THE UNIVERSITY OF THE WEST INDIES

CAVE HILL CAMPUS

FACULTY OF SCIENCE AND TECHNOLOGY

2018 - 2019

HANDBOOK

2048

EMBRACE YOUR INNER NERD

Department of Biological and Chemical Sciences

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.

Table of Contents

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 of 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)***
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Secretary	Shana Odle (LCCI) 417-4310

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I.T Technician	
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:	***Patrick McConney*** ***BSc. (Bangor), M. ES. (Dalhousie),*** ***PhD (UBC)*** ***417-4725***
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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)
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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Senior Marine Technician	Renata Goodridge BSc (Calgary), MSc (UWI) 417-4726
Senior IT Technician	Dale Benskin BSc (UWI) 417-4313

DEPARTMENT OF BIOLOGICAL AND CHEMICAL SCIENCES

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BSc, PhD (UWI)

Administrative Assistant — Shirley Jones
417-4323

Stenographer/Clerk — Cynthia Spooner
417-4574

Stenographer/Clerk — Toni Russell
417-4324

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	Yvonne Vallès BSc (Oviedo), MSc (San Francisco State) PhD (UC Berkeley). 417 4331
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
Senior Lecturer	Srinivasa Popuri BSc (Nagarjuna), MSc (DAVV), PhD (SVU) 417-4340
Senior Lecturer	Avril Williams BSc, PhD (UWI) 417-4342
Lecturer	Jeanese Badenock BSc (UWI), PhD (Dartmouth) 417-4336
Lecturer	Leah Garner-O'Neale BSc, PhD (UWI) 417-4343
Lecturer	Emma Smith BSc (Liverpool), MSc (Heriot-Watt), PhD (Plymouth) 417-4838

ENVIRONMENTAL SCIENCE

Lecturer	Casey Allen BSc (Utah), MSc (Utah), PhD (Arizona) 417-4321
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

Lecturer	Adrian Als BSc, MPhil (UWI), PhD (Sheffield Hallam) 417-4793

Lecturer	John Charlery BSc (UWI), Dip. Trop. Met. (Miami) Adv. Dip. (Comp. Sci), MPhil, PhD (UWI) 417-4363
Lecturer	Dwaine Clarke SB, MEng, PhD (MIT) 417-4333
Senior Lecturer	Colin Depradine BEng. (UCL), MSc (ICL), PhD (UWI) 417-4375
Lecturer	Thomas Edward BSc, PhD (UWI) 417-4792
Lecturer	Jeffery Elcock BSc (UWI), MSc. (Oxon.) Ph.D. (UWI) 417-4380
Lecturer	Curtis Gittens BSc (UWI), MSc, PhD (W.Ont.) 417-4473
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
Senior Lecturer	Peter Chami BSc, PhD (UWI) 417-4369
Lecturer	Jonad Pulaj BSc (UNC), PhD (TU Berlin) 417-4383
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	Carlos Hunte BSc, MPhil., PhD (UWI) 417-4382
Senior Lecturer	Janak Sodha BSc, MSc, PhD (Manch.) 417-4573
Lecturer	Sujit Bag B.Tech. (IIT Kharagpur), PhD (Leic.) 417-4851
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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Director	David Farrell BSc (W. Ont.), MSc, PhD (Manitoba) 425-1367
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Lecturer	Shawn Boyce BSc (UWI), MSc (Newcastle) 425-1362

Lecturer	Kathy-Ann Caesar BSc (SUNY) MSc (Texas A & M) 425-1362
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), PhD (UWI) 425-1362
Lecturer	Andrea Sealy BSc (Jackson State), MSc (Penn. State), PhD (Howard) 425-1362
Lecturer	Cédric Van Meerbeeck MSc (Ghent), PhD (Amsterdam) 425-1362
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 Dale Webber - Mona
BSc *UWI*, PhD *UWI*

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

Mr. Jefferson Cumberbatch – Cave Hill
LL.B *UWI*; Leg Ed Cert

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	417-4119
Administrative Assistant	Mrs. Deborah Knight	417-4122
Administrative Assistant (Ag.)	Mrs. Carol Jordan BSc, MSc	417-4862
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 (Transcripts & Academic Records)	Ms. Esther Layne, BSc	417-4142

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 required to apply on-line at www.cavehill.uwi.edu/apply.

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
Environmental Science	Two science subjects relevant to course of study
Chemistry [1]	Chemistry & another subject
Computer Science [1]	Mathematics & another subject
Information Technology (IT)	Mathematics & another subject
Mathematics [1]	Pure Mathematics & another subject
Electronics	Mathematics & Physics
Physics	Mathematics & Physics
Meteorology	Mathematics & Physics
BSc Options [2]	
Computer Science (or IT) & Accounting	Mathematics & another subject
Computer Science (or IT) & Management	Mathematics & another subject
Mathematics & Economics	Pure Mathematics & another subject
Mathematics & Accounting	Pure 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.

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 ***12*** 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.

INDEX TO THE REGULATIONS

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 *
Ecology *
Electronics *
Environmental Biology
Environmental Science*
Experimental Biology
Environmental Science
Food Chemistry
Geology
Information Technology *
Mathematics *
Meteorology *
Microbiology *
Molecular Biology
Physics *
Zoology

* Offered at Cave Hill

APPENDIX III

FOUNDATION COURSES

FOUN 0100 – Fundamentals of Written English
[1]FOUN 1001 – Exposition for Academic Purposes
[1]FOUN 1008 – An Introduction to Professional Writing
*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 EXPOSITION FOR ACADEMIC PURPOSES (3 Credits)

This course is designed to: (1) 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; (2) familiarize them with the linguistic situation in the Caribbean and break down common misconceptions they usually have about it; (3) introduce students to the rhetorical modes of discourse; and (4) develop skill in critical thinking and reading.

(Cannot be taken with FOUN1008)

FOUN 1008 AN INTRODUCTION TO PROFESSIONAL WRITING (3 Credits)

This course is designed to help students develop skills common to all professional, workplace-oriented writing, whether in business or science.

