (4 Credits)

Pre-requisite: MATH2110 Linear Algebra, MATH2120 Analysis & Methods I, MATH2130 Ordinary Differential Equations

Syllabus: Types of error, Finite Differences and Interpolation; Numerical Evaluation and Integrals; Numerical solution of Differential equations; Roots of Equations: Linear Systems and Matrices,; Construction of Algorithms for Computation using MATLAB.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3140 - FOURIER ANALYSIS AND PDE (4 Credits)

Pre-requisite: MATH2130 Ordinary Differential Equations

Syllabus: Orthogonal systems (Fourier, Haar, Bessel, Sturm-Liouville etc.). Periodic functions, Fourier expansion, Fourier coefficients, periodic extension. Fourier series for odd and even functions. Problem of convergence. Dirichlet theorem. Minimal property of partial sums. Bessel's inequality. Parseval's identity.

Integration and differentiation of Fourier series. Fourier series in complex form. Multiple Fourier series. Fourier transform its properties. Convolution. Partial differential equations, their classification. Basic differential equations of mathematical physics: wave equation; Laplace equation, heat equation. Application of the Fourier method to the solution of the PDE. The Discrete Fourier transform. The Fast Fourier transform.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3150 - COMPLEX VARIABLES 1 (4 Credits)

Pre-requisite: MATH2120 Analysis & Methods I

Description: This is a first course in the theory and methods of complex variables. Many concepts in complex variable are generalizations of topics in calculus and real analysis, while other results and methods are specific to the subject itself. The material in this course is a blend of mathematical theorems and computational techniques. This course will be of interest to students majoring in mathematics or physics.

Syllabus: Complex numbers, their analysis and geometry. Functions of a complex variable, limits, continuity. Analytic functions and harmonic functions. Complex integration, contour integrals, Cauchy theorems and consequences. Power series, Taylor series and Laurent series. Residue theory and applications.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3160 - NUMBER THEORY (4 Credits)

Pre-requisite: MATH2100 Abstract Algebra

Syllabus: Number systems. Peano's axioms for \mathbb{N} and extensions. Mathematical Induction. Equivalence relations. Quotient systems. Euclidean Algorithm. Linear Diophantine Equations. Congruences. Wilson's theorem. Chinese remainder theorem. Euler totient function. Elements of Cryptography.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3170 - ADVANCED ALGEBRA (4 Credits)

Pre-requisite: MATH2100 Abstract Algebra

Syllabus: Normal subgroups. Factor groups. Isomorphism theorems. Cayley's theorem Sylow's theorems. Rings and ideals. Fields.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3180 - INTRODUCTION TO TOPOLOGY (4 Credits)

Pre-requisites: MATH2100 Abstract Algebra & MATH2120 Analysis & Methods I

Syllabus: Definition of a topological space, examples, continuous functions. Connected spaces and compact spaces. Topology of the real line and Euclidean space. Countability of topological spaces and separation axioms.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3190 - MATRIX ANALYSIS (4 Credits)

Pre-requisite: MATH 2110 – Linear Algebra

Syllabus: Complex matrices, The eigenvalue problem, Simultaneous reduction of quadratic forms, Cayley Hamilton theorem, The Spectral Theorem, Jordan Canonical Forms. Applications to difference and differential equations.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3220 - SAMPLING THEORY (4 Credits)

Pre-requisite: MATH1110 Applied Statistics and MATH2150 Mathematical Statistics

Syllabus: Basic ideas concerning the design and uses of sample surveys. Sampling techniques: Simple random sampling (with Derivations of basic results), Stratified sampling, Cluster sampling, (one and two stage). Systematic sampling. Non-response and missing data in sample surveys. Designing forms and collecting data. Interpretation of data.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

In-class tests/Assignments	40%
Final Theory Examination (2 hours)	60%

MATH3300 - MATHEMATICS RESEARCH PROJECT (4 Credits)

Pre-requisite: Restricted to Finalists Majoring in Mathematics

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Mathematics The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and research effort. The project should contain some originality in material and evidence of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of the Semester and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in the same Semester. N.B. Enrolment will be limited to those students who have demonstrated a sound academic background and an aptitude for research.

