THE UNIVERSITY OF THE WEST INDIES

CAVE HILL CAMPUS

FACULTY OF SCIENCE AND TECHNOLOGY

2017 - 2018

HANDBOOK

FS&T

FACULTY OF SCIENCE AND TECHNOLOGY

BCS

Department of Biological and Chemical Sciences

CMP

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS AND PHYSICS

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 2017 - 2018. 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 approximately 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 a MSc. in Natural Resource and Environmental Management, as well as a MSc. in Renewable Energy Management.

The Department of Computer Science and Mathematics offers a series of taught Masters programmes from the discipline of Computer Sciences. The Department of Biological and Chemical Sciences offers a taught Masters and Diploma in Biosafety.

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.

STAFF OF THE FACULTY OF SCIENCE & TECHNOLOGY

FACULTY OFFICE & OFFICERS

Tel:	(246) 417-4310 - 12
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1. Dean	***Colin Depradine*** ***B. Eng. (University College London),*** ***MSc. (Imperial College London), Ph.D. (UWI)***
2. Deputy Dean	***Adrian Als*** ***BSc, MPhil (UWI)*** ***Ph.D. (Sheffield Hallam)***
3. Deputy Dean	***Leah Garner-O'Neale*** ***Outreach & Research*** ***BSc, PhD (UWI)***

Administrative Assistant	Kay Browne BSc, MSc (UWI)	417-4311
Project Officer	Natasha Corbin BSc, MSc (UWI), PMP	417-4739
Secretary	Shana Odle	417-4310
Stenographer/Clerk	Gloria Harper BSc (UWI)	417-4312
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Senior Mechanical Workshop Technicians	Glendon Pile	417-4914
	Grantley Forde	417-4914
Senior Environmental Science Technician	Damian Greaves BSc (UWI)	417-4914
Senior Electronics Workshop Technician	Andrew Phillips BSc (UWI)	417-4314
Senior Electronics Workshop Technician	Brian Haynes BSc (UWI)	417-4314

CENTRE FOR RESOURCE MANAGEMENT AND ENVIRONMENTAL STUDIES (CERMES)

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Director:	***Adrian Cashman*** ***BSc (KCL), MSc, DIC (ICL),*** ***MSc. (York), Ph.D. (Sheffield)*** 417-4829	
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Professor of Marine Ecology and Fisheries	Hazel Oxenford BSc (Exeter), PhD (UWI) 417-4571	
Emeritus Professor	Robin Mahon BSc (UWI), MSc., PhD (Guelph)	

Senior Lecturer	Leonard Nurse BSc (UWI), MSc. (Memorial), PhD (McGill) 417-4344
Senior Lecturer	Patrick McConney BSc. (Bangor), M. ES. (Dalhousie), PhD (UBC) 417-4725
Lecturer	Janice Cumberbatch BSc (UWI), MSc (York), PhD (UWI) 417-4569
Coordinator – Graduate Programmes	Neetha Selliah BSc (Surrey), MSc (UWI) 417-4568
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Research Assistant	Jehroum Wood BSc, MSc (UWI) 417-4827
Senior Marine Technician	Renata Goodridge BSc (Calgary), MSc (UWI) 417-4726
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DEPARTMENT OF BIOLOGICAL AND CHEMICAL SCIENCES

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Senior Research Fellow in Sports Agronomy & Head of Department	***Francis Lopez BSc, PhD (UWI)***
Administrative Assistant	Shirley Jones
Stenographer/Clerk	Cynthia Spooner
Stenographer/Clerk	Toni Russell

BIOLOGICAL SCIENCES

Professor of Plant Biology	C. M. Sean Carrington BSc (Edin.), DPhil (York-UK) 417-4330
Professor of Conservation Ecology	Julia A. Horrocks BSc. (Reading), PhD (UWI) 417-4320
Lecturer	Angela Alleyne BSc, MPhil, PhD (UWI) 417-4808
Lecturer	Shane Austin BSc (UWI), MSc (McGill), PhD (MUW) 417-4360
Lecturer	Darren Browne BSc, PhD (UWI) 417-4328
Lecturer	Bidyut Mohapatra BSc (OUAT), MSc (Calcutta) PhD (Kochi) 417-4859

Lecturer	Marilaine Mota-Meira Ing. (Curitiba) MSc, PhD (Laval) 417-4354
Lecturer	Thea Scantlebury-Manning BSc, PhD (Concordia) 417-4356
Lecturer	Henri Valles BSc (Oviedo), MSc (UWI-CERMES) PhD (McGill). 417-4361
Lecturer	Suzanne Workman BSc (Manch.) MPhil, PhD (UWI) 417-4663
Senior Research Fellow in Sports Agronomy	Francis Lopez BSc, PhD (UWI) 417-4345

CHEMICAL SCIENCES

Professor of Theoretical And Computational Chemistry	Sean McDowell BSc (UWI), PhD (Cantab) 417-4352
Professor of Organic Chemistry	Winston Tinto BSc, PhD (UWI), CSci, CChem, FRSC 417-4357/4329
Senior Lecturer	Sergei M. Kulikov MS (Novosibirsk State U.), PhD, BSc (Russ. Acad. Sci.) 417-4351

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Lecturer	Jeanese Badenock BSc (UWI), PhD (Dartmouth) 417-4336
Lecturer	Leah Garner-O'Neale BSc, PhD (UWI) 417-4343
Lecturer	Srinivasa Popuri BSc (Nagarjuna), MSc (DAVV), PhD (SVU) 417-4340
Lecturer	Emma Smith BSc (Liverpool), MSc (Heriot-Watt), PhD (Plymouth) 417-4838

ENVIRONMENTAL SCIENCE

Lecturer in Atmospheric Science	Isabelle Gouirand Lic, PhD (Aix-Marseille I) 417-4837

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS & PHYSICS

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COMPUTER SCIENCE

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Lecturer	Jeffery Elcock BSc (UWI), MSc. (Oxon.) Ph.D. (UWI) 417-4380
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Lecturer	Mechelle Gittens BSc (UWI), MSc, PhD (W. Ont.) 417-4465

Lecturer	Hussein Thompson BSc, PhD (UWI) 417-4558
Lecturer	Paul Walcott BSc, MPhil (UWI), PhD (City) 417-4372

MATHEMATICS

Professor of Mathematical Statistics	Smail Mahdi BSc, MSc (Constantine), PhD (Montreal) 417-4367
Professor of Mathematics	Jayaram Chillumuntala MSc (Andra), PhD (Madras) 417-4462
Lecturer	Peter Chami BSc, PhD (UWI) 417-4369
Lecturer	Bernd Sing Dipl.-PHYS (Tübingen), PhD (Bielefeld) 417-4737

PHYSICS & ELECTRONICS

Professor of Theoretical Physics	Tane Ray BSc, (Illinois), PhD (Boston) 417-4377
Professor of Condensed Matter Physics	Upindranath Singh BSc, MPhil. (UWI) MSc, PhD (Delaware)

Emeritus Professor of Physics	L. Leo Moseley BSc, MSc (UWI), PhD (Wales) 417-4373
Senior Lecturer	Janak Sodha BSc, MSc, PhD (Manch.) 417-4573
Lecturer	Sujit Bag B.Tech. (IIT Kharagpur), PhD (Leic.) 417-4851
Senior Lecturer	Carlos Hunte BSc, MPhil., PhD (UWI) 417-4382
Lecturer	Ramon Sargeant BSc, MPhil (UWI), MSc, PhD (King's Col) 417-4374

THE CARIBBEAN INSTITUTE FOR METEOROLOGY & HYDROLOGY (CIMH)
Is an Affiliate Institution whose Faculty members teach our degree programme in Meteorology

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Lecturer	Jonathan Cox BSc (Cardiff), PhD (Salford-Manchester) 425-1362
Lecturer	Margarette Mayers-Als BSc, MPhil (UWI) 425-1362
Lecturer	Lawrence Pologne BSc (UWI), MSc (Florida State) 425-1362
Lecturer	Andrea Sealy BSc (Jackson State), MSc (Penn. State), PhD (Howard) 425-1362

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Lecturer	Ashford Reyes BSc (UWI), PhD (Howard) 425-1362

PRINCIPAL OFFICERS OF THE UNIVERSITY OF THE WEST INDIES

Visitor
Her Majesty the Queen

Chancellor
Mr. Robert Bermudez

Vice-Chancellor
Professor Sir Hilary Beckles
BA, PhD Hull, Hon DLitt, *Hull*, Hon DLitt *Knust*

CHAIRMEN, CAMPUS COUNCILS

Sir Paul Altman
GCM, BCH, JP, BBA *Mia*, Hon. LLD *UWI*

Dr. Marshal Hall
CD, BSc *Col,* Ph.D. *Wis*

Mr. Ewart Williams
BSc, MSc *UWI*

Sir K. Dwight Venner
KBE, CBE, BSc, MSc, UWI

PRO-VICE CHANCELLORS

Professor Alan Cobley
BA *Manc*, MA *York, UK*, PhD *Lond*

Professor Dale Webber
BSc *UWI*, PhD *UWI*

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

Professor Clement Sankat
BSc, MSc, *UWI*, PhD *Guelph*, MASAE, MAPETT, FIAgreE

Dr Luz Longsworth
BA *UWI*, MBA *UWI*, MA Queens, DBA *Bath*

Campus Principals

Professor V. Eudine Barriteau – Cave Hill
BSc UWI, MPA *NYC*, PhD *Howard*

Professor Archibald McDonald – Mona
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Professor Clement Sankat – St. Augustine
BSc, MSc *UWI*, PhD *Guelph*, MASAE, MAPETT, FIAgreE

Dr. Luz Longsworth – Open Campus
BA, MBA *UWI*, MA *Queens*, DBA. *Bath*

DEPUTY CAMPUS PRINCIPALS

Professor R Clive Landis– Cave Hill
BSc *Birmingham*, MSc *Loyola*, PhD *Loyola*

Professor Ishenkumba Kahwa – Mona
BSc , MSc *Dar*, PhD *Louisiana State*

Professor Rhoda Reddock – St. Augustine
BSc *UWI*, MSc *ISS The Hague*, PhD *Amsterdam*