(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

BSc COMPUTER SCIENCE AND ACCOUNTING

LEVEL I (33 Credits)

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

LEVELS II & III (60 CREDITS)

LEVEL II (27 Credits)

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
MGMT2023 Financial Management I

AND Six (6) Credits from Level II Accounting Courses

LEVEL III (15 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems 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 Computer Science Elective Courses

AND Six (6) Credits from Level III Accounting Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE WITH ACCOUNTING

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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 (60 CREDITS)

LEVEL II (24 Credits)

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 (15 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems 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 *Computer Science Elective Courses

***AND* Fifteen (15) Level II/III Credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE AND ECONOMICS

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

MATH1230 Introductory Applied Statistics 1

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

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 (12 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

ECON3049 Econometrics I

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Four Level II/III ECON courses (12 Credits)

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE WITH ECONOMICS

LEVEL I (24 Credits)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

MATH1230 Introductory Applied Statistics 1

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

LEVELS II & III (60 CREDITS)

LEVEL II (27 Credits)

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 (3 Credits)

LEVEL III (9 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular Course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE AND MANAGEMENT

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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

LEVELS II & III (60 CREDITS)

LEVEL II (33 Credits)

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 (12 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

MGMT3017 Human Resources Management

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Nine (9) Credits from LEVEL III Management Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE WITH MANAGEMENT

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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 (60 CREDITS)

LEVEL II (27 Credits)

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 (12 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

MGMT3017 Human Resources Management

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY AND ACCOUNTING

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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/III (60 CREDITS)

LEVEL II (27 Credits)

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

MGMT2023 Financial Management I

AND Six (6) Credits from Level II Accounting Courses

LEVEL III (15 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

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 Information Technology Elective Courses

AND Six (6) Credits from Level III Accounting Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY WITH ACCOUNTING

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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/III (60 CREDITS)

LEVEL II (24 Credits)

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

LEVEL III (15 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

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 Information Technology Elective Courses

***AND* Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY AND ECONOMICS

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

MATH1230 Introductory Applied Statistics 1

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

LEVEL II/III (60 CREDITS

LEVEL II (30 Credits)

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 (12 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

ECON3049 Econometrics I

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND Four Level II/III ECON courses (12 Credits)

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY WITH ECONOMICS

LEVEL I (24 CREDITS)

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

LEVEL II/III (60 CREDITS

LEVEL II (27 Credits)

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 (3 Credits)**

LEVEL III (9 Credits)

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design

AND* at least Six (6) Credits (including at least one Level III course) from *Information Technology Elective Courses

***AND* Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY AND MANAGEMENT

LEVEL I (33 CREDITS)

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

LEVELS II/III (60 CREDITS)

LEVEL II (33 Credits)

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 (12 Credits)

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design
MGMT3017 Human Resources Management

AND* at least Six (6) Credits (including at least one Level III course) from *Information Technology Elective Courses

***AND* Nine (9) Credits from Level III Management Courses**

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY WITH MANAGEMENT

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
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 (60 CREDITS)

LEVEL II (27 Credits)

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 (12 Credits)

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design
MGMT3017 Human Resources Management

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS AND ACCOUNTING

LEVEL I (33 CREDITS)

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

LEVELS II/III (60 CREDITS)

LEVEL II (24 Credits)

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 (21 Credits)

ACCT2017 Management Accounting I

ACCT3043 Auditing I

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND 3 Credits from Level III Mathematics Elective Courses

AND Six (6) Credits From Level III Accounting Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS WITH ACCOUNTING

LEVEL I (33 CREDITS)

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

LEVELS II/III (60 CREDITS)

LEVEL II (24 Credits)

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 (18 Credits)

ACCT3043 Auditing I

AND Either

ACCT3040 Accounting Theory

OR

ACCT3041 Advance Financial Accounting

MATH3543 Abstract Algebra II
MATH3545 Linear Algebra II
MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND Three (3) Credits from Level III Mathematics Elective Courses

AND Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS AND ECONOMICS

LEVEL I (24 CREDITS)

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

LEVELS II/III (60 CREDITS)

LEVEL II (30 Credits)

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 (15 Credits)

ECON3049 Econometrics I

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND* Three (3) Credits from Level III *Mathematics Elective Courses

***AND* Four Level II/III ECON courses (12 Credits)**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS WITH ECONOMICS

LEVEL I (24 CREDITS)

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

LEVELS II/III (60 CREDITS)

LEVEL II (30 Credits)

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 (3 Credits)**

LEVEL III (12 Credits)

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

***AND* Three (3) Credits from Level III Mathematics Elective Courses**

***AND* Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

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

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

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

AND

MKTG2001 Principles of Marketing

MGMT2006 Management Info. Systems I

MGMT2008 Organizational Behaviour

MGMT2023 Financial Management I

MGMT3017 Human Resources Management

***AND* Fifteen (15) Level II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

The following Science Majors are currently being offered with a Major/Minor in Management

BSc CHEMISTRY AND MANAGEMENT

LEVEL I (36 CREDITS)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry
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 (60 CREDITS)

LEVEL II (36 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
MKTG2001 Principles of Marketing
MGMT2006 Management Info. Systems I
MGMT2008 Organizational Behaviour
MGMT2020 Managerial Economics
MGMT2023 Financial Management I
MGMT2026 Production & Operations Management

LEVEL III (6 Credits)

CHEM3625 Laboratory Methods in Chemistry III
MGMT3017 Human Resources Management

<u>AND</u> 6 Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

<u>AND</u> 3 Credits from:

CHEM3630 Methods in Instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

<u>AND</u> Nine (9) Credits from Level III Management Courses

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
<u>OR</u>
FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

BSc CHEMISTRY WITH MANAGEMENT

LEVEL I (36 CREDITS)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry
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 (60 CREDITS)

LEVEL II (30 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
MKTG2001 Principles of Marketing
MGMT2006 Management Information Systems I
MGMT2008 Organizational Behaviour
MGMT2023 Financial Management I

LEVEL III (6 Credits)

CHEM3625 Laboratory Methods in Chemistry III
MGMT3017 Human Resources Management

AND 6 Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND 3 Credits from:

CHEM3630 Methods in Instrumental Analysis
CHEM218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc METEOROLOGY AND MANAGEMENT

LEVEL I (42 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

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

AND

6 Level I Credits from any Faculty

LEVELS II & III (63 CREDITS)

LEVEL II (35 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

MKTG2001 Principles of Marketing

MGMT2006 Management Info. Systems I

MGMT2008 Organizational Behaviour

MGMT2020 Managerial Economics

MGMT2023 Financial Management I

MGMT2026 Production & Operations Management

LEVEL III (15 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

MGMT3017 Human Resources Management

AND at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

AND Nine (9) Credits from LEVEL III Management Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

#4 Credit Courses

BSc METEOROLOGY WITH MANAGEMENT

LEVEL I (42 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

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 (60 CREDITS)

LEVEL II (29 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

MKTG2001 Principles of Marketing

MGMT2006 Management Info. Systems I

MGMT2008 Organizational Behaviour

MGMT2023 Financial Management I

LEVEL III (15 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

MGMT3017 Human Resources Management

<u>AND</u> at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

<u>AND</u> Twelve (12) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

#4 Credit Courses

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 93 credits.