Method of Examination:

Oral Presentation	20%
Proposal and Literature Review	20%
Written Report	60%

MATH3375 - DISCRETE AND COMPUTATIONAL GEOMETRY (4 Credits)

Pre-requisite: MATH1102 Basic Mathematics II or COMP2105 Discrete Mathematics, and 12 additional credits from Level II & III Mathematics or Computer Science courses

Syllabus: Polygons, convex hulls, Delaunay triangulation, Voronoi diagrams, Euler's polyhedral formula, Gauss Bonnet theorem

Teaching: Three (3) lectures and one tutorial per week

Method of Examination:

In-class Test(s)/Assignment(s)	40%
Final Theory Examination (2 hour)	60%

MATH3450 - STATISTICAL THEORY I (4 Credits)

Pre-requisite: MATH2120 Analysis & Methods and MATH2140 Probability Theory and MATH2150 Mathematical Statistics

Syllabus: Measure Theory & Law of Large Numbers, Conditional Expectation, Bounding Probability & Expectations, Introduction to Queuing Theory, Renewal Theory

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Class tests/computer assignments	40%
Final Theory Examination (2 hour)	60%

MATH3460 - STATISTICAL THEORY II (4 Credits)

Pre-requisite: MATH2140 Probability Theory and MATH2150 Mathematical Statistics

Syllabus: Methods of finding estimators and their properties; Bayesian Inference; Regression Analysis; Time Series Analysis; Testing of Hypothesis; Design of Experiments; Sampling Theory.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Class tests/computer assignments	40%
Final Theory Examination (2 hour)	60%

PHYSICS

PRELIMINARY PHYSICS COURSES

PHYS0070 - PRELIMINARY PHYSICS I (6 Credits)

Pre-requisite: None

Syllabus: SI system and standard units, dimensional analysis, vectors (graphical and analytical) Equilibrium, Newton's first law, third law, friction, motion in a straight line, average and instantaneous velocity & acceleration, accelerated motion, free fall, relative velocity Motion in a plane, projectiles, circular motion, centripetal force, Newton's second law & applications. Gravitation, mass and weight, satellite motion. Work & kinetic energy, gravitational & elastic potential energy, dissipative and conservative forces, power, simple machines moments & torque, couples. Stress, strain, elastic moduli, force constant, Hooke's law, simple harmonic motion (basic concepts), SHM & circular motion, mass-spring system, simple pendulum, pressure in a fluid, pressure gauges, Archimedes principle, surface tension, pressure difference across surface film, contact angle and capillaries, Bernoulli's equation (applications), viscosity, Stoke's law, Reynold's number. The temperature concept, thermometers, scales, thermal expansion and stress. Heat capacity, phase changes, conduction, convection, radiation, Stefan-Boltzman law, ideal radiator, solar energy, ideal gas, equation of state, phase diagrams, triple and critical points, vapour pressure, effect of dissolved substances on freezing and boiling point, first law of thermodynamics, energy and work, work and heat, adiabatic, isochoric, isothermal and isobaric processes, internal energy, molecular theory of motion, kinetic theory of ideal gas. Mechanical waves, waves, mathematical representation, waves at boundaries, standing waves, interference of sound waves, beats, sound intensity, the decibel, the ear & hearing, quality and pitch, Doppler effect, ultrasonics and applications.

Teaching: Three (3) lectures, one tutorial per week and 52 hours of practical work.