Professor Julie Meeks Gardner – Open Campus
BSc, Dip Nutrition, PhD *UWI*

University Registrar
Mr. C. William Iton
BSc *UWI*, LLM *Essex*

University Bursar
Mr. Archibald Campbell
BSc MSc *UWI*, FAC

University Librarian
Mrs. Karen Lequay
BSc *UWI*, MSc *Soton*, MSc *Lough*

PUBLIC ORATORS

Dr. Jennifer Obidah-Alleyne – Cave Hill
BA *Hunter Col*, MA *Yale*, PhD *U of California*, Berkley

Dr. Michael Bucknor – Mona
BA, PhD *UWI*

Dr. Brian Cockburn – St. Augustine
BSc, PhD *UWI*

Dr. Francis Severin – Open Campus
BA, MSc, PhD *UWI*

STUDENT AFFAIRS

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Admissions:

Assistant Registrar	Mr. Timothy Arthur, BA, MSw	417-4119
Administrative Assistant	Mrs. Deborah Knight	417-4122
Administrative Assistant (Ag.)	Mrs. Carol Jordan BSc, MSc	417-4123
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

Examinations:

Assistant Registrar	Miss Orwyn Herbert BSc, MSc	417-4133
Administrative Assistant	Mrs. Eudine Spooner	417-4139
Administrative Assistant	Ms. Ingrid Lashley	417-4135
Stenographer/Clerk	Mrs. Ann Arthur	417-4137

Records:

Administrative Assistant	Miss Nakita Squires, BSc	417-4140
Stenographer/Clerk	Ms. Esther Layne, BSc	417-4142
(Transcripts & Academic Records)		

School for Graduate Studies and Research:

Senior Assistant Registrar	Mr. Owen Ellis	417-4902
Administrative Assistant	Mrs. Fay Williams, BSc	417-4907
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
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:

a. awarded a fail mark;
b. excluded from some or all further examinations of the University for such period as it may determine;
c. be dismissed from the University, it shall make such recommendation to the Academic Board.

CLEARANCE ON A CHARGE OF LEVEL 2 PLAGIARISM

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

LEVEL 2 PLAGIARISM: APPEAL TO THE SENATE

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

DELEGATION BY DEAN OR HEAD OF DEPARTMENT

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

CONFLICT OF INTEREST DISQUALIFICATION

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

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+.

DEAN'S LIST REGULATIONS

Eligibility for inclusion on the Dean's List

The following guidelines are applicable:

(a) Inclusion on the Dean's List will be on a Semester basis. The Summer School Programme will not be considered.

(b) Students must obtain a Semester GPA of 3.60 and above in any semester

(c) Full-time students must have passed a minimum of 12 Faculty credits in the semester. Part-time students must have passed a minimum of 6 credits of Faculty courses in the semester.

Credits gained for the following will NOT be taken into consideration in computing the Dean's List:

- Foundation courses
- Co-curricular offerings
- Audited courses
- Summer courses
- Not-for-credit courses

(d) Repeat courses will be included in the computation of the Semester GPA towards the Dean's List.

(e) Special consideration will be given to students who are differently-abled and who have obtained a semester GPA of 3.60 and above but who have registered for less than 12 Faculty credits. Such students must declare and provide supporting documents, to the relevant University authority, as evidence of their disability at the start of the semester. Decisions for inclusion of such differently-abled students in the Dean's List will be taken at the Faculty's Board of Examiners Meeting.

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	9
	93

(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 ***12*** 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 i.e.: 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) A ***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.

G. LEAVE OF ABSENCE AND VOLUNTARY WITHDRAWAL

25. (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.

26. 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.

27. 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

28. 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.

29. (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.

30. (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.

31. 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.

32. 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).

33. 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.

34. 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.

35. 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

36. 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.

37. 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.

38. (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

39. (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
Alternative Energy
Applied Chemistry
Biochemistry *
Biology*
Biotechnology
Botany
Chemistry *
Computer Science *
Earth Science
Ecology *
Electronics *
Environmental Biology Experimental Biology
Environmental Science[+]
Food Chemistry
Geology
Information Technology *
Mathematics *
Meteorology *
Microbiology *
Molecular Biology
Physics *
Zoology

* Offered at Cave Hill

[+]Offered at Cave Hill as a Minor

APPENDIX III

FOUNDATION COURSES

FOUN 0100 – Fundamentals of Written English

[1]FOUN 1001 – English for Academic Purposes

[1]FOUN 1008 – Rhetoric II: Writing for Special Purposes

*FOUN 1101 – Caribbean Civilization

[2]FOUN 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 <u>one</u> 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.

REPLACING A FOUNDATION COURSE WITH A FOREIGN LANGUAGE COURSE

Students in the Faculty of Science and Technology may replace FOUN1101 Caribbean Civilization OR FOUN1301 Law, Governance, Economy and Society with a foreign language course in French, Spanish, Portuguese or Chinese.

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 I

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

LEVEL II

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

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 at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

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

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 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

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

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 at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

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

***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 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

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

ECON2000 Intermediate Microeconomics I

ECON2001 Intermediate Microeconomics II

ECON2002 Intermediate Macroeconomics I

ECON2003 Intermediate Macroeconomics II

ECON2026 Statistical Methods II

LEVEL III

COMP3100 Operating Systems

COMP3180 Algorithm Design and Analysis

ECON3049 Econometrics I

AND at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

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

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 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 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

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

COMP3100 Operating Systems

COMP3180 Algorithm Design and Analysis

AND at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

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

***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 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

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2611 Data Structures
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 at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
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

***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 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

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2611 Data Structures
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 at least Six (6) Credits (including at least one Level III course) from:

COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
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

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 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

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
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 at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

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 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

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
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 at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

***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 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

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
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 Studies
COMP3170 Web-Based Applications
ECON3049 Econometrics I

AND at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

***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 Foreign Language course.

INFORMATION TECHNOLOGY 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 Introduction to Microeconomics
ECON1002 Introduction to Macroeconomics

AND Six (6) Level I Credits

LEVEL II

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
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 Studies
COMP3170 Web-Based Applications

AND at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

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 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

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures

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 at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

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 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

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
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 at least Six (6) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2950 Computer Science Elective
COMP2245 Web Development Concepts, Tools and Practices
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

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 Foreign Language course.

MATHEMATICS AND ACCOUNTING

LEVEL I

MATH1141 Introductory Linear Algebra & 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

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 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 (8 credits)
AND Two Level II/III MATH course (8 credits)

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 Foreign Language course.

MATHEMATICS WITH ACCOUNTING

LEVEL I

MATH1141 Introductory Linear Algebra & 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

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 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 (8 credits)
AND Two Level II/III MATH courses (8 credits)

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 Foreign Language course.

MATHEMATICS AND ECONOMICS

LEVEL I

MATH1141 Introductory Linear Algebra & 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

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 Differential Equations
ECON2000 Intermediate Microeconomics I
ECON2001 Intermediate Microeconomics II
ECON2002 Intermediate Macroeconomics I
ECON2003 Intermediate Macroeconomics II
ECON2026 Statistical Methods II

LEVEL III

Two Level III MATH courses (8 credits)

Two Level II/III MATH courses (8 credits)

AND

ECON3049 Econometrics I

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 Foreign Language course.

MATHEMATICS WITH ECONOMICS

LEVEL I

MATH1141 Introductory Linear Algebra & 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

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 Differential Equations
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

Two Level III MATH courses (8 credits)

Two Level II/III MATH courses (8 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 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 (30) 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 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 (30) 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 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 (30) 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 (30) 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 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 (30) 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 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 (30) 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 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

BIOC2365 Primary Metabolism

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

BIOL2373 Skills for Biologists

ECOL2460 Essentials of Ecology

ECOL2461 Caribbean Island Biodiversity

MICR2260 Essential Microbiology

CHEM2700 Intermediate Inorganic Chemistry

CHEM2705 Intermediate Organic Chemistry

CHEM2715 Laboratory Methods in Chemistry I

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

LEVEL III

BIOC 3260 Principles of Biotechnology

BIOC 3265 Principles of Bioinformatics

BIOC 3370 Basis of Human Disease

BIOC 3290 Biochemistry Project for Minors

ECOL3461 Ecology of a Changing Planet

ECOL3463 Tropical Crop Ecology

MICR3266 Ecology of Microorganisms

MICR3268 Microbial Pathogenesis

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

BIOL2373 Skills for Biologists

ECOL2462 Marine Biota

MICR2261 Eukaryotic Microbes

MICR2262 Methods in Microbiology

CHEM2710 Intermediate Physical Chemistry

CHEM2720 Laboratory Methods in Chemistry II

CHEM2725 Chemistry of the Environment

CHEM2730 Quantitative Chemical Analysis

ENSC2002 Earth's Climate

ENSC2003 Sustainable Energy Systems

LEVEL III

BIOC 3261 Mitochondrial Bioenergetics

BIOC 3290 Biochemistry Project for Minors

BIOL 3025 Molecular Plant Pathology

ECOL3100 Statistics for Ecologists

ECOL3460 Biology & Ecology of Coral Reefs

ECOL3462 Behaviour: An Evolutionary Approach

CHEM3100 Inorganic Chemistry II
CHEM3300 Physical Chemistry II
CHEM3415 Analytical Chemistry III
CHEM3500 Chemistry Project
CHEM3515 Environmental Chemistry
ENSC3000 Climate Variation and Change

MICR3265 Microbiology of Food
MICR3267 Essential Virology
CHEM3135 Bioinorganic Chemistry
CHEM3200 Organic Chemistry II
CHEM3210 Bioorganic & Medicinal Chemistry
CHEM3500 Chemistry Project
ENSC3001 Natural Hazards and Disasters

YEAR-LONG COURSES

CHEM3505 Chemistry Research Project
BIOC3990 Biochemistry Project
BIOL3990 Biology Project
ECOL3990 Ecology Project
MICR3990 Microbiology Project
ENSC3900 Research Project in Environmental Science

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 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry

LEVEL II - (15 Credits)

BIOL2373 Skills for Biologists[1]
BIOC2371 Molecular Techniques
BIOC2365 Primary Metabolism
BIOC2366 Protein Biochemistry

AND 3 Credits from ONE OF the following:

BIOL2166 Advanced Genetics I
BIOC2370 Cell Signals [1]

LEVEL III - (15 Credits)

BIOC3265 Principles of Bioinformatics

AND 12 Credits from among 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

[1]Biochemistry Majors must do this course in Semester 1

***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

BIOC3290 Biochemistry Project for 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 [1, 2]

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 courses
Level III BIOC/BIOL/ECOL/MICR courses

Six (6) credits from:

Level III BIOC/BIOL/ECOL/MICR courses

Level II 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

Level III 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

[1]Biology Majors must do this course in Semester 2

[2]Students following this 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.