SCIENCE AND PSYCHOLOGY

LEVEL I

Required Level I Courses for Science Major 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 9 CREDITS: FOUNDATION COURSES
FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

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

Required Level I Courses for Science Major plus

PSYC1003 Introduction to Psychology
PSYC1004 Introduction to Social Psychology
PSYC1013 Introduction to Research Methods In Psychology

AND
3 Level I Credits from any Faculty**

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
PSYC2012 Developmental Psychology
PSYC2014 Statistics And Research Design II
PSYC3016 Research Paper in Psychology [Minor] (3 Credits)

AND Twelve (12) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES
FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND
*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

**If needed to satisfy the Level I requirement.

SCIENCE WITH SPANISH

LEVEL I

Required Level I Courses for Science Major plus

SPAN1001 Spanish Language IA

SPAN1002 Spanish Language IB

AND 3 or 6 Level I credits from any Faculty**

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 Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

**As required to satisfy the Level I requirement.

SCIENCE WITH EDUCATION

LEVEL I

Required Level I Courses for Science Major plus

EDPS1001 Introduction to Human Development

<u>AND</u> 6 or 9 Level I credits from any Faculty**

LEVELS II & III

Thirty (30) credits of required Level II/III Courses for Science Major

<u>PLUS</u>

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice
EDRS2201 Introduction to Research Methods in Education
EDSO3102 The Social Context of Education

<u>AND</u> One of the following:

EDMA2111 The Structure and Nature of Mathematics
EDSC2110 The Structure and Nature of Science

<u>AND</u> 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

<u>AND</u> Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
<u>OR</u>
FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

**As required to satisfy the Level I requirement.

The following Science Majors are currently being offered with a Major/Minor in Education, Psychology and Spanish:

BSc BIOLOGY WITH EDUCATION

LEVEL I (24 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

EDPS1001 Introduction to Human Development

AND 9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (12 Credits):

BIOC2371 Molecular Techniques

BIOL2373 Skills for Biologists

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

AND 3 Credits from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

AND Two courses (6 Credits) from:

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

AND Two courses (6 Credits) from:

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

AND Six (6) Credits from Biological Science Electives Courses:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

LEVEL III (3 Credits)

EDSO3102 The Social Context of Education

AND Six (6) Credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses [1]

AND 3 Credits from:

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 Fifteen (15) Levels II and III Credits from any Faculty. Three (3) of these Credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc BIOLOGY AND PSYCHOLOGY

LEVEL I (27 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

PSYC1003 Introduction to Psychology

PSYC1004 Introduction to Social Psychology

PSYC1012 Introduction to Developmental Psychology

PSYC1013 Intro. to Research Methods In Psychology

PSYC1015 Historical Issues in Psychology

LEVELS II & III (60 CREDITS)

LEVEL II (24 Credits):

BIOC2371 Molecular Techniques

BIOL2373 Skills for Biologists

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

AND Two courses (6 Credits) from:

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

AND Two courses (6 Credits) from:

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

AND Six (6) Credits from Biological Sciences Elective Courses:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

LEVEL III (12 Credits)

PSYC3017 Personality Theory II

PSYC3030 Introduction to Clinical Psychology

PSYC3011 Research Paper In Psychology** ***(6 credits)***

AND Six (6) credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc BIOLOGY WITH PSYCHOLOGY

LEVEL I (24 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

PSYC1003 Introduction to Psychology

PSYC1004 Introduction to Social Psychology

PSYC1013 Introduction to Research Methods In Psychology

AND 3 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

***LEVEL II* (18 Credits):**

BIOC2371 Molecular Techniques

BIOL2373 Skills for Biologists

PSYC2003 Physiological Psychology

PSYC2004 Personality Theory I

PSYC2012 Developmental Psychology

PSYC2014 Statistics And Research Design II

AND Two courses (6 Credits) from:

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

AND Two courses (6 Credits) from:

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

AND Six (6) Credits from Biological Sciences Elective Courses:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

LEVEL III (3 Credits)

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

AND Six (6) credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc CHEMISTRY WITH EDUCATION

LEVEL I (24 CREDITS)

CHEM1110 Introduction to Organic Chemistry

CHEM1120 Introduction to Physical Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1130 Introduction to Inorganic Chemistry

EDPS1001 Introduction to Human Development

AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (24 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

EDCU2101 Intro. to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

***AND* 3 Credits (one course) from:**

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (6 Credits)

CHEM3625 Laboratory Methods in Chemistry III

EDSO3102 The Social Context of Education

***AND* 6 Credits (two courses) from:**

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

***AND* 3 Credits (one course) from:**

CHEM3630 Methods in instrumental Analysis

CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

***AND* 3 Credits (one course) from:**

EDPH2016 Philosophy of Education

EDME2211 Testing, Measurement & Evaluation I

EDEA2304 Intro. to Educational Administration

EDSE2924 Introduction to Special Education

EDTK3304 Media & Technology in Education

EDTE3404 Issues in Teacher Education

***AND* Fifteen (15) Levels II and III credits (five courses) from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc CHEMISTRY AND PSYCHOLOGY

LEVEL I (27 CREDITS)

CHEM1110 Introduction to Organic Chemistry
CHEM1120 Introduction to Physical Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1130 Introduction to Inorganic Chemistry
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 (60 CREDITS)

LEVEL II (36 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
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

LEVEL III (15 Credits)

CHEM3625 Laboratory Methods in Chemistry III
PSYC3017 Personality Theory II
PSYC3030 Introduction to Clinical Psychology
PSYC3011 Research Paper In Psychology ***(6 credits)***

AND 6 Credits (two courses) from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND 3 Credits (one course)from:

CHEM3630 Methods in instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

AND 9 CREDITS*: *FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc CHEMISTRY WITH PSYCHOLOGY

LEVEL I (24 CREDITS)

CHEM1110 Introduction to Organic Chemistry

CHEM1120 Introduction to Physical Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1130 Introduction to Inorganic Chemistry

PSYC1003 Introduction to Psychology

PSYC1004 Introduction to Social Psychology

PSYC1013 Introduction to Research Methods In Psychology

AND 3 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (30 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

PSYC2003 Physiological Psychology

PSYC2004 Personality Theory I

PSYC2012 Developmental Psychology

PSYC2014 Statistics And Research Design II

LEVEL III (6 Credits)