Method of Examination:

Final Theory Examination (3 hours)	70%
In-course Tests/Assignments	20%
Practical Reports	10%

PHYS0071 - PRELIMINARY PHYSICS II (6 Credits)

Pre-requisite: None

Syllabus: Charge, Coulomb's law, insulators and conductors. Electric field, lines of force, electric potential, potential differences, electron volt (Millikan's experiment, CRO). Capacitance, series and parallel combination, energy in a charge capacitor. Dielectrics, current Resistivity, resistance, EMF, work and

power, resistors in series and parallel. Kirchhoff's laws, Wheatstone bridge and potentiometer. The magnetic field, lines of force, magnetic flux, motion in a magnetic field. Thomson's measurement of e/m , isotopes and spectrography. Force on conductor. Torque on a current loop. The d.c. motor, pivoted-coil galvanometer. Magnetic field of a long straight wire. Force between parallel conductors, the ampere, induced EMF. Faraday's law, Lenz's law. Eddy currents. The nature of light, speed of light (experimental). Waves and rays. Refraction and reflection. Snell's law. Total internal reflection. Dispersion. Single surface images Reflection from plane and spherical surfaces, refraction at plane and spherical surfaces. Focal point and length. Graphical and analytical methods. Images as objects. Thin lens, diverging lens, lensmaker equation. Aberrations, the eye, defects of vision. Magnifier, camera, projector, compound microscope, telescope, etc. Atomic nucleus, nuclear radiation. Isotopes and isobars, binding energy and stability. Alpha, beta and gamma rays. Decay law, decay constant. Half life, activity, radioactivity series, radioactive shielding, radiation and the life sciences.

Teaching: Three (3) lectures, one tutorial per week and 52 hours of practical work.

Method of Examination:

Final Theory Examination (3 hours)	70%
In-course Tests/Assignments	20%
Practical Reports	10%

LEVEL I PHYSICS COURSES

PHYS1200 – PHYSICS I: MECHANICS OF TRANSLATIONAL MOTION (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2

Co-requisite: PHYS1205 Physics II: Rotation, Waves and Thermodynamics

Objectives: Fundamentals of kinematics and dynamics of classical particles

Syllabus: Kinematics: Displacement, velocity and acceleration vectors. Constant acceleration in one dimension. Scalar and cross products. Projectile motion. Vector treatment of uniform circular motion. Dynamics: Force, mass, Newton's laws of motion. Static and kinetic friction; drag force. Centripetal force. Energy: Kinetic energy, work and the work-energy theorem. Work by gravity and springs; work done by a general variable force. Potential energy, conservative forces, conservation of mechanical energy, potential energy curves, energy and friction. Centre of mass, Newton's second law for a system of particles. Momentum: Linear momentum, impulse, conservation of linear momentum. Inelastic and elastic collisions in one dimension. Collisions in two dimensions.

Systems with varying mass; rockets.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week.
Course runs during first six (6) weeks of Semester I.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests/Assignments	20%
Practical Reports	20%

PHYS1205 – PHYSICS II: ROTATION, WAVES AND THERMODYNAMICS (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2.

Co-requisite: PHYS1200 Physics I: Mechanics of Translational Motion.

Objectives: Fundamentals of rotation, mechanical waves and thermodynamics.

Syllabus: Rotation: Rotational variables, angular velocity and angular acceleration. Constant angular acceleration. Relation between linear and angular variables. Kinetic energy of rotation, rotational inertia and torque. Newton's second law applied to rotating systems. Rolling motion as a combination of translation and rotation. Angular momentum, rigid body rotation. Conservation of angular momentum, precession of a gyroscope. Waves: Simple harmonic motion. Energy in simple harmonic motion. Transverse and longitudinal waves. Traveling waves energy and power transmitted. Wave equation, superposition and interference of waves, standing waves and the Doppler effect. Thermodynamics: Temperature, heat and the first law of thermodynamics. Ideal gas equation of state and properties. Absorption of heat by liquids and solids. Mean free path, pressure, temperature and RMS speed. Adiabatic expansion of ideal gas. Second law of thermodynamics and entropy. Heat engines, refrigerators; efficiencies of real engines and refrigerators.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during second six (6) weeks of Semester I.

Method of Examination:	Final Theory Examination (2 hours)	60%
	In-class Tests/Assignments	20%
	Practical Reports	20%

PHYS1210 – PHYSICS III: ELECTRIC FIELDS, CURRENTS AND CIRCUITS (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2.