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

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[2]
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

Level II 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

Level III 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 and Ecology of Coral Reefs
ECOL3461 Ecology of a Changing Planet
ECOL3462 Behaviour: An Evolutionary Approach
ECOL3463 Tropical Crop Ecology
MICR3265 Microbiology of Food
MICR3266 Ecology of Microorganisms
MICR3267 Essential Virology
MICR3268 Microbial Pathogenesis

[2]Students following this Double Major who have passed BIOL1010 Basic Skills for Biologists cannot take BIOL2373 Skills for Biologists but must substitute this course with any BIOC/BIOL/ECOL/MICR level 2 or 3 course.

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*[+2]

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*

AND Twelve (12) Credits from the following:

Level III ECOL elective courses

ECOL3460 Biology & Ecology of Coral Reefs

ECOL3463 Tropical Crop Ecology

ECOL3462 Behaviour: an Evolutionary Approach

ECOL3990 Ecology Project (6 credits)

AND/OR

ENSC2000 Essentials of Oceanography**

MICR3266 Ecology of Microorganisms***

BIOC2371 Molecular Techniques

BIOL2372 Plants for Caribbean Landscapes

*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)

[+]Ecology Majors must do this course in Semester 2

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).

[2]Students following this Major who have passed BIOL1010 Basic Skills for Biologists cannot take BIOL2373 Skills for Biologists but must substitute this course with any BIOC/BIOL/ECOL/MICR level 2 or 3 course.

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

ECOL2460 Essentials of Ecology

ECOL2461 Caribbean Island Biodiversity

ECOL2462 Marine Biota

ECOL3461 Ecology of a Changing Planet

AND Three (3) credits from the following:

ECOL3100 Statistics for Ecologists

ECOL3460 Biology & Ecology of Coral Reefs

ECOL3462 Behaviour: An Evolutionary Approach

ECOL3463 Tropical Crop Ecology

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[1]
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)

[1]Microbiology Majors must do this course in Semester 1

[2]Students following this 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.

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

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

Old Course	***New Course***
BIOC 2351 Biochemistry I	BIOC2365 Primary Metabolism
BIOC 2352 Biochemistry II	BIOC2366 Protein Biochemistry
No Equivalent	BIOC2370 Cell Signals
BIOC 3251 Microbial Biochemistry	***Any BIOC/CHEM/MICR Level 3 or CHEM Level 2 course***
No Equivalent	BIOC3260 Principles of Biotechnology
No Equivalent	BIOC3261 Mitochondrial Bioenergetics
No Equivalent	BIOC3290 Biochemistry Project for Minors
BIOC 3254 Biochemical Plant Pathology	BIOL3025 Molecular Plant Pathology
BIOC 3354 Biochemistry of Human Disease	BIOC3370 Basis of Human Disease
BIOC 3950 Biochemistry Research Project	BIOC3990 Biochemistry Project
No equivalent	BIOL2373 Skills for Biologists[1]
BIOL 2053 Physiology of Plants & Animals[2]	BIOL2370 Flowering Plant Physiology
BIOL 2053 Physiology of Plants & Animals[2]	BIOL2371 Ecophysiology of Animals
BIOL 2058 Tropical Ornamental Plants	BIOL2372 Plants for Caribbean Landscapes
BIOL 2151 Genetics I	BIOL2166 Advanced Genetics I
BIOL 2152 General Molecular Biology	BIOC2371 Molecular Techniques
BIOL 3053 Developmental Physiology	Any BIOC/BIOL/ECOL/MICR Level 2 or 3 course
BIOL 3152 Bioinformatics	BIOC3265 Principles of Bioinformatics
BIOL 3950 Biology Research Project	BIOL3990 Biology Project
ECOL 2055 Horticulture	BIOL2465 Tropical Horticulture[3]
ECOL 2451 Population Ecology	ECOL2460 Essentials of Ecology
ECOL 2452 Community Ecology	Any ECOL Level 2 or 3 course
ECOL 2453 Caribbean Island Biogeography	ECOL2461 Caribbean Island Biodiversity
ECOL 2454 Marine Biology	ECOL2462 Marine Biota
ECOL 3423 Coral Reef Ecology	ECOL3460 Biology & Ecology of Coral Reefs
ECOL 3451 Human Ecology and Conservation	ECOL3461 Ecology of a Changing Planet
ECOL 3452 Behavioural Ecology	ECOL3462 Behaviour: An Evolutionary Approach
ECOL 3453 Crop Ecology	ECOL 3463 Tropical Crop Ecology
ECOL 3950 Ecology Research Project	ECOL3990 Ecology Project
No Equivalent	ECOL3100 Statistics for Ecologists
MICR 2251 General Microbiology	MICR2260 Essential Microbiology
MICR 2252 Eukaryotic Micro-Organisms	MICR2261 Eukaryotic Microbes
No Equivalent	MICR2262 Methods in Microbiology
MICR 3251 Food Microbiology	MICR3265 Microbiology of Food
MICR 3252 Microbial Ecology	MICR3266 Ecology of Microorganisms
MICR 3253 Biology Of Viruses	MICR3267 Essential Virology
MICR 3258 Pathogenic Micro-Organisms	MICR3268 Microbial Pathogenesis
MICR 3950 Microbiology Research Project	MICR3990 Microbiology Project

[1] Students following a BIOC/BIOL/ECOL/MICR 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 irrespective of their major.

[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 (18 Credits)

CHEM2700 Intermediate Inorganic Chemistry
CHEM2705 Intermediate Organic Chemistry
CHEM2710 Intermediate Physical Chemistry
CHEM2715 Laboratory Methods in Chemistry I
CHEM2720 Laboratory Methods in Chemistry II
CHEM2730 Quantitative Chemical Analysis

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 (Fifteen [15] Credits): Course descriptions

CHEM2715 Laboratory Methods in Chemistry I
CHEM2720 Laboratory Methods in Chemistry II
CHEM2700 Intermediate Inorganic Chemistry
CHEM2705 Intermediate Organic Chemistry
CHEM2710 Intermediate Physical Chemistry

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 II/III

LEVEL II (21 Credits)

CHEM2700 Intermediate Inorganic Chemistry
CHEM2705 Intermediate Organic Chemistry
CHEM2710 Intermediate Physical Chemistry
CHEM2715 Laboratory Methods in Chemistry I
CHEM2720 Laboratory Methods in Chemistry II
CHEM2730 Quantitative Chemical Analysis
CHEM2725 Chemistry of the Environment

LEVEL III

CHEM3505 Chemistry Research Project (8 credits)

AND Twenty-Eight (28) credits from:

CHEM2950 Chemistry Elective
CHEM3100 Inorganic Chemistry II
CHEM3135 Bioinorganic 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

Equivalencies Between Old and New Chemistry Courses for the Purpose of Fulfilling Major and Minor Requirements

OLD COURSE	***NEW COURSE***
CHEM1010 Fundamentals f Chemistry	No Equivalent
CHEM1020 Introductory Chemistry	No Equivalent
No Equivalent	CHEM1110 Introduction to Organic Chemistry
No Equivalent	CHEM1120 Introduction to Physical Chemistry
No Equivalent	CHEM1125 Introduction to Experimental Chemistry
No Equivalent	CHEM1130 Introduction to Inorganic Chemistry
CHEM2010 Practical Chemistry I	CHEM2715 Laboratory Methods in Chemistry I
CHEM2020 Practical Chemistry II	CHEM2715 Laboratory Methods in Chemistry II
CHEM2100 Inorganic Chemistry I	CHEM2700 Intermediate Inorganic Chemistry
CHEM2200 Organic Chemistry I	CHEM2705 Intermediate Organic Chemistry
CHEM2300 Physical Chemistry I	CHEM2710 Intermediate Physical Chemistry
CHEM2400 Analytical Chemistry I	CHEM2730 Quantitative Chemical Analysis
CHEM3515 Environmental Chemistry	CHEM2725 Chemistry of the Environment

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.

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 equivalences 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	***New Course***
METE1200 Oceans and Climate	METE1110 Introduction to Ocean and Climate
ERSC1001 Dynamic Earth	ENSC1001 Introduction to Physical Geology: Dynamic Earth
No equivalent	ENSC1000 Earth and its Environment
ERSC2001 Earth & Life	ENSC2001 Introduction to the Earth-Life System
ERSC2002 Climatology	ENSC2002 Earth's Climate
ERSC2003 Oceanography	ENSC2000 Essentials of Oceanography
ERSC2004 Renewable Energy	ENSC2003 Sustainable Energy Systems
ERSC3001 Natural Hazards	ENSC3001 Natural Hazards and Disasters
ERSC3002 Climate Variability and	ENSC3000 Climate Variation and Change Predictability
ERSC3900 Earth Science Research Project	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 SCIENCE 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 SCIENCE 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: 20 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 SCIENCE 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: This course provides a comprehensive view of how eukaryotic cells communicate within themselves and between each other normally and in a diseased state. Hormonal signaling in animal systems will be examined, in addition to the regulatory mechanisms used to control these hormones. Animal examples (and selected examples of organisms) of hormonal signaling will be used to understand the biochemical modes of action of these chemical messengers.