CHEM3625 Laboratory Methods in Chemistry III

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

AND 6 Credits (two courses) from:

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

AND 3 Credits (one course) from:

CHEM3630 Methods in instrumental Analysis

CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE WITH EDUCATION

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

EDPS1001 Introduction to Human Development

<u>AND</u>

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

COMP2210 Mathematics for Computer Science II

COMP2611 Data Structures

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

<u>AND</u> 3 Credits (one course) from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (12 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

EDSO3102 The Social Context of Education

<u>AND</u> at least Six (6) Credits (including at least one Level III course) from <u>Computer Science Elective Courses</u>

<u>AND</u> 3 Credits (one course) from:

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

<u>AND</u> Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

BSc ELECTRONICS WITH EDUCATION

LEVEL I (24 CREDITS)

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

ELET1205 Computer-Aided Design

MATH1190 Calculus A

EDPS1001 Introduction to Human Development

<u>AND</u>

3 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (6 Credits)

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

<u>AND</u> at Least Twelve (12) Credits from:

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation & Applications

ELET2225 Discrete Component Electronics

ELET2230 Digital Communication Systems I

ELET2235 Automation Technology & Applications

ELET2240 Sensors & Actuation Devices

PHYS2400 Mathematical Methods in Physics

<u>AND</u> 3 Credits (one course) from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (3 Credits)

EDSO3102 The Social Context of Education

<u>AND</u> at Most Eighteen (18) Credits from:

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

<u>AND</u> 3 Credits (one course) from:

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

<u>AND</u> Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

BSc INFORMATION TECHNOLOGY WITH EDUCATION

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

EDPS1001 Introduction to Human Development

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

COMP2611 Data Structures

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

AND 3 Credits from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (12 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

EDSO3102 The Social Context of Education

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND 3 Credits from:

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 Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS WITH EDUCATION

LEVEL I (24 CREDITS)

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

EDPS1001 Introduction to Human Development

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

AND 3 Credits from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (15 Credits)

EDSO3102 The Social Context of Education

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND 3 Credits from Mathematics Elective Courses

AND 3 Credits from:

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 Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc METEOROLOGY WITH EDUCATION

LEVEL I (24 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

EDPS1001 Introduction to Human Development

AND

3 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (23 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

AND 3 Credits (one course) from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (15 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

EDSO3102 The Social Context of Education

AND at LEAST Four (4) Credits from: ELECTIVES:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

AND 3 Credits (one course) from:

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 Twelve (12 Credits) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

#4 Credit Courses

BSc PHYSICS WITH EDUCATION

LEVEL I (24 CREDITS)

PHYS1200 Physics I: Mechanics of Transitional Motion

PHYS1205 Physics II: Rotation, Waves and Thermodynamics

PHYS1210 Physics III: Electric Fields, Currents and Circuits

MATH1190 Calculus A

MATH1195 Calculus B

EDPS1001 Introduction to Human Development

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

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

EDCU2101 Introduction to Curriculum, Theory, Planning & Practice

EDRS2201 Introduction to Research Methods in Education

AND 3 Credits from:

EDMA2111 The Structure and Nature of Mathematics

EDSC2110 The Structure and Nature of Science

LEVEL III (12 Credits)

PHYS3420 Electromagnetic Theory I

PHYS3480 Theory of Quantum Mechanics

PHYS3485 Theory of Statistical Mechanics

EDSO3102 The Social Context of Education

AND at least Six (6) Credits (two courses) from Physics Elective Courses:

AND 3 Credits from:

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 Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

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

CHEM2513 Fundamentals of Teaching Chemistry

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

ENSC3020 Case Study in Environmental Science
MICR3266 Ecology of Microorganisms

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

MICR3266 Ecology of Microorganisms

MICR3268 Microbial Pathogenesis

CHEM3167 Advanced Inorganic Chemistry

CHEM3620 Advanced Physical Chemistry

CHEM3625 Laboratory Methods in Chemistry III

CHEM3630 Methods in Instrumental Analysis

CHEM3950 Basic Project in Chemistry

ENSC3000 Climate Variation and Change

ENSC3020 Case Study in Environmental Science

MICR3265 Microbiology of Food

MICR3267 Essential Virology

CHEM3175 Advanced Organic Chemistry

CHEM3625 Laboratory Methods in Chemistry III

CHEM3635 Biological Inorganic Chemistry

CHEM3800 Nanostructures and Supramolecular Chemistry

CHEM3950 Basic Project in Chemistry

CHEM3992 Special Topics in Physical Chemistry

ENSC3001 Natural Hazards and Disasters

YEAR-LONG COURSES

CHEM 3955 Research Project in Chemistry

BIOC3990 Biochemistry Project

BIOL3990 Biology Project

ECOL3990 Ecology Project

MICR3990 Microbiology Project

ENSC3900 Research Project in Environmental Science

SUMMER COURSES

BIOL2465 Tropical Horticulture

CHEM3990 Professional Placement for Chemists

ENSC3020 Case Study 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 Major or 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

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
CHEM3635 Biological Inorganic Chemistry

[1]This course is offered in both semesters but it is recommended that Biochemistry Majors take 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

CHEM3635 Biological Inorganic 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

BIOLOGICAL SCIENCES ELECTIVE COURSES

Level II 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 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]This course is offered in both semesters but it is recommended that Biology Majors take 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 *Biological Sciences Elective Courses*:**

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

BIOC2371 Molecular Techniques must be replaced in the BIOL Minor by any BIOC/BIOL/ECOL/MICR 3-credit, level 2 or 3 course when the BIOL Minor is combined with a BIOC, ECOL or MICR Major.