Co-requisite: PHYS1220 Physics IV: Magnetism, Electromagnetic Waves and Optics.

Objectives: Fundamentals of electric fields, electric potential, current, resistors and capacitors, simple circuits.

Syllabus: Electric fields: Electric charge and Coulomb's law. Electric field lines and Electric dipoles. Integration of charge distributions. Electric flux and Gauss' law. Electric potential and potential energy. Potential due to discrete and continuous charge distributions. Capacitance. Capacitors in series and parallel. Energy stored in capacitors, dielectrics. Currents and Circuits: Electric current and current density. Resistance and resistivity. Ohm's law, microscopic view. Power in electric circuits. Electromotive force (emf), work and energy. Calculation of currents in single and multiple-loop circuits. Ammeters and voltmeters. RC circuits.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during first six (6) weeks of Semester II.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests/Assignments	20%
Practical Reports	20%

PHYS1220 – PHYSICS IV: MAGNETISM, ELECTROMAGNETIC WAVES AND OPTICS (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2.

Co-requisite: PHYS1210 Physics III: Electric Fields, Currents and Circuits.

Objectives: Fundamentals of magnetic fields, induction, electromagnetic waves, interference and diffraction.

Syllabus: Magnetism: Magnetic fields, Hall effect, cyclotrons and synchrotrons. Magnetic force on a current-carrying wire. Torque on a current loop. Magnetic dipole moment. Biot-Savart law. Force between two parallel currents. Ampere's law, solenoids and toroids. Inductance and Electromagnetic waves: Faraday's law of electromagnetic induction and Lenz's law. Induced electric fields. Inductance and self-inductance. *RL* circuits. Energy stored in magnetic fields, mutual induction, *LC* oscillations. Damped oscillations in an *RLC* circuit. Alternating current. The series *RLC* circuit. Power in alternating-current circuits. Transformers, induced magnetic fields. Displacement current and Maxwell's equations. Traveling electromagnetic waves and energy transport: the Poynting vector. Polarization. Interference and Diffraction: Reflection and refraction. Total internal reflection. Light as a wave. Young's double slit experiment. Interference from thin films. Michaelson's interferometer. Diffraction by a single slit, circular aperture, double slit. Diffraction gratings. X-ray diffraction.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during last six (6) weeks of Semester II.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests/Assignments	20%
Practical Reports	20%

LEVEL II PHYSICS COURSES

PHYS2100 - MATHEMATICAL METHODS IN PHYSICS (4 Credits)

Prerequisites: MATH 1120 Calculus I

Syllabus: Taylor's Expansion, Partial Differentiation of Multivariate Functions, diagonalization of Matrices, Eigenvectors, Eigenvalues, Elementary functions of Complex Variables, Divergence Theorem, Stokes' Theorem, line Integrals, Surface and Volume Integrals, Fourier Series, Ordinary differential Equations, Laplace Transforms, Introduction to Special functions, Wave Equation, Diffusion Equation.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-course tests / assignments	20%

PHYS2101 - QUANTUM MECHANICS & SPECIAL RELATIVITY (4 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1102 Optics, Thermodynamics & Modern Physics, and MATH1120 Calculus I

Syllabus: Superposition of states, Wave mechanics, Matrix mechanics, Uncertainty relations, Complementarity, Wave-particle duality, Wave equation, Wave packets. Group velocity, Momentum and position operators, operators. Measurement, expectation values, TISE, Free particle, 1-D potentials – square well, Finite square well, Step potential, barrier penetration, Numerical solution of the S.E, Ether hypothesis, Einstein's relativity, Lorentz transformation, Time dilation, Fitzgerald contraction, combination of velocities, Relativistic energy and momentum.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS2102 – SOLID STATE PHYSICS (4 Credits)