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%

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 twenty-four (24) 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 CO_2 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. Cephalopods and fish. Adaptations to life in the epipelagic. 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 SCIENCE COURSES

BIOC3260 – PRINCIPLES OF BIOTECHNOLOGY (3 Credits)

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)

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)

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)

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)

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 bio-medical 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)

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%

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%

BIOL3990 - BIOLOGY PROJECT (6 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 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%

ECOL3100 - STATISTICS FOR ECOLOGISTS (3 Credits)

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)

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)

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. 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)

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)

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)

Pre-requisites: BIOL2373 Skills for Biologists or BIOL1010 Basic 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, or by persons who have passed 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%
Seminar	15%
Supervisor assessment	15%

MICR3265 - MICROBIOLOGY OF FOOD (3 Credits)

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)

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)

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)

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 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%

MICR3990 - MICROBIOLOGY PROJECT (6 Credits)

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

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

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%

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%

CHEM1130 - 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%

LEVEL II CHEMISTRY COURSES

CHEM2700 – INTERMEDIATE INORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry and CHEM1130 Introduction to Inorganic Chemistry

Syllabus: This course seeks to build on the fundamental Inorganic Chemistry knowledge that the students were exposed to in their first year by, amongst others, introducing the transition metals and their utility in industry related to their chemical and physical properties. The students are also exposed to spectroscopic and magnetochemical analysis used in the characterization of transition metal complexes.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

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

CHEM2705 - INTERMEDIATE ORGANIC CHEMISTRY (3 Credits)

Pre-requisite: CHEM1110 Introduction to Organic Chemistry and CHEM1125 Introduction to Experimental Chemistry

Syllabus: This course introduces students to the utilization of spectroscopic techniques in elucidating the structure of organic molecules, advanced organic stereochemistry, properties of aromatic molecules, electrophilic aromatic substitution, enolate chemistry, and several other reaction classes. They will learn how to predict the expected outcome of reactions, craft reaction mechanisms and determine the structure of organic molecules while reinforcing concepts learnt, and skills cultivated in the first year Organic Chemistry course.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

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

CHEM2710 - INTERMEDIATE PHYSICAL CHEMISTRY (3 Credits)

Pre-requisite: CHEM1120 Introduction to Physical Chemistry and CHEM1125 Introduction to Experimental Chemistry

Syllabus: This course looks at the thermodynamics, adsorption processes at solid surfaces as well as electrochemistry and aims to build on the physical chemistry fundamental knowledge that the students were exposed to in their first year. This course would help to deepen the students' understanding of the microscopic and macroscopic behaviour of matter.

Teaching: Two lectures and one tutorial per week

Method of Examination:

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

CHEM2715 - LABORATORY METHODS IN CHEMISTRY I (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

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

CHEM2720 - LABORATORY METHODS IN CHEMISTRY II (3 credits)

Pre-requisite: CHEM1125 Introduction to Experimental Chemistry

Syllabus: A course of seventy-two (72) hours of practical work selected from the disciplines of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

Teaching: Six hours of practical classes per week.

Method of Examination:

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

CHEM2725 - CHEMISTRY OF THE ENVIRONMENT (3 Credits)

Prerequisites: CHEM1125 Introduction to Experimental Chemistry

Description: An understanding of the fundamental chemical processes in the environment is critical to understanding the world in which we live and our impact on it. Students will develop knowledge and skills that will allow them to contribute to regional needs related to air, water and soil quality. This course is required for the double major in chemistry and is an elective course that contributes to the minor in Environmental Science

Teaching: Three interactive lectures/tutorials per week.

Method of Examination:

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

CHEM2730 - QUANTITATIVE CHEMICAL ANALYSIS (3 Credits)

Pre-requisite: CHEM1120 Introduction to Physical Chemistry and CHEM1125 Introduction to Experimental Chemistry

Syllabus: This course intends to build the foundations of good analytical laboratory practices by introducing the statistical methods applicable to 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 spectroscopy, fundamentals of Atomic Absorption Spectroscopy and Atomic Emission Spectroscopy. The course also looks at the use of electrochemical methods and chromatographic methods (GC, HPLC) for quantitative chemical analysis.

Teaching: Three lectures and one tutorial per week

Method of Examination:

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

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%

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 anisotrophy 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%

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)
METE1130: Introduction to Dynamic Meteorology (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%

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 in 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

ENSC3000 - CLIMATE VARIATION AND CHANGE (3 Credits)

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)

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)

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
ELET1215 Digital Electronics II
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 (3 credits)

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2235 Networks I
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
ELET2215 Microprocessor Systems
ELET2230 Digital Communication Systems I

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
MATH1190 Calculus A
MATH1195 Calculus B
MATH1152 Sets and Number Systems
MATH1230 Introductory Applied Statistics I
PHYS1210 Physics III: Electric Fields, Currents and Circuits
PHYS1220 Physics IV: Magnetism, Electromagnetic Waves and Optics

LEVEL II (3 credits)

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools & Practices
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
ELET2220 Circuit Simulation & Applications
ELET2225 Discrete Component Electronics
ELET2235 Automation Technology & Applications
ELET2140 Medical Instrumentation
ENSC2003 Sustainable Energy Systems

ELET2240 Sensor & Actuator Devices
MATH2304 Multivariable Calculus
MATH2305 Differential Equations
MATH2315 Linear Algebra 1
MATH2330 Probability Theory I
PHYS2400 Mathematical Methods in Physics I
PHYS2410 Modern Physics
PHYS2420 Advanced Physics Laboratory I
PHYS2102 Solid State Physics

LEVEL III (4 credits)

COMP3100 Operating Systems
COMP3125 Artificial Intelligence
COMP3140 Software Engineering II
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
MATH3100 Multivariate Analysis
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3300 Research Project
MATH3375 Discrete & Computational Geometry
PHYS3100 Quantum Mechanics
PHYS3102 Optics and Lasers
PHYS3106 Physics Research Project
PHYS3107 Fundamental of Photovoltaic Physics

8 Credits

MATH2310 Abstract Algebra 1
MATH2321 Real Analysis 1
Math2325 Elementary Number Theory
MATH2335 Statistics 1
PHYS2405 Mathematical Methods in Physics II
PHYS2415 Theory of Classical Mechanics
PHYS2420 Advanced Physics Laboratory I
PHYS2425 Computational Methods in Physics

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
COMP3910 Computer Science Research Project
COMP3920 Computer Science Major Research Project*
COMP3930 Computer Science Group Research Project
ELET3041 Microcontrollers & Applications
ELET3120 Communication Circuits
ELET3151 Digital Communications II
ELET3160 Electronics Research Project
MATH3120 Numerical Analysis
MATH3140 Fourier Analysis & PDE
MATH3170 Advanced Algebra
MATH3300 Research Project
MATH3460 Statistical Theory II
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics
PHYS3106 Physics Research Project

COURSES BY SEMESTER: METEOROLOGY

SEMESTER I

LEVEL I

METE1110 Introduction to Oceans and Climate (3 credits)

METE1135 Introduction to Physical Meteorology

METE1125 Mete. Observations, Instruments & Basic Analysis

LEVEL II

METE2000 Physical Meteorology I

METE2100 Dynamic Meteorology I

METE2300 Hydrometeorology

LEVEL III

METE3100 Dynamic Meteorology II

METE3200 Synoptic Meteorology II

SEMESTER II

LEVEL I

METE1130 Introduction to Dynamic Meteorology

METE1125 Mete. Observations, Instruments & Basic Analysis

METE1305 Intro. To Climate Change and Society

LEVEL II

METE2001 Physical Meteorology II

METE2200 Synoptic Meteorology I

LEVEL III

METE3300 Tropical Meteorology

METE3400 Weather Radars and Satellites

METE3500 Bioclimatology

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

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

LEVEL III

COMP3100 Operating Systems

COMP3180 Algorithm Design and Analysis

AND at Least Seven (7) Credits (including at least one Level III courses) from:

COMP2235 Networks I

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2245 Web Development Concepts, Tools and Practices

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 [Fifteen (15) Credits]:

At Least Nine (9) Credits From:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2611 Data Structures

AND at Most Six (6) Credits from:

COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2611 Data Structures

LEVEL III

COMP3160 Database Management Systems

COMP3170 Web-Based Applications

AND Seven (7) Credits (including at least one Level III course) from:

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

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 [Fifteen (15) Credits]: Course descriptions

At Least Nine (9) Credits From:

COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
COMP2611 Data Structures
COMP3160 Database Management Systems
COMP3170 Web-Based Applications

AND At Most Eight (8) Credits From:

COMP2210 Mathematics for Computer Science II
COMP2220 Computer System Architecture
COMP2235 Networks I
COMP2245 Web Development Concepts, Tools and Practices
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

COMP2210 Mathematics for Computer Science II

COMP2225 Software Engineering

COMP2220 Computer System Architecture

COMP2235 Networks I

COMP2232 Object-Oriented Programming Concepts

COMP2611 Data Structures

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:

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2950 Computer Science Elective

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	***New Course***
COMP1105 Computer Programming I	COMP1205 Computing I