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

<u>LEVELS II & III (60 credits)</u>

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

BIOLOGICAL SCIENCES ELECTIVE COURSES

Level II 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 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

[+]***This course is offered in both semesters but it is recommended that Ecology Majors take 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

MICR3265 Microbiology of Food

MICR3266 Ecology of Microorganisms

MICR3267 Essential Virology

MICR3268 Microbial Pathogenesis

MICR3990 Microbiology Project (6 credits)

[1]***This course is offered in both semesters but it is recommended that Microbiology Majors take 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 courses [Currently]:

MICR2261 Eukaryotic Microbes

MICR2262 Methods in Microbiology

MICR2900 Microbiology Exchange Elective

Level III courses [Currently]:

MICR3265 Microbiology of Food

MICR3266 Ecology of Microorganisms

MICR3267 Essential Virology

MICR3268 Microbial Pathogenesis

BIOL3025 Molecular Plant Pathology

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 (12 Credits)

CHEM3625 Laboratory Methods in Chemistry III

AND Six (6) Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND Three (3) Credits from:

CHEM3630 Methods in Instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology*

*Students wishing to pursue this elective should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

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 (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

CHEM3625 Laboratory Methods in Chemistry III

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

AND Thirty (30) credits from:

CHEM2725 Chemistry of the Environment

CHEM2513 Fundamentals of Teaching Chemistry

CHEM3635 Biological Inorganic Chemistry

CHEM3218 Environmental Chemistry and Toxicology

CHEM3630 Methods in Instrumental Analysis

CHEM3800 Nanostructures and Supramolecular Chemistry

CHEM 3955 Research Project in Chemistry (6 Credits)

CHEM3990 Professional Placement for Chemists

CHEM3992 Special Topics in Physical Chemistry

BIOC2365 Primary Metabolism ***OR*** ENSC2000 Essentials of Oceanography* ***OR*** ENSC2003 Sustainable Energy Systems

*Students wishing to pursue this elective should ensure that they have the relevant Level I prerequisite courses: METE1110 Introduction to Ocean and Climate OR ERSC1000 Earth and its Environment OR METE1200 Oceans and Climate.

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

OLD COURSE	***NEW COURSE***
CHEM1010 Fundamentals of 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
No Equivalent	CHEM2513 Fundamentals of Teaching Chemistry
CHEM3100 Inorganic Chemistry II	CHEM3167 Advanced Inorganic Chemistry
CHEM3200 Organic Chemistry II	CHEM3175 Advanced Organic Chemistry
CHEM3300 Physical Chemistry II	CHEM3620 Advanced Physical Chemistry
CHEM3135 Bioinorganic Chemistry	CHEM3635 Biological Inorganic Chemistry
CHEM3210 Bioorganic and Medicinal Chemistry	No Equivalent
CHEM3415 Analytical Chemistry III	CHEM3630 Methods in Instrumental Analysis
CHEM3500 Chemistry Project	CHEM3950 Basic Project in Chemistry
CHEM3505 Chemistry Research Project	CHEM3955 Research Project in Chemistry
No Equivalent	CHEM3218 Environmental Chemistry and Toxicology
No Equivalent	CHEM3800 Nanostructures and Supramolecular Chemistry
No Equivalent	CHEM3990 Professional Placement for Chemists
No Equivalent	CHEM3992 Special Topics in Physical Chemistry

ENVIRONMENTAL SCIENCE

The Department of Biological & Chemical Sciences offers a Single Major and Minor in Environmental Science. . Only the Biology, Ecology, Chemistry and Meteorology Major may be combined with the Environmental Science Major or Minor. Students wishing to combine Environmental Science 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 ENVIRONMENTAL SCIENCE: Course Descriptions

LEVEL I (6 Credits)

METE1110 Introduction to Oceans and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

LEVEL II

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System ENSC2002 Earth's Climate

AND 21 Credits from Environmental Science Electives Courses:

LEVEL II

ENSC2003 Sustainable Energy Systems

ECOL2461 Caribbean Island Biodiversity

ECOL2460 Essentials of Ecology

CHEM2725 Chemistry of the Environment*

Level III

ENSC3000 Climate Variation and Change

ENSC3001 Natural Hazards and Disasters

METE3500 Bioclimatology#

CHEM3218 Environmental Chemistry and Toxicology

PHIL3110 Environmental Ethics**

MDSC3003 Environmental Health**

LAW3450 Caribbean Environmental Law**

ENSC3020 Case Study in Environmental Science***

ENSC3900 Research Project in Environmental Science

*Requires CHEM1125 Introduction to Experimental Chemistry

** No Pre-Requisites

*** Could be run in Semesters I, II or Summer and need approval from Lecturer

#4 Credit Course

MINOR IN ENVIRONMENTAL SCIENCE: Course Descriptions

LEVEL I (6 Credits)

METE1110 Introduction to Oceans 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

PROGRAMME STRUCTURE

BIOLOGICAL SCIENCES; CHEMICAL SCIENCES; ENVIRONMENTAL SCIENCES

BSc BIOCHEMISTRY:

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

LEVELS II & III (60 CREDITS)

LEVEL II (12 Credits)

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

AND 3 Credits from:

BIOL2166 Advanced Genetics I
BIOC2370 Cell Signals

LEVEL III - (3 Credits)

BIOC3265 Principles of Bioinformatics

AND 12 Credits from:

BIOC2900 Biochemistry Exchange Elective
BIOC3370 Basis of Human Disease
BIOC3260 Principles of Biotechnology
BIOC3261 Mitochondrial Bioenergetics
BIOC3990 Biochemistry Project
BIOL3025 Molecular Plant Pathology
CHEM3635 Biological Inorganic Chemistry

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc BIOLOGY

LEVEL I (24 CREDITS)

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

AND 3 Level I Credits from FST Courses
AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

BOTH courses (6 Credits):

BIOC2371 Molecular Techniques
BIOL2373 Skills for Biologists

AND Two courses (6 Credits) from:

BIOC2365 Primary Metabolism
ECOL2460 Essentials of Ecology
MICR2260 Essential Microbiology

AND Two courses (6 Credits) from:

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

AND Six (6) Credits from Biological Sciences Elective Courses:

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

AND Six (6) credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society
*A student may substitute one of these with a Foreign Language course.

BSc DOUBLE MAJOR IN BIOLOGICAL SCIENCES

LEVEL I (24 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

AND 3 Level I Credits from FST Courses

AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (21 credits):

BIOC2365 Primary Metabolism

BIOC2371 Molecular Techniques

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

BIOL2373 Skills for Biologists

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

AND ONE of the following (6 Credits):

BIOC3990 Biochemistry Project

BIOL3990 Biology Project

ECOL3990 Ecology Project

MICR3990 Microbiology Project

BIOL3901 Multidisciplinary Project

AND 15 credits from Biological Sciences Elective Courses:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

AND 18 credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc ECOLOGY

LEVEL I (24 CREDITS)

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

AND 3 Level I Credits from FST Courses
AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (12 Credits)

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

AND Six (6) Credits from:

ECOL3461 Ecology of a Changing Planet
ECOL3100 Statistics for Ecologists

AND Twelve (12) Credits from:

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

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc MICROBIOLOGY

LEVEL I (24 CREDITS)

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

AND 3 Level I Credits from FST Courses
AND 9 Level I credits from any Faculty

LEVELS II and III (60 CREDITS)