Pre-requisite: PHYS1101 Electricity & Magnetism

Syllabus: Miller indices, Brillouin zones X-ray diffraction: Solid-state bonding: electrons in periodic potential Kronig-Penney model. Fermi Level: Thermal properties of solids. Electrical conductivity, Intrinsic and extrinsic semiconductors, Insulators, Thermoelectric and galvanomagnetic effects, Factors affecting the properties of semiconductors, Basic semiconductor devices, Types of magnetism and magnetic materials.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS2103 - CLASSICAL MECHANICS (4 Credits)

Pre-requisite: PHYS1100 Mechanics & MATH1120 Calculus I

Syllabus: Full treatment of classical harmonic oscillator: damped and forced oscillations, jerk, coupled oscillators - normal modes (secular equation, normal frequencies, normal coordinates), simulation of 1-D crystal as linear array of coupled oscillators. General wave equation, phase and group velocity. Mechanics of continuous media: waves on a string, surface waves, sound waves, boundary effects. Fluids: statics, kinematics and dynamics of steady flow. Lagrange and Hamiltonian equations of motion. Non inertial frames of reference: accelerated and rotating, Coriolis effect. Rotation of a rigid body, Euler equations of motion. Dynamics of a particle in a central field of force, scattering.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS2105 - COMPUTATIONAL PHYSICS I (4 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and MATH1120 Calculus I

Syllabus: Algorithms, flowcharts and pseudocode, organisation, control structures and standards for scientific programming, FORTRAN, C/ C++, MATLAB and MAPLE, Introduction to UNIX, error, accuracy and stability, Introduction to numerical methods, practical implementation, Roots of equations, interpolation and extrapolation, numerical differentiation and integration, numerical solution of differential equations, Fourier methods, Introduction to computer modeling in Science.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination:

Final Theory Examination (2 hours)	40%
In-class Tests/Assignments	60%

PHYS2106 - ADVANCED PHYSICS / TECHNOLOGY LABORATORY I (2 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and PHYS1102 Optics, Thermodynamics & Modern Physics

Syllabus: A minimum of five (5) experiments will be performed, researched and written up in a report format specified by the lecturer. Students will not be allowed to repeat experiments carried out in PHYS2107. At least two (2) experiments will be chosen from each of the following two (2) categories: (i) Classical Physics Experiments (ii) Experiments in New Technology.

Teaching: Four hours of laboratory per week.

Method of Examination:

Written Laboratory Reports (5)	80%
Oral Examination	20%

PHYS2107 - ADVANCED PHYSICS / TECHNOLOGY LABORATORY II (2 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and PHYS1102 Optics, Thermodynamics & Modern Physics

Syllabus: A minimum of five (5) experiments will be performed, researched and written up in a report format specified by the lecturer. Students will not be allowed to repeat experiments carried out in PHYS2106. At least two (2) experiments will be chosen from each of the following two (2) categories: (i) Classical Physics Experiments (ii) Experiments in New Technology.

Teaching: Four hours of laboratory per week.

Method of Examination:

Written Laboratory Reports (5)	80%
Oral Examination	20%

PHYS2950 - PHYSICS ELECTIVE (4 Credits)

Pre-requisites: None

Syllabus: An advanced course in Physics taken as an exchange student at an approved institution and pre-approved by the Dean.

LEVEL III PHYSICS COURSES

PHYS3100 - QUANTUM MECHANICS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Operators and eigenvectors, eigenvalue equations, vector spaces, Dirac bra-ket formulation, axioms of quantum mechanics, compatible observables, uncertainty relations. Evolution of states in time. Hamiltonian operator, Ehrenfest's equations, representations and transformations of state vectors. Factorisation method. Harmonic oscillator, general Hamiltonian, normalisation. Free particle in 3-D, angular momentum, parity. Central potentials, isotropic harmonic oscillator, hydrogen atom. Fermions and bosons, the Exclusion Principle. Electron spin, magnetic moment, Perturbation theory. Time-dependent perturbations, transitions to the continuum, density of states. Elastic scattering in 1-D, scattering by a square well, resonances. Interpretation of Q. M. Copenhagen interpretation, alternative interpretations of wave-function collapse, EPR paradox, Bell's theorem.