COMP1115 Computer Programming II	COMP1210 Computing II
MATH1101 Basic Mathematics I/ MATH1100 Basic Mathematics	COMP1180 Mathematics for Computer Science I
COMP1125 Introduction to Unix	COMP1215 Unix
COMP1130 Web Technology Fundamentals	COMP1170 Entrepreneurship for Computer Scientists
COMP2105 Discrete Mathematics	COMP2210 Mathematics for Computer Science II
COMP2115 Information Structures	COMP2611 Data Structures
COMP2125 Computer Architecture	COMP2220 Computer System Architecture
COMP2145 Software Engineering I	COMP2225 Software Engineering
COMP2150 Computer Networks I	COMP2235 Networks I
COMP2155 Building Web Applications	COMP2245 Web Development Concepts, Tools and Practices
COMP2160 Object-Oriented Programming	COMP2232 Object-Oriented Programming Concepts
No Equivalent	COMP2410 Computing in the Digital Age
No Equivalent	COMP2415 Information Technology Engineering

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

LEVEL II

At Least Twelve (12) Credits (4 Courses) From:

ELET2215 Microprocessor Systems
ELET2220 Circuit Simulation & Applications
ELET2225 Discrete Component Electronics
ELET2230 Digital Communication Systems I
ELET2235 Automation Technology & Applications
ELET2240 Sensor & Actuation Devices
ELET2951 Electronics Exchange Elective
PHYS2400 Mathematical Methods in Physics I

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 [FIFTEEN (15) Credits]: Course descriptions

Fifteen (15) Credits (Five Courses) From:

ELET2215 Microprocessor Systems
ELET2220 Circuit Simulation & Applications
ELET2225 Discrete Component Electronics
ELET2230 Digital Communication Systems I
ELET2235 Automation Technology & Applications
ELET2240 Sensor & Actuation Devices
ELET2951 Electronics Elective
PHYS2400 Mathematical Methods in Physics I
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 [Fifteen (15) Credits]: Course descriptions

ELET2140 Medical Instrumentation
ELET2225 Discrete Component Electronics
ELET2240 Sensor & Actuation Devices
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	*NEW COURSE*
ELET1100 Circuit Analysis	ELET1200 Basic Circuit Analysis
ELET1110 Digital Electronics	ELET1210 Digital Electronics I
No Equivalent	ELET1215 Digital Electronics II
ELET1120 Basic Electronics	ELET1220 Introduction to Electronics
No Equivalent	ELET1205 Computer Aided Design
ELET2110 Circuit Simulation	ELET2220 Circuit Simulation and Applications
ELET2120 Discrete Device Electronics	ELET2225 Discrete Component Electronics
ELET2130 Digital Communications	ELET2230 Digital Communication Systems I
ELET2140 Medical Instrumentation	No Equivalent
ELET2100 Microprocessors I	ELET2215 Microprocessor Systems
ELET2150 Automation Technology	ELET2235 Automation Technology and Applications
ELET3210 Sensors & Actuator Technology	ELET2240 Sensors and Actuation Devices

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 the Final exam and attain a overall course grade of more than 50%.

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

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 Differential Equations

LEVEL III

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

MATH2325 Elementary Number Theory
MATH2330 Probability Theory 1
MATH2335 Statistics 1
MATH3100 Multivariate Analysis
MATH3120 Numerical Analysis
MATH3140 Fourier Analysis & PDE
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3300 Mathematical Research Project
MATH3375 Discrete & Computational Geometry
MATH3460 Statistical Theory II

MINOR IN MATHEMATICS [Fifteen (15) Credits at Level II]: Course descriptions

LEVEL II

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1

MATH2305 Differential Equations

DOUBLE MAJOR IN MATHEMATICS: Course descriptions

LEVEL I

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

LEVEL II

MATH2304 Multivariable Calculus
MATH2310 Abstract Algebra 1
MATH2315 Linear Algebra 1
MATH2321 Real Analysis 1
MATH2305 Differential Equations
MATH2330 Probability Theory 1
MATH2335 Statistics 1
Math2325 Elementary Number Theory

LEVEL III

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

MATH3100 Multivariate Analysis
MATH3120 Numerical Analysis
MATH3110 Design of Experiments
MATH3120 Numerical Analysis
MATH3130 Optimization Theory
MATH3140 Fourier Analysis and PDE
MATH3150 Complex Variables
MATH3160 Number Theory
MATH3170 Advanced Algebra
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3220 Sampling Theory
MATH3300 Mathematics Research Project
MATH3375 Discrete and Computational Geometry
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	***New Course***
MATH1101 Basic Mathematics I	MATH1152 Sets and Number Systems
MATH1102 Basic Mathematics II	MATH1141 Introductory Linear Algebra & Analytical Geometry
MATH1110 Applied Statistics	MATH1230 Introductory Applied Statistics I
MATH1120 Calculus I	MATH1190 Calculus A
MATH1130 Calculus II	MATH1195 Calculus B AND MATH2304 Multivariable Calculus
No Equivalent	MATH1235 Python Programming & Mathematical Software
MATH2100 Abstract Algebra	MATH2310 Abstract Algebra 1
MATH2110 Linear Algebra	MATH2315 Linear Algebra 1
MATH2120 Analysis & Methods 1	MATH2321 Real Analysis
MATH2130 Ordinary Differential Equations	MATH2305 Differential Equations
MATH2140 Probability Theory	MATH2330 Probability Theory 1
MATH2150 Mathematical Statistics	MATH2335 Statistics 1
MATH3160 Number Theory	Math2325 Elementary Number Theory

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

METE1110 Introduction to Oceans and Climate (3 credits)

METE1130 Introduction to Physical Meteorology

METE1125 Meteorological Observations, Instruments & Basic Analysis

METE1135 Introduction to Dynamic Meteorology

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	***NEW COURSE***
METE1200 Oceans and Climate	METE1110 Introduction to Oceans and Climate
METE1000 Introduction to Physical Meteorology and Weather Observations	METE1130 Introduction to Physical Meteorology METE1125 Meteorological Observations, Instruments and Basic Analysis
METE1100 Introduction to Dynamic Meteorology and Weather Systems	METE1135 Introduction to Dynamic Meteorology
METE1300 Climate Change Education and Awareness	METE1305 Introduction to Climate Change and Society

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

PHYS2400 Mathematical Methods in Physics I

PHYS2405 Mathematical Methods in Physics II

PHYS2410 Modern Physics

PHYS2415 Theory of Classical Mechanics

PHYS2420 Advanced Physics Laboratory I

LEVEL III

PHYS3100 Quantum Mechanics

PHYS3101 Electrodynamics

PHYS3105 Statistical Mechanics

AND Four (4) Credits From:

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation Applications

ELET2225 Discrete Component Electronics

ELET2230 Digital Communication Systems I

PHYS2425 Computational Physics

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 (Fifteen (15) Credits): Course descriptions

At Least Nine (9) Credits From:

PHYS2400 Mathematical Methods in Physics I
PHYS2405 Mathematical Methods in Physics II
PHYS2410 Modern Physics
PHYS2415 Theory of Classical Mechanics
PHYS2420 Advanced Physics Laboratory I
PHYS3100 Quantum Mechanics
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics

AND at Most Eight (8) Credits From:

PHYS2425 Computational Methods in Physics
PHYS2950 Physics Elective
PHYS3103 Astrophysics
PHYS3102 Optics and Lasers
PHYS3106 Physics Research Project
PHYS3107 Fundamentals of Photovoltaic Physics

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

Old Course	***New Course***
PHYS1100 Mechanics	PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1101 Electricity & Magnetism	PHYS1210 Physics III: Electric Fields, Currents and Circuits
PHYS1102 Optics, Thermodynamics & Modern Physics	PHYS1205 Physics II: Rotation Waves and Thermodynamics
	PHYS1220 Physics IV: Magnetism, Electromagnetic Waves
No Equivalent	and Optics
PHYS2100 Mathematical Methods in Physics	PHYS2400 Mathematical Methods in Physics I
PHYS2101 Quantum Mechanics and Special Relativity	PHYS2410 Modern Physics
PHYS2103 Classical Mechanics	PHYS2415 Theory of Classical Mechanics
PHYS2105 Computational Physics I	PHYS2425 Computational Methods in Physics
PHYS2106 Advanced Physics/Technology Laboratory I	PHYS2420 Advanced Physics Laboratory I
No Equivalent	PHYS2405 Mathematical Methods in Physics II

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 associatively, commutatively, 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

COMP2210 – MATHEMATICS FOR COMPUTER SCIENCE II (3 Credits)

Pre-requisite: COMP1180 Mathematics for Computer Science I

Anti-requisite: None

Syllabus: Logic; Proofs; Mathematical Induction; Number Theory; Algorithms; Relations; Elementary Combinatorics; Discrete Probability; Elementary Graph Theory; Algebraic Structures; Modeling computation.

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%

COMP2220- COMPUTER SYSTEM ARCHITECTURE (3 Credits)

Pre-requisite: COMP1180 Mathematics for Computer Science I ***AND***
COMP1210 Computing II
OR
MATH1101 Basic Mathematics I ***AND*** COMP1210 Computing II
OR
ELET1210 Digital Electronics I

Anti-requisite: COMP2125 Computer Architecture

Syllabus: Basic Computer Architecture; Computer Memory; Computer Arithmetic; The Instruction Cycle; Instructions Sets and Assembly Language Programming; System Interconnection; Instruction Sets; Addressing Modes; CPU Structure and Function (Register organization, instruction cycle, instruction pipelining); RISC vs. CISC Architecture.

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

Method of Examination:

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

COMP2225 - SOFTWARE ENGINEERING (3 Credits)

Pre-requisite: COMP1210 Computing II

Anti-requisite: COMP2145 Software Engineering I

Syllabus: Teams and Tools; Software Development (Requirements analysis, Specifications, design, implementation validation and verification, maintenance); Project and Product Documentation (User manuals, internal documentation); Software Process Models; Agile Development Methodologies; Project Management.

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

Method of Examination:

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

COMP2232 – OBJECT ORIENTED PROGRAMMING CONCEPTS (3 Credits)

Pre-requisite: COMP1210 Computing II

Anti-requisite: COMP2160 Object oriented Programming

Syllabus: Object-Oriented Design; Introduction to UML; Structure of an object-oriented class (Classes and Objects, Encapsulation and Information Hiding, Message Passing); Class Design (Inheritance, Composition, Constructors, Polymorphism, Abstract Classes); Error Handling and Testing (Exceptions, Assertions, Design By Contract).