LEVEL II (18 Credits)

BIOC2365 Primary Metabolism
BIOC2371 Molecular Techniques
BIOL2373 Skills for Biologists[1]
MICR2260 Essential Microbiology
MICR2261 Eukaryotic Microbes
MICR2262 Methods in Microbiology

LEVEL III

***AND* Twelve (12) Credits from:**

BIOL3025 Molecular Plant Pathology
MICR2900 Microbiology Exchange Elective**
MICR3265 Microbiology of Food
MICR3266 Ecology of Microorganisms
MICR3267 Essential Virology
MICR3268 Microbial Pathogenesis
MICR3990 Microbiology Project (6 credits)

***AND* Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

**Substitute Exchange Course

BSc CHEMISTRY

LEVEL I (24 CREDITS)

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

AND 3 Level I Credits from FST Courses
AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

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 (3 Credits)

CHEM3625 Laboratory Methods in Chemistry III

AND 6 Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND 3 Credits from:

CHEM3630 Methods in Instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology**

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc CHEMISTRY (DOUBLE)

LEVEL I (24 CREDITS)

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

AND 3 Level I Credits from FST Courses
AND 9 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

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 (12 Credits)

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry
CHEM3625 Laboratory Methods in Chemistry III

AND Thirty (30) credits from:

CHEM2513 Fundamentals of Teaching Chemistry
CHEM2725 Chemistry of the Environment
CHEM3630 Methods in Instrumental Analysis
CHEM3635 Biological Inorganic Chemistry
CHEM3218 Environmental Chemistry and Toxicology
CHEM3800 Nanostructures and Supramolecular Chemistry
CHEM3955 Research Project in Chemistry (6 cr)
CHEM3990 Professional Placement for Chemists**
CHEM3992 Special Topics in Physical Chemistry

BIOC2365 Primary Metabolism
OR ENSC2000 Essentials of Oceanography***
OR ENSC2003 Sustainable Energy Systems

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

**Offered in summer only.

***Students wishing to pursue this elective should ensure that they have the relevant Level I prerequisite courses:
METE1110 Introduction to Ocean and Climate
OR ERSC1000 Earth and its Environment
OR METE1200 Oceans and Climate

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 & III (60 CREDITS)

LEVEL II (30 Credits)

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

AND Three (3) Credits from:

BIOL2166 Advanced Genetics I
BIOC2370 Cell Signals

LEVEL III (12 Credits)

BIOC3265 Principles of Bioinformatics
CHEM3625 Laboratory Methods in Chemistry III

AND Six (6) Credits from:

CHEM3167 Advanced Inorganic Chemistry
CHEM3175 Advanced Organic Chemistry
CHEM3620 Advanced Physical Chemistry

AND Twelve (1)2 Credits from:

BIOC2900 Biochemistry Exchange Elective
BIOC3370 Basis of Human Disease
BIOC3260 Principles of Biotechnology
BIOC3261 Mitochondrial Bioenergetics
BIOC3990 Biochemistry Project
BIOL3025 Molecular Plant Pathology
CHEM3635 Biological Inorganic Chemistry

AND Three (3) Credits from:

CHEM3990 Methods in instrumental Analysis
CHEM3218 Environmental Chemistry and Toxicology**

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

BSc BIOLOGY AND CHEMISTRY

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

LEVELS II & III (60 CREDITS)

LEVEL II (24 Credits)

BIOC2371 Molecular Techniques

BIOL2373 Skills for Biologists

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

***AND* 6 Credits from:**

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

***AND* 6 Credits from:**

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

***AND* 6 Credits from Biological Sciences Elective Courses:**

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

LEVEL III (9 Credits)

CHEM3625 Laboratory Methods in Chemistry III

***AND* 6 Credits from:**

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

***AND* 6 Credits from Biological Sciences Elective Courses:**

Level III BIOC/BIOL/ECOL/MICR courses

***AND* 3 Credits from:**

CHEM3630 Methods in instrumental Analysis

CHEM3218 Environmental Chemistry and Toxicology**

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

BSc ENVIRONMENTAL SCIENCE

LEVEL I (24 CREDITS)

METE1110 Introduction to Oceans and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND 6 Level I Credits from FST Courses

AND 12 Level I credits from any Faculty

LEVELS II & III (60 CREDITS):

Level II (9 Credits)

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

AND ***21*** Credits from Environmental Science Electives Courses

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc BIOLOGY AND ENVIRONMENTAL SCIENCE

LEVEL I (24 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

METE1110 Introduction to Oceans and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND 6 Level I credits from any Faculty

LEVELS II & III (60 CREDITS)

Level II (15 Credits)

BIOC2371 Molecular Techniques

BIOL2373 Skills for Biologists

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

AND Two courses (6 Credits) from:

BIOC2365 Primary Metabolism

ECOL2460 Essentials of Ecology

MICR2260 Essential Microbiology

AND Two courses (6 Credits) from:

BIOL2166 Advanced Genetics I

BIOL2370 Flowering Plant Physiology

BIOL2371 Ecophysiology of Animals

AND Six (6) Credits from Biological Sciences Elective Courses:

Level II BIOC/BIOL/ECOL/MICR courses

Level III BIOC/BIOL/ECOL/MICR courses

AND 21 Credits from ***Environmental Science Elective Courses***

AND Six (6) credits from Biological Sciences Elective Courses:

Level III BIOC/BIOL/ECOL/MICR courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc CHEMISTRY AND ENVIRONMENTAL SCIENCE

LEVEL I (24 CREDITS)

CHEM1110 Introduction to Organic Chemistry

CHEM1120 Introduction to Physical Chemistry

CHEM1125 Introduction to Experimental Chemistry

CHEM1130 Introduction to Inorganic Chemistry

METE1110 Introduction to Oceans and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

Level II (27 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

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

LEVEL III (9 Credits)

CHEM3625 Laboratory Methods in Chemistry III

AND 6 Credits from:

CHEM3167 Advanced Inorganic Chemistry

CHEM3175 Advanced Organic Chemistry

CHEM3620 Advanced Physical Chemistry

AND 3 Credits from:

CHEM3990 Methods in instrumental Analysis

CHEM3218 Environmental Chemistry and Toxicology**

AND 21 Credits from Levels II/III Environmental Science Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

**Students wishing to pursue this course should ensure that they have the relevant Level II prerequisite course: CHEM2725 Chemistry of the Environment.