Teaching: Three (3) lectures and one tutorial per week

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS3101 - ELECTRODYNAMICS (4 Credits)

Pre-requisite: PHYS1102 Optics, Thermodynamics & Modern Physics and
PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Development of Maxwell's equations. Potentials. E-m waves in free space, conducting medium, plasmas. Reflection of e-m waves from dielectric and metallic boundaries, waveguides, special relativity and electrodynamics. Transformation of electric and magnetic fields.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS3102 - OPTICS & LASERS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Spatial and temporal coherence. Fraunhofer and Fresnel diffraction. Image formation and processing. Basic principles of lasers, population inversion, stimulated emission, A & B coefficients, etc. Gas, solid-state, liquid & dye lasers. Production of tunable, highpower, high-stability and short-pulse lasers. Applications.

Teaching: Three (3) lectures and one tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS3103 - ASTROPHYSICS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Structure of the sun and planets. Introduction to General Relativity Stellar Evolution Types and evolution of galaxies Cosmological models

Teaching: Three (3) lectures and one tutorial per week

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS3105 - STATISTICAL MECHANICS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Models of thermal systems. Probability. Entropy. Internal energy. Temperature Contact with thermodynamics. Chemical potential. Free energy. Heat capacities. Microcanonical Canonical and grand canonical distributions (Boltzmann and Gibbs sums). Quantum statistics. F-D, B-E and Planck distributions. Blackbody radiation. Ideal gas. Fermi gas Density of states. Superfluidity. Bose-Einstein condensation. Phase transitions. Thermodynamics of the superconducting transition.

Teaching: Three (3) lectures and one tutorial per week

Method of Examination:

Final Theory Examination (2 hours)	80%
In-class Tests/Assignments	20%

PHYS3106 - PHYSICS RESEARCH PROJECT (4 Credits)

Pre-requisite: Restricted to Final Year students, Majoring in Physics.

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Physics. The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and

research effort. The project should contain some originality in material and evidence of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of Semester II and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in Semester II.

N.B. Limited to those students who have demonstrated a sound academic background and an aptitude for research.

Method of Examination:

Final Written Project Report	80%
Oral Presentation	20%

PHYS3107 - FUNDAMENTALS OF PHOTOVOLTAIC PHYSICS (4 Credits)

Pre-requisites: PHYS1101 Electricity & Magnetism & MATH1120 Calculus I

Syllabus: Group III-V semiconductors, p-n junctions, and wide-band-gap metal-oxide semiconductors with good optical properties. Fundamentals of photoelectric conversion, i.e. charge photoexcitation and separation, charge conduction and transport (diffusion and drift), and charge collection. First, second, and third generation photovoltaic technologies. Characterization of photovoltaic cells: open-circuit photovoltage, short-circuit photocurrent, fill factor, photoconversion efficiency, charge recombination, and charge trapping and detrapping are discussed. Photovoltaic cells manufacturing, systems, reliability, life-cycle analysis, and risk analysis. The economics of photovoltaic technology evolution in the context of markets, policies, society, and environment.

Teaching: Two lectures, one hour of tutorial, and 26 hours of practical work.

Method of Examination:

Final Examination (2 hours)	50%
Laboratory Work	25%
Assignments	25%

METEOROLOGY

LEVEL I METEOROLOGY COURSES

METE1000 – INTRODUCTION TO PHYSICAL METEOROLOGY & WEATHER OBSERVATIONS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).

Syllabus: The Atmosphere: composition and structure. Weather elements and instruments. Energy and heat transfer. Radiation and the Earth's atmosphere. Seasonal and daily temperatures. Energy budget. Clouds and precipitation. Thermodynamics. Simple thermodynamics chart analysis; Weather observations. Scalar analysis.

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE1100 – INTRODUCTION TO DYNAMIC METEOROLOGY & WEATHER SYSTEMS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).