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%

COMP2235 - NETWORKS I (3 Credits)

Pre-requisite: COMP1210 Computing II and COMP1215 UNIX

Anti-requisite: COMP2150 Computer Networks I

Syllabus: OSI and TCP/IP reference models. Network performance. Transmission media. Multiplexing. Packet switching and Circuit switching. Framing. Error detection and Error correction. Cyclic Redundancy Check (CRC). Automatic Repeat reQuest (ARQ). Media Access Control (MAC) sublayer. Ethernet. Wireless LANs and Wireless WANs. Virtual LANs. Spanning Tree Protocol (STP). Bluetooth.

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%

COMP2245 – WEB DEVELOPMENT CONCEPTS, TOOLS AND PRACTICES (3 Credits)

Pre-requisite: COMP1170 Entrepreneurship for Computer Scientists

Anti-requisite: COMP2155 - Building Web Applications

Syllabus: Overview of Web concepts (TCP/IP, HTTP and HTTPS); The client-server computing model; Web browser architecture; User interface: Visual design and user interaction concepts; Web development stack; Single-, two- and three-tier application architectures; Data validation and verification; Server and application configuration; Relative and absolute paths; Web-accessible directories; Server and application configuration directives; Designing and implementing a three-tier Web application architecture;Client-side programming using JavaScript; Server-Side Scripting.

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%

COMP2410 – COMPUTING IN THE DIGITAL AGE (3 Credits)

Pre-requisite: COMP1210 Computing II

Anti-requisite: None

Syllabus: Ethics. Computer history. Computer organization. Usability. Software engineering and software reliability. Parallel computing. Digital data and copyright. Software as intellectual property. Artificial intelligence. Big Data. Massive open online courses (MOOCs). Crowd computing. Wearable computing. Computational *X* (biology, photography, psychology).

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%

COMP2415 – INFORMATION TECHNOLOOGY ENGINEERING (3 Credits)

Pre-requisite: COMP1210 Computing II

Anti-requisite: None

Syllabus: Introduction to Statistical Mathematics. Web Analytics - Log file analysis, Page-tagging. Introduction to Computer Architecture - Motherboards, Processors, Memory, Peripherals, Storage Mediums (IDE,

SATA, SCSI, USB, FireWire, IEEE 1394, RAID, NAS, SAN). Virtualization. Introduction to Computer Networks - RJ11, RJ45, Fiber, Wi-Fi, LANs, WANs, DHCP, DNS, VPN. Introduction to Servers - Web Servers (Apache, TomCat, JBOSS, IIS), FTP Servers, Email Servers, Proxy Servers. Version Control - Subversion, GIT. Cloud Computing.

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%

COMP2611 – DATA STRUCTURES (3 Credits)

Pre-requisite: ***COMP1210 Computing II And COMP1215 UNIX***

Anti-requisite: COMP2115 Information Structures

Syllabus: Abstract Data Types (Lists, Queues, Double-ended queues, Priority queues, Stacks);Dictionaries (Binary search trees, AVL-trees, Red-Black trees, Splay trees, Binary heaps, B-trees); Sets; Vectors; Hashing and collision resolution schemes; Sorting algorithms; Searching techniques; Data compression.

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%

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 (GGI, 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

ELET2215 - MICROPROCESSORS SYSTYEMS (3 Credits)

Pre-requisite: ELET1215 – Digital Electronics II

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.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2220 – CIRCUIT SIMULATION AND APPLICATIONS (3 Credits)

Pre-requisite: ELET1200 – Basic Circuit Analysis

Syllabus: Simple AC & DC circuits and transient analysis, BIAS circuit and AC Sweep analysis, Characteristics of

diodes and zener diodes, Diode and zener diode circuits, Characteristics of bipolar transistors, Bipolar transistor circuits, Characteristics of Field Effect transistors, Field Effect transistor circuits, Characteristics of Thyristors, Transistor as a switch, Characteristics of OPAMPS, Operational Amplifier (OP-AMP) circuits, Component tolerances in software, Circuit design with component tolerances.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2225 – DISCRETE COMPONENT ELECTRONICS (3 Credits)

Pre-requisite: ELET1200 – Basic Circuit Analysis

Syllabus: Diode and Transistor parameters, Various biasing methods for transistors, Modelling (Re and Hybrid) of transistor circuits, Calculating input and output impedances and voltage, current and power gain for common configurations of BJT and FET, Advantages and disadvantages of various other circuits (such as Darlington, cascade, cascode and complementary symmetry) and calculations for these circuits as above, Calculating the effect of RC coupling on bandwidth (high and low frequency response), Oscillator fundamentals (positive and negative feedback and effect on gain, bandwidth and stability), Calculations for transistors used in regulator circuits, Calculations for transistors used in switching circuits.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2230 – DIGITAL COMMUNICATIONS SYSTEMS I (3 Credits)

Pre-requisite: ELET1215 – Digital Electronics II ***AND*** (MATH1190 – Calculus A ***OR*** COMP1180 – Mathematics for Computer Science I ***OR*** COMP2150 – Networks I)

Syllabus: Digital Communication System Blocks, Performance Criteria, Discrete Memoryless Channel (DMC), Introduction to Error-Control Coding, Information Theory, Shannon's Source Coding Theorem, Huffman Code Source Coding Algorithm, Universal Source Coding Algorithm, Channel Capacity, Shannon's Channel

Coding Theorem, Bandpass modulation techniques, Binary Phase Shift Keying (BPSK), BPSK Performance, Quadrature Phase Shift Keying (QPSK), M-ary PSK Modulation (MPSK), Soft-Decision, Information Throughput.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2235 – AUTOMATION TECHNOLOGY AND APPLICATIONS (3 Credits)

Pre-requisite: ELET1210 – Digital Electronics 1

Syllabus: Microcontroller systems and architectures, Programmable Logic Controller (PLC) and Field-Programmable Gate Arrays (FPGA) architectures and systems, Industrial Network Topologies, Distributed Control Systems (DCS) and applications, Supervisory Control And Data Acquisition (SCADA) systems and their applications.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2240 - SENSORS AND ACTUATION DEVICES (3 Credits)

Pre-requisite: ELET1215 – Digital Electronics II

Syllabus: Measurements of Displacement and Strain, Force and Torque Measurement, Pressure Measurement, Flow Measurement, Measurement of Temperature, Measurement of other non-electrical quantities such as humidity, pH, level, Temperature sensors, Magnetic sensors, Electrical sensors, Mechanical sensors, Acoustic sensors, Optical sensors, Chemical sensors, Image sensors, Biosensors, Electrical actuators, Mechanical actuators, Pneumatic and Hydraulic actuators, Piezoelectric actuators, Polymer actuators, Elements of telemetry and data acquisition systems, Wireless sensors and Networking.

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

Method of Examination:

Final Theory Examination (2 hours)		60%
In-course Tests/Assignments	20%	
Laboratory		20%

ELET2951 - ELECTRONICS EXCHANGE ELECTIVE (3 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.

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 Equipment 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%

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

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 $h \to 0$, 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'Hôspital'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%

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 dierence 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%

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%

LEVEL II MATHEMATICS COURSES

MATH2304 – MULTIVARIABLE CALCULUS (3 Credits)

Pre-requisite: MATH1141 Introductory Linear Algebra & Analytical Geometry & MATH1195 Calculus B & MATH1235 Python Programming & Mathematical Software

Syllabus:

EUCLIDEAN SPACES: vectors in $\mathbb{R}^n$; scalar product (dot product), norm and angle; cross product; lines and planes; linear transformations.

VECTOR FUNCTIONS (CURVES): continuity & differentiation; arc length; application to the geometry of curves.

SCALAR FIELDS (SURFACES): graphs of scalar functions; continuity; differentiability, partial derivatives and gradient: properties and their relationship to each other; Clairaut's theorem; level sets; maxima, minima and critical points of functions in $\mathbb{R}^2$; Lagrange multipliers; evaluating double integrals; double integrals over non-rectangular regions; change of variables in multiple integrals; spherical and cylindrical polar coordinates.

VECTOR FIELDS: continuity and differentiability; divergence, curl and Laplace operator.

VECTOR INTEGRATION AND INTEGRAL THEOREMS: line integrals of scalar and vector fields; conservative vector fields; surface integrals; Green's theorem in a plane; Stokes' theorem; divergence theorem.

Teaching: Three (2) lectures and one tutorial per week.

Method of Examinations:

In-class Tests/Assignments	50%
Final Theory examination (2 hours)	50%

MATH2305 - DIFFERENTIAL EQUATIONS (3 Credits)

Pre-requisite: MATH1195 Calculus B & MATH1235 Python Programming & Mathematical Software

Co-requisite: MATH2304 Multivariable Calculus

Syllabus:

BASIC CONCEPTS: definition of an ordinary differential equation (ODE); order, degree; linearity/nonlinearity solution of an ODE; initial conditions; n-parameter family of solutions; singular solution; general solution; particular solution; direction field; isocline; ordinary and singular point.

DIFFERENTIAL EQUATIONS OF FIRST ORDER: separable differential equations (including existence and uniqueness of solutions); homogenous differential equations; exact differential equation (including existence and uniqueness of solutions); integrating factor; linear differential equations of first order (including existence and uniqueness of solutions).

MODELLING AND EQUILIBRIA: classification of equilibria; modelling with ODEs: mixing problems, fishery, Newton's law of cooling, growth and decay processes (e.g., logistic equation), free fall, etc.