BSc ECOLOGY AND ENVIRONMENTAL SCIENCE

LEVEL I (24 CREDITS)

BIOC1015 Introduction to Biochemistry

BIOL1020 Diversity of Life I

BIOL1025 Diversity of Life II

BIOL1030 Introduction to Genetics

METE1110 Introduction to Oceans and Climate

OR

ENSC1000 Earth and its Environment

AND

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

Level II (21 Credits)

BIOL2373 Skills for Biologists

ECOL2460 Essentials of Ecology

ECOL2461 Caribbean Island Biodiversity

ECOL2462 Marine Biota

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

AND 21 Credits from Levels II/III Environmental Science Elective Courses

AND Six (6) Credits from:

ECOL3461 Ecology of a Changing Planet

ECOL3100 Statistics for Ecologists

AND Twelve (12) Credits from:

ECOL3460 Biology & Ecology of Coral Reefs

ECOL3463 Tropical Crop Ecology

ECOL3462 Behaviour: an Evolutionary Approach

ECOL3990 Ecology Project (6 credits)

AND/OR

MICR3266 Ecology of Microorganisms

BIOC2371 Molecular Techniques

BIOL2372 Plants for Caribbean Landscapes

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc ENVIRONMENTAL SCIENCE AND METEOROLOGY

LEVEL I (24 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

ENSC1001 Introduction to Physical Geology: Dynamic Earth

AND 3 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

Level II (26 Credits)

ENSC2000 Essentials of Oceanography

ENSC2001 Introduction to the Earth Life System

ENSC2002 Earth's Climate

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

LEVEL III (12 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

AND 21 Credits from Levels II/III Environmental Science Elective Courses

AND at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

#4 Credit Courses

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 SCIENCE 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 (2 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, ENSC3900 Research Project in Environmental Science 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%

BIOL3025 – MOLECULAR PLANT PATHOLOGY (3 Credits)

Pre-requisites: Any Level II BIOC, BIOL, ECOL or MICR course

Restrictions: Not to be taken with BIOL3254 Biochemical Plant Pathology,

Syllabus: This course presents an overview of plant diseases and their impact on agriculture. Emphasis is placed on diseases in tropical agriculture. Central themes in plant disease studies including pathogen infection strategies, molecular and biochemical interactions between pathogen and host, disease resistance, epidemiology, disease management, and molecular disease diagnostics are developed during the course.

Method of Examination:

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

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, ENSC3900 Research Project in Environmental Science 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: BIOL2373 Skills for Biologists AND 12 credits from Level II BIOC/BIOL/ECOL/MICR courses.

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, ENSC3900 Research Project in Environmental Science 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, ENSC3900 Research Project in Environmental Science 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, ENSC3900 Research Project in Environmental Science 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%
Laboratory 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%

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

CHEM2513 – FUNDAMENTALS OF TEACHING CHEMISTRY (3 credits)

Pre-requisite: CHEM1110 Introduction to Organic Chemistry
CHEM1130 Introduction to Inorganic Chemistry
CHEM1125 Introduction to Experimental Chemistry
CHEM1120 Introduction to Physical Chemistry

OR

CHEM1010 – Fundamentals of Chemistry AND CHEM1020 – Introductory Chemistry

Syllabus: This course seeks to expose Chemistry students, who are interested in becoming teachers, to the skills of teaching Chemistry/Science, how learning occurs as well as how to overcome some of the barriers to learning. In the process participants will further develop their critical thinking, analytical and communication skills. They will be exposed to best practice relating to scientific literacy, an inquiry based approach to Chemistry/Science as well as various teaching strategies to engage active and hence deep learning. Participants will also engage in lesson planning and microteaching.

Teaching: Three teaching hours per week.

Method of Examination:

Coursework	100%

CHEM2700 – INTERMEDIATE INORGANIC CHEMISTRY (3 Credits)

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

Chemistry

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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
OR
CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory Chemistry

Restriction: Not to be taken if student has passed CHEM3515 Environmental 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

OR

CHEM1010 Fundamentals of Chemistry ***AND*** CHEM1020 Introductory 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 (3 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

CHEM3167 – ADVANCED INORGANIC CHEMISTRY (3 Credits)

Prerequisites: CHEM2700 Intermediate Inorganic Chemistry or CHEM2100 Inorganic Chemistry I or CHEM2115 Main Group Chemistry and CHEM3115 Transition Metal Chemistry I

Restriction: Not to be taken if student has passed CHEM3100 Inorganic Chemistry II.

Syllabus: This final year inorganic chemistry course covers topics in the applications of group theory to problems in bonding and spectroscopy, the application of physical techniques used to study inorganic systems and the organometallic chemistry of main group and transition elements. It is directed at students at the advanced level of learning and will build on knowledge gained in the prerequisite course(s). It will provide students with a good foundation for graduate work in the fields of inorganic/metalloorganic and materials chemistry.

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%

CHEM3175 – ADVANCED ORGANIC CHEMISTRY (3 Credits)

Pre-requisites: CHEM2705 Intermediate Organic Chemistry or CHEM2200 Organic Chemistry I or CHEM2215 Basic Organic Chemistry

Restriction: Not to be taken if student has passed CHEM3200 Organic Chemistry II.

Syllabus: This level III course of 24 lecture hours and associated tutorials emphasizes the importance of organic reaction mechanisms, giving special emphasis to the techniques used in the elucidation of a reaction pathway. It is further supplemented by an investigation into the properties of key organic reaction intermediates, an introduction to the principles of synthetic strategy and retrosynthetic analysis, in addition to a presentation of the essential classes of pericyclic reactions. Case studies taken from synthetic journal articles will be used to highlight the utility of particular reactions in the synthesis of important natural products and drug targets.

Teaching: Two lectures and one tutorial per week.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3218 – ENVIRONMENTAL CHEMISTRY AND TOXICOLOGY (3 Credits)

Pre-requisites: CHEM2725 Chemistry of the Environment or CHEM3515 Environmental Chemistry

Syllabus: This course explores the analysis and impact of pollutants in the environment with a focus on their toxicological effects on organisms including man. Fundamental concepts in environmental chemistry and toxicology will be reviewed and applied to a variety of chemicals/environmental issues, such as toxic metals, persistent organic pollutants, emerging chemicals of concern, as well as environmental forensics.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3620 - ADVANCED PHYSICAL CHEMISTRY (3 Credits)

Pre-requisites: CHEM2710 Intermediate Physical Chemistry or CHEM2300 Physical Chemistry I or CHEM2315 Physical Chemistry II

Restriction: Not to be taken if student has passed CHEM3300 Physical Chemistry II.