Syllabus: Air pressure and winds. Wind: small-scale and local systems. Wind: global systems. Air masses and fronts. Middle-latitude cyclones. Thunderstorms and tornadoes. Tropical weather systems. Laboratory classes will include basic scalar analysis, computation exercises of geostrophic gradients and thermal winds, frontal analysis utilizing surface and upper air charts.

Teaching: Two (2) lectures, one (1) tutorial and three (3) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE1110 - INTRODUCTION TO OCEANS AND CLIMATE (3 Credits)

Pre-requisites: None

Restriction: Not to be taken with ERSC1002 Oceans and Climate

Syllabus: The climate system components and interactions. Timescales and responses of the climate system. The basic global radiation budget. The

atmosphere: evolution and composition. The greenhouse effect The biosphere - atmosphere interaction. The biosphere – hydrosphere interaction. Classification of oceans and seas. Topography of ocean floor. Chemistry of the ocean: temperature, salinity and density. The circulations of the oceans: wind driven and thermohaline circulation. Ocean and atmospheric interactions: tropical cyclones, monsoon circulation, upwelling, ENSO. Waves and tides. Drivers of natural climate variability and anthropogenic climate change.

Laboratory classes will involve basic analysis of earth science datasets by hand, and using the Grid Analysis and Display System (GrADS). A computer based application for manipulation and visualization of earth science datasets.

Teaching: One (1) lecture; one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
Theory: In-course Tests/Assignments	40%

METE1300 - CLIMATE CHANGE EDUCATION AND AWARENESS (4 Credits)

Pre-requisites: None

Restriction: Cannot be taken by majors and minors in Meteorology. Students are not allowed to take BOTH METE1200 and METE1300 for credit.

Syllabus: The biosphere: definition, evolution and contributions to climate and climate change. The greenhouse effect. Climate change scenarios: definition and uses. Changing climate scenarios and challenges to man's health. Climate change and energy consumption and sustainability. Climate change and water availability, distribution and usage. The cost of changing climate. Climate change and Caribbean industries: sustainability, adaptation and mitigation. Preparing for climate change: global and regional mitigation and adaptation strategies.

Teaching: Three (3) lectures, one (1) tutorial hour per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

LEVEL II METEOROLOGY COURSES

METE2000 - PHYSICAL METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Thermodynamics of dry air and moist air. Thermodynamic diagrams. Hydrostatics, instability and convection. Mixing of air masses. Formation and growth of cloud droplets by diffusion and condensation. Droplet growth by collision and coalescence. The growth and structure of ice crystals. The size and distribution of droplets and crystals. Widespread and convective precipitation, thunderstorms.

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE2001 - PHYSICAL METEOROLOGY II (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Fundamental physics, quantification and laws of radiation. Solar and terrestrial radiation. The heat balance of the earth and atmosphere. The atmospheric greenhouse effect. Fundamentals of atmospheric electricity. Elementary atmospheric optics. Ozone in the atmosphere.

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE2100 - DYNAMIC METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Elementary vector methods in meteorology. Derivation of the equation of motion from Newton's law. The equation of motion in various co-ordinate systems. Simplification of the equation of motion. The conservation of mass and the conservation of total energy. The basic equations with pressure as the vertical coordinate. Horizontal balanced motions; the geostrophic thermal wind. Concepts of circulation and vorticity; the circulation theorems and the vorticity equation and their applications. Structure and dynamics of the planetary boundary layer.

Teaching: Three (3) lectures and one (1) tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE2200 - SYNOPTIC METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: The characteristics, structure and evolution of mid- latitude frontal systems and cyclones. Kinematics of horizontal motion and the computation of kinematic parameters of divergence, vorticity and deformation. Analysis of scalar and vector fields. Analysis of mid-latitude synoptic systems. Methods of estimating vertical motion. Evaluation of advection.