LINEAR DIFFERENTIAL EQUATIONS OF ORDER GREATER THAN TWO: definition of homogeneous and non-homogeneous linear differential equations of higher order; linear independence and Wronskian; existence and uniqueness theorem for initial value problems (IVPs); comparison to boundary value problems (BVPs); general solution of homogeneous linear differential equation with constant coefficients: characteristic equation and linear combination of solutions; particular solution of a nonhomogeneous linear differential equation with constant coefficients: variation of parameters and method of undetermined coefficients; examples of linear differential equations with variable coefficients; applications of second order linear differential equations: free undamped/damped motion, non-resonant/resonant case, forced damped motion and steady-state solutions.

NUMERICAL METHODS: Euler's method, numerical solutions for first order ODEs; improved Euler's method; Runga-Kutta methods (RK4).

Teaching: Three (2) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	50%
Final Theory Examination (2 hours)	50%

MATH2310 - ABSTRACT ALGEBRA 1 (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems

Syllabus:

SETS AND RELATIONS: equivalence relations; binary operations.

THE DEFINITION OF A GROUP: definition of a group; examples of groups (numbers, symmetries, matrices); properties of groups: cyclic, Abelian, finite.

SUBGROUPS, QUOTIENT GROUPS AND GROUP HOMOMORPHISMS: subgroups; cosets and Lagrange's theorem; Euler-Fermat theorem; Wilson's theorem; normal subgroups; construction of a quotient group; generating sets; homomorphisms of groups; kernel of a homomorphism; isomorphism theorems.

PERMUTATION GROUPS: symmetric group; transpositions and cycles; cycle decomposition and cycle structure; alternating group.

THE DEFINITION OF A RING: definition of a ring; examples of rings; special classes of rings; associativity and commutativity; zero-divisors and integral domains.

IDEALS, QUOTIENT RINGS, AND RING HOMOMORPHISMS: one-sided and two-sided ideals; construction of the quotient ring; maximal ideals; principal ideals; prime ideals; homomorphisms of rings; ring isomorphism theorems.

EUCLIDEAN RINGS: defining properties of Euclidean rings; Euclidean rings as principal ideal rings; divisibility and primality.

DIVISION RINGS: 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	50%

Final Theory Examination (2 hours)	50%

MATH2315 - LINEAR ALGEBRA 1 (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems & MATH1235 Python Programming & Mathematical Software

Syllabus:

REVISION OF FUNDAMENTALS OF LINEAR ALGEBRA: homogeneous and non-homogeneous systems of linear equations; augmented matrix; row space and column space of a matrix; elementary row and column transformations: reduced row-echelon form; elementary matrices; matrix products via elementary row transformations; matrix products expressed as products of elementary matrices definition of determinant; properties of the determinant; Cramer's rule; cofactors and the inductive definition of the determinant; determinants and inverses of matrices.

VECTOR SPACES: vector space over an arbitrary field; subspaces; examples of vector spaces and subspaces; intersections of and direct sums of subspaces.

LINEAR INDEPENDENCE AND BASES: linear combinations; linear span; linear independence; bases; dimension; examples of vector spaces of finite dimension and of infinite dimension; dimension of a subspace.

LINEAR TRANSFORMATIONS: definition; null space and range; rank; rank-nullity theorem; matrix of a linear transformation; composition of transformations; change of basis.

INNER PRODUCT SPACES: properties of inner products; orthogonality; norms; orthonormal bases; the Gram-Schmidt orthogonalization process; orthogonal matrices.

EIGENVALUES AND EIGENVECTORS: properties of eigenvalues and eigenvectors; diagonalization of matrices; similarity; characteristic polynomial; Cayley-Hamilton theorem

Teaching: Three (2) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	50%
Final Theory Examination (2 hours)	50%

MATH2321 – REAL ANALYSIS I (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems & MATH1195 Calculus B

Syllabus:

REAL NUMBER SYSTEMS: preliminaries: sets, functions, logic and proofs; irrationality of $\sqrt{2}$; axioms of arithmetic and order hold for $\mathbb{R}$ and $\mathbb{Q}$; axiom of completeness; upper/lower bounds; supremum/infimum; nested interval property; Archimedean property; density of $\mathbb{Q}$in $\mathbb{R}$; existence of square roots; countable and uncountable sets; countability of $\mathbb{Q}$; the set $\mathbb{R}$ is uncountable; Cantor's diagonal argument.

SEQUENCES AND SERIES: definition of sequence; converging sequences and their limit; bounded sequences; algebraic limit theorem and order limit theorem; monotone convergence theorem; partial sums and convergence of series; convergence of $\sum 1/n^2$, divergence of the harmonic series; subsequences; Bolzano-Weierstrass theorem; Cauchy sequence; Cauchy criterion; algebraic limit theorem for series; Cauchy criterion for series; geometric series; absolute convergence test; alternating series test; ratio & root test; rearrangement of series: absolute and conditional convergence.

TOPOLOGICAL PROPERTIES OF $\mathbb{R}$: open and closed sets; interior points; limit points; isolated points; bounded sets; compact sets and connectedness; Heine-Borel theorem.

FUNCTIONAL LIMITS AND CONTINUITY: functional limits; sequential criterion for functional limits; characterization of continuity; algebraic continuity theorem; composition of continuous functions; preservation of compact sets; extreme value theorem (attainment of bounds); uniform continuity; sequential criterion for nonuniform continuity; continuous functions defined on a compact set are uniform continuous; intermediate value theorem

Teaching: Three (2) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	50%
Final Theory Examination (2 hours)	50%

MATH2325 – ELEMENTARY NUMBER THEORY (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems & MATH1235 Python Programming & Mathematical Software

Co-requisite: MATH2310 Abstract Algebra 1

Syllabus:

THE NATURAL NUMBERS: Peano axioms; mathematical induction and strong induction; well-ordering principle.

DIVISIBILITY: properties of divisibility; division algorithm; representation of integers.

GREATEST COMMON DIVISOR: definition of GCD; GCD as linear combination; Euclid's lemma; least common multiple (LCM); Euclidean algorithm; linear Diophantine equations (existence of solutions; set of all solutions; existence of solutions in positive integers).

PRIMES: sieve of Eratosthenes; fundamental theorem of arithmetic; Euclid's proof of the infinitude of primes; distribution of primes (e.g., in arithmetic progressions).

CONGRUENCES: congruence modulo a number; equivalence relations and classes; residue classes; linear congruences; the set $\mathbb{Z}^*_n$; check digits in coding theory (ISBN-10 & UPC); Chinese remainder theorem.

SPECIAL CONGRUENCES: Fermat's little theorem; Euler's theorem; Euler's phi function (totient function) and its properties; Wilson's theorem.

PRIMITIVE ROOTS: order of an element modulo a number; existence of primitive roots; primitive roots modulo composites; straightedge and compass constructions - the regular 17-gon.

CRYTOGRAPHY: monoalphabetic substitution ciphers and affine ciphers; Pohlig-Hellmann cipher; Massey-Omura exchange; RSA algorithm.

Teaching: Three (2) lectures and one tutorial per week.

Method of Examinations:

In-class Tests/Assignments	50%
Final Theory examination (2 hours)	50%

MATH2330 - PROBABILITY THEORY 1 (3 Credits)

Pre-requisite: MATH1195 Calculus B

Co-requisite: MATH2304 Multivariable Calculus

Syllabus:

BASIC IDEAS OF PROBABILITY***:*** definition of statistical experiment, sample space, events; the calculus of Events; equally likely events; combinatorial probability; definition of conditional probability; application to computing probabilities in simple situations; the theorem of total probability and Bayes' theorem; independent events; applications to simple situations including systems of components in series and in parallel.

DISCRETE RANDOM VARIABLES***:*** definition of a random variable; definition and examples of discrete and continuous random variables; the probability function and distribution function of a discrete random variable; definition and calculation of the expectation, variance and moments of a discrete random variable from the probability function; detailed properties of the Bernoulli, binomial, hypergeometric, geometric and Poisson random variables; the Poisson approximation to the binomial.

CONTINUOUS RANDOM VARIABLES: probability density function (pdf) and distribution function of one continuous random variable; calculating the probability of an event from the pdf; percentiles of a continuous random variable; expectation and moments of a continuous random variable; the pdf and moments of the exponential, normal, gamma and chi-squared random variables; properties of one normal random variable; the normal approximation to the binomial; the distribution of X given X>a; the memoryless property of the exponential distribution; the Poisson process; the distribution of functions of one discrete or continuous random variable; the distribution function of any random variable.

SEVERAL RANDOM VARIABLES: joint distribution of several random variables in the discrete and continuous case; joint pdf; evaluating probabilities of events using the joint pdf of two random variables; marginal and conditional distributions; independence of random variables; expectation and its properties; $E(XY) = E(X)E(Y)$ when X and Y are independent; covariance and correlation; the mean and variance of linear combinations of several random variables; the distribution of linear combinations of independent normal random variables and simple applications.

SAMPLE STATISTICS: definition of a statistic; definition and distribution of the sample mean and the sample variance; special case when the population is normal; the central limit theorem and its applications to simple problems.

Teaching: Three (2) lectures and one tutorial per week.

Method of Examination:

In-class Tests/Assignments	50%
Final Theory Examination (2 hours)	50%

MATH2335 - STATISTICS I (3 Credits)

Pre-requisite: MATH2330 Probability Theory I & MATH1235 Python Programming & Mathematical Software

Syllabus:

INTRODUCTION TO R AND MINITAB***:*** brief introduction to the software packages and to their use in describing and summarizing data involving one variable and several variables using basic statistics, graphs and plots; nominal, ordinal and `interval' or continuous data will be considered.

SAMPLING DISTRIBUTIONS***:*** distribution of the sample means and sample variance including the special case of normality; the chi-squared, t and F distributions.

POINT ESTIMATION***:*** definitions of parameter, parameter space, point estimator, bias and mean squared error (MSE); MSE = variance (estimator) + bias squared; maximum likelihood estimators of one or more parameters.

INTERVAL ESTIMATORS***:*** the t and F distributions; derivation and calculation of confidence intervals of the means, difference between two means and variances in samples from normal populations with variance known and with variance unknown; confidence intervals for binomial proportions; sample size determination.