Teaching: Two (2) lectures and four (4) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE2300 - HYDRO-METEOROLOGY (4 Credits)

Pre-requisites: MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: The hydrological cycle. Water balance concepts. Precipitation measurement and analysis. Interception and interception loss. Evaporation and evapo-transpiration. Infiltration measurement and estimation. Rainfall-runoff processes. Hydrologic simulation.

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE2950 METEOROLOGY ELECTIVE (4 Credits)

Pre-requisites: None

Syllabus: An advanced course in Meteorology taken as an exchange student at an approved institution and pre-approved by the Dean.

LEVEL III METEOROLOGY COURSES

METE3100 - DYNAMIC METEOROLOGY II (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I & METE2200 Synoptic Meteorology I

Syllabus: The dynamics of developing synoptic scale systems in mid-latitudes. The theory and behaviour of pure wave motions in the atmosphere. Introduction to numerical weather prediction; barotropic and filtered baroclinic models; primitive equation models. The physical basis of baroclinic instability and cyclogenesis. The energy cycle and momentum budget of the atmosphere.

Teaching: Three (3) lectures and one (1) tutorial per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE3200 - SYNOPTIC METEOROLOGY II (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I and METE2200 Synoptic Meteorology I

Syllabus: The Polar front jet stream - structure and characteristics and its role in mid-latitude development. The pressure tendency equation and its applications. Four-dimensional analysis of mid-latitude synoptic systems; use of thickness maps, sounding and cross-sections. Theories of mid-latitude cyclone development; Characteristic and formation of cut-off cyclones, upper level anticyclones, and blocking systems; Development theories associated with polar lows and dry lines; Familiarization with and use of numerical products and satellite and radar data in analysis and forecasting.

Teaching: Two (2) lectures and four (4) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE3300 - TROPICAL METEOROLOGY (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I and METE2200 Synoptic Meteorology I

Syllabus: General circulation of the tropics. The role of the tropics in the heat, energy and momentum budgets of the earth-atmosphere system. Tropical jet streams. Structure and characteristics of the tropical boundary layer and the trade wind inversion. Cumulus convection and scale interaction in the tropics. Structure and characteristics of synoptic scale systems in the tropics. Structure, behaviour and dynamics of tropical cyclones. Analysis of the evolution of tropical weather systems.

Teaching: Two (2) lectures and four (4) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE3400 - WEATHER RADARS AND SATELLITES (4 Credits)

Pre-requisites: METE2000 Physical Meteorology I, METE2001 Physical Meteorology II and METE2200 Synoptic Meteorology I

Syllabus: Radar Meteorology: Brief historical review. Radar components and related features. Electromagnetic waves. Radar beam characteristics. Propagation of radar waves. Formulation of the radar equation. Precipitation measurements. Principles of Doppler radar. Interpretation of radar echoes. Applications and use of radar data. Satellite Meteorology: Brief History and basic concepts. Instrumentation and receiving systems. Identification of cloud and weather systems. Atmospheric temperature and water vapor profiles. Satellite wind estimation. Precipitation estimation. Analysis of tropical cyclones. Satellite detection of aerosols. Applications and use of satellite information. Use of satellite data in combination with radar data.

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-course Tests/Assignments	40%

METE3500 - BIOCLIMATOLOGY (4 Credits)

Pre-requisites: METE1200 Oceans & Climate or BIOL1051 Biodiversity 1 and 28 FST Level II/III credits.

Syllabus: Characteristics of Caribbean climate; interseasonal, inter-annual and inter-decadal climate variability. Role of climate in vegetation distribution. Influence of weather parameters on vegetation and terrestrial ecosystems. Bioclimatic indices and natural ecosystems. Weather, climate and coastal and marine ecosystems. Climate change and terrestrial, coastal and marine ecosystems. Role of vegetation in determining climate (biogeochemical cycles, albedo, roughness and fluxes). Carbon trading, clean development mechanism (CDM).

Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.

Method of Examination:

Final Theory Examination (2hours)	60%
In-course Tests	10%
Essay Assignments & Computer Exercises	30%