HYPOTHESIS TESTING***:*** definitions of statistical hypothesis;null and alternative hypothesis; type I and type II errors; significance level and power of a test; calculating significance level and power of a test given the critical or rejection region; testing hypotheses concerning the means and variances of normal populations; testing hypotheses concerning proportions; definition and calculation of p values.

CONTINGENCY TABLES***:*** testing for goodness of fit; independence.

EXPERIMENTAL DESIGN***:*** designed experiments and observational studies; the completely randomized design; one-way ANOVA; Duncan's multiple range test examining assumptions of the linear model; the randomized complete block design; the statistical model and two-way ANOVA; latin squares; factorial Designs involving two factors.

REGRESSION ANALYSIS***:*** the idea of regression; the method of least squares; simple linear regression; use of graphical techniques to examine assumptions of the linear model; basic estimation, testing and forecasting problems in regression.

NON-PARAMETRIC METHODS BASED ON RANKS***:*** the sign test; signed rank test; rank-sum test; Kruskal-Wallis test.

Teaching: Three (2) lectures and one tutorial per week.

Method of Examinations:

In-class Tests/Assignments	50%
Final Theory examination (2 hours)	50%

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-Lioville etc.). Periodic functions, Fourier expansion, Fourier coefficients, periodic extension. Fourier series for odd and even functions. Problem of convergence. Drichlet 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%

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 Final Theory Examination (2 hours) 60%

Examination:	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, ELECTOMAGNETIC 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

PHYS2400 – MATHEMATICAL METHODS IN PHYSICS I (3 Credits)

Pre-requisite: MATH1190 Calculus A,
MATH1195 Calculus B.

Objectives: Fundamentals of applied mathematics used in advanced physics and engineering courses.

Syllabus: Taylor series, Maclaurin series, ratio test for convergence, interval of convergence, geometric series, telescoping series. Complex numbers, complex roots, complex elementary functions, Euler's formula. Equations of lines and planes in three dimensional space, vectors, linear functions, diagonalization of matrices, eigenvectors and eigenvalues. Partial derivatives, total differentials, chain rule for functions of two or more independent variables, change of variables for two or more independent variables, Leibniz's rule, Lagrange multipliers. Cartesian, cylindrical and spherical coordinate systems, double and triple integrals, surface integrals, Jacobians. First order differential equations, separation of variables, integrating factor, exact differential equations, using Newton's second law to formulate differential equations.

Teaching: Two (2) one-hour lectures, one (1) hour of tutorial per week.

Method of	Final Theory Examination (2 hours)	60%
Examination:	In-class Tests/Assignments	40%

PHYS2405 – MATHEMATICAL METHODS IN PHYSICS II (3 Credits)

Pre-requisite: PHYS2400 Mathematical Methods in Physics I.

Objectives: Fundamentals of applied mathematics used in advanced physics and engineering courses (continuation from PHYS2400 Mathematical Methods in Physics I).

Syllabus: Vector fields, derivatives of vector fields and functions, directional derivatives, gradient, divergence and curl. Vector identities with div grad and curl. Line integrals, surface integrals, Green's theorem, divergence theorem, Stokes' theorem. Periodic functions, Fourier series, complex Fourier coefficients, even and odd functions, Parseval's theorem, Fourier transforms. Ordinary differential equations and the Frobenius method, Laplace transforms, Dirac delta function, solving differential equations involving Dirac delta functions. Calculus of variations, Euler-Lagrange equation, Brachistochrone problem, Lagrange's form of mechanics. Wave equation, diffusion equation, Schrodinger's equation, Poisson's equation. Gamma functions, Legendre polynomials and Bessel functions.

Teaching: Two (2) one-hour lectures, one (1) hour of tutorial per week.

Method of	Final Theory Examination (2 hours)	60%
Examination:	In-class Tests/Assignments	40%

PHYS2410 – MODERN PHYSICS (3 Credits)

Pre-requisite: 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.

Objectives: Fundamentals of special relativity, quantum mechanics, atomic and nuclear physics.

Syllabus: Lorentz contraction, time dilation, Lorentz transformations, velocity addition, Doppler effect, relativistic energy and momentum. Photons, photoelectric effect, blackbody radiation, matter waves and the de Broglie relation. Wave-particle duality, Heisenberg uncertainty principle, Compton effect, Bohr model of the atom. Time-independent Schrodinger equation, infinite potential well in one dimension, finite potential wells with bound and scattering states, quantum tunneling, hydrogen atom, electron spin and the Stern-Gerlach experiment, magnetic resonance, lasers. Conductors, insulators and semiconductors. Doped semiconductors, p-n junctions, diodes, light-emitting diodes and transistors. Radioactive decay, radioactive dating, nuclear fission, nuclear reactors, thermo-nuclear fusion and the evolution of stars.

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

Method of	Final Theory Examination (2 hours)	60%
Examination:	In-class Tests/Assignments	40%

PHYS2415– THEORY OF CLASSICAL MECHANICS (3 Credits)

Pre-requisite: 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.

Objectives: Fundamentals of classical mechanics treated with differential equations.

Syllabus: Newton's laws of motion in one dimension, constant forces, position dependent forces, work-energy theorem, potential energy, turning points, velocity dependent forces, drag and terminal velocity. Full treatment of the simple harmonic oscillator, energy, damped harmonic motion, phase space, underdamped, overdamped and critically damped oscillator, driven damped harmonic oscillator and resonance. Displacement, velocity and acceleration in two and three dimensions, potential energy in three-dimensional motion, separable forces, projectile motion with drag, harmonic oscillator in two and three dimensions, motion of charged particles in electric and magnetic fields, constrained motion of a particle. Accelerated coordinate systems and inertial forces, rotating coordinate systems, dynamics of particles in rotating systems, effects of Earth's rotation and Foucault pendulum. Gravity and central forces, orbit equation, effective potential, stability of orbits. Center of mass, linear momentum, angular momentum and kinetic energy of a system of particles, motion of two interacting bodies and reduced mass.

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

Method of	Final Theory Examination (2 hours)	60%
Examination:	In-class Tests/Assignments	40%

PHYS2420 – ADVANCED PHYSICS LABORATORY I (3 Credits)

Pre-requisite: 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.

Objectives: Practical experience in conducting experiments, troubleshooting apparatus, data analysis, error analysis, writing proper laboratory reports, background research for experiments.

Syllabus: Several experiments performed, researched and written in a standard report format as outlined during the first four weeks of class. Mean and standard deviation, error analysis, method of least squares (to be examined in an in-class test). Examples of experiments: Millikan oil drop experiment,

electron diffraction, photoelectric effect, Michaelson interferometer, electron spin resonance, rotational motion and moment of inertia, Cavendish experiment (measurement of gravitational constant), hydrogen fuel cell, coupled oscillators, heat engine and ideal gas laws, Faraday rotation of polarized waves, magnetic force.

Teaching: Six (6) hours of laboratory per week. Lectures (proper writing of laboratory reports, data analysis and uncertainty analysis) during first four weeks embedded within the six hours of laboratory.

Method of	Written Laboratory Reports	70%	
Examination:	In-class Test	10%	
	Oral Presentation		20%

PHYS2425 – COMPUTATIONAL METHODS IN PHYSICS (3 Credits)

Pre-requisite: 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.

Objectives: Practical introduction to numerical analysis and computer simulation of physical problems.

Syllabus: Algorithms, pseudocode and flowcharts, programming syntax in a standard high level language (e.g. C, C++, FORTRAN), structural programming, basic UNIX commands, Monte Carlo simulation with pseudorandom numbers, roots, quadrature, Euler method for numerical solution of differential equations, Fourier methods, concepts in computer modelling.

Teaching: One (1) one-hour lecture and four (4) hours of practical per week.

Method of	Final Theory Examination (2 hours)	40%	
Examination:	In-class Tests	20%	
	Practical Assignments		40%

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.

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 galvomagnetic 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%

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, isotrophic 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 Canocial and grand canocial 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

METE1110 - INTRODUCTION TO OCEANS AND CLIMATE (3 Credits)

Pre-requisites: None

Restriction: Not to be taken with ERSC1002 Oceans and Climate

Co-requisites: METE1000: Introduction to Physical Meteorology and Weather Observations (or 3 credit equivalent)
METE1130: Introduction to Dynamic Meteorology (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 practical per week.

Method of Examination:

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

METE1125 – METEOROLOGICAL OBSERVATIONS, INSTRUMENTS & BASIC ANALYSIS (3 Credits)

Co-requisites: None

Syllabus: This course is a yearlong 3-credit course in the practical aspects of meteorology. Topics to be covered include weather observations hands on approach to producing accurate weather observations, identifying weather symbols and the use of surface and upper air plotting models., use and maintenance of weather instruments; Use and interpretation of thermodynamic charts, scalar analysis, surface chart analysis, graphical subtraction and addition using analysis, calculation of geostrophic, gradient and thermal winds, frontal analysis, upper air analysis and analysis using current software packages.

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

Method of Examination:

Coursework:	100%
Laboratory Exercises :	50%
Test:	50%

METE1135 – INTRODUCTION TO DYNAMIC METEOROLOGY (3 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.

Teaching: Two (2) lectures, and one (1) tutorial of practical per week.

Method of Examination:

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

METE1130 – INTRODUCTION TO PHYSICAL METEOROLOGY (3 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, and one (1) tutorial hour per week.

Method of Examination:

Final Theory Examination (2 hours)	70%
In-course Tests/Assignments	30%

METE1305 – INTRODUCTION TO CLIMATE CHANGE AND SOCIETY (3 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. Global climate change with particular reference to the Caribbean region; the influence of climate change on biodiversity, livelihoods, population displacement, energy, food security, health and economic activity, global climate change policies and initiatives and the Caribbean region's evolving adaptation to climate change strategy.

Teaching: Two (2) 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; diurnal, intra- and inter-seasonal, 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%