Syllabus: This elective addresses topics in statistical thermodynamics, the thermodynamics of liquid surfaces, physical methods applied to molecular weight determination of polymers, and theoretical aspects of chemical kinetics and mechanisms. This course requires a solid foundation in basic mathematics, as well as calculus. The aim of this course is to build on the foundations laid by the first-year Introductory Physical Chemistry course and the second-year Intermediate Physical Chemistry course in order to deepen students' understanding of the behaviour of matter at the macroscopic level. It is an elective for students pursuing a Major in Chemistry. It is applicable to students who wish to enhance their understanding of physical chemistry.

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%

CHEM3625 – LABORATORY METHODS IN CHEMISTRY III (3 Credits)

Pre-requisites: CHEM2715 Laboratory Methods in Chemistry I or CHEM2010 Practical Chemistry I
CHEM2720 Laboratory Methods in Chemistry II or CHEM2020 Practical Chemistry II

Syllabus: This laboratory course is one in which final year students in Chemistry are exposed to concepts and techniques associated with, but not limited to Analytical, Bioinorganic, Bioorganic/Medicinal, Environmental, Inorganic, Organic, and Physical Chemistry. This course primarily seeks to further build on practical theory and techniques acquired during Level II and will equip students with advanced chemistry practical skills. It also seeks to reinforce the principles of laboratory safety that will place the students in good stead for graduate work or future careers. This laboratory experience provides opportunities for learners to develop their skills in making observations, taking measurements, designing experiments, communicating their data, results and conclusions, improving their scientific, information, numeracy and general literacy skills. The course comprises a series of experiments designed to illustrate important preparative reactions, characterization and analytical techniques.

Teaching: Six practical hours per week.

Method of Examination:

Coursework	100%

CHEM3630 – METHODS IN INSTRUMENTAL ANALYSIS (3 Credits)

Pre-requisites: CHEM2730 Quantitative Chemical Analysis or CHEM2400 Analytical Chemistry I

Restriction: Not to be taken if student has passed CHEM3415 Analytical Chemistry III.

Syllabus: This course focuses on the implementation of advanced instrumental techniques and their applications in analytical chemistry. It discusses the instrumental techniques and method development of analysis including chromatographic methods Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC), and electrophoresis. The operating principles and practices of some of the more chemically important instruments, such as FTIR and Mass spectrometers will also be discussed. Students will engage in problem-based activities that will help to develop their skills in the use and interpretation of statistical data using typical analytical methods: calibration curves, weighted and unweighted regression lines and ANOVA. Detailed descriptions of the electro-analytical techniques such as cyclic voltammetry and polarography are also included.

Teaching: Eighteen lecture hours, six tutorial hours and twenty-four laboratory hours per semester.

Method of Examination:

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

CHEM3635 – BIOLOGICAL INORGANIC CHEMISTRY (3 Credits)

Pre-requisites: CHEM2700 Intermediate Inorganic Chemistry or CHEM2100 Inorganic Chemistry I or CHEM2115 Main Group Chemistry and CHEM3115 Transition Metal Chemistry I

Restriction: Not to be taken if student has passed CHEM3135 Bioinorganic Chemistry.

Syllabus: This course is intended for final year chemistry and biochemistry students who wish to cement their knowledge regarding the chemistry of biological molecules. The course will provide students with a general overview of the many fundamental tasks performed by inorganic elements in living organisms as well as the related methods and theories. It focuses on the application of principles of inorganic chemistry to the understanding of biological function at the molecular level. Topics covered include spectroscopic methods in chemical biology, metal ion acquisition & speciation in biological systems, metalloenzymes in metabolism and synthesis, role of metals in diseased states and metal containing pharmaceuticals.

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%

CHEM3800 – NANOSTRUCTURES AND SUPRAMOLECULAR CHEMISTRY (3 Credits)

Pre-requisites: CHEM2700 Intermediate Inorganic Chemistry or CHEM2100 Inorganic Chemistry I
CHEM2705 Intermediate Organic Chemistry or CHEM2200 Organic Chemistry I

Syllabus: This course is intended for final year chemistry and biochemistry students and develops the concepts of supramolecular chemistry (both organic and metal-based systems) and its applications. The course will focus on the general basic and theoretical background of supramolecular chemistry concepts and terminology, and on key intermolecular interactions; supramolecular chemistry of living organisms illustrated using representative natural systems; analytical methods, utilized in supramolecular chemistry and concepts of supramolecular design.

Method of Examination:

Final Examination (2 hours)	50%
In-course test(s)/Assignment(s)	50%

CHEM3950 – BASIC PROJECT IN CHEMISTRY (3 Credits)

Pre-requisites: CHEM2700 Intermediate Inorganic Chemistry ***or*** CHEM2100 Inorganic Chemistry I
CHEM2705 Intermediate Organic Chemistry ***or*** CHEM2200 Organic Chemistry I
CHEM2710 Intermediate Physical Chemistry ***or*** CHEM2300 Physical Chemistry I
CHEM2730 Quantitative Chemical Analysis ***or*** CHEM2400 Analytical Chemistry I
CHEM2715 Laboratory Methods in Chemistry 1 ***or*** CHEM2010 Practical Chemistry I
CHEM2720 Laboratory Methods in Chemistry II ***or*** CHEM2020 Practical Chemistry II

Restrictions: For chemistry majors only or with permission of the Department. Not to be taken if student has passed CHEM3500 Chemistry Project. Not to be taken with CHEM3955 Research Project in Chemistry.

Syllabus: This course consists of a one-semester research project for students pursuing a Chemistry Major, carried out under the supervision of a member of staff. It is meant to provide the necessary training and skill development in the different areas of chemistry and comprises at least sixty six (66) hours of laboratory and/or computational work, and six (6) hours of orientation workshops, including library session (literature search), scientific report (word processing, Excel) and presentation (Power Point) preparation.

Method of Examination:

Supervisor's Assessment	30%
Seminar	15%
Project Report	55%

CHEM3955 - RESEARCH PROJECT IN CHEMISTRY (6 Credits)

Pre-requisites: CHEM2700 Intermediate Inorganic Chemistry ***or*** CHEM2100 Inorganic Chemistry I
CHEM2705 Intermediate Organic Chemistry ***or*** CHEM2200 Organic Chemistry I
CHEM2710 Intermediate Physical Chemistry ***or*** CHEM2300 Physical Chemistry I
CHEM2730 Quantitative Chemical Analysis ***or*** CHEM2400 Analytical Chemistry I
CHEM2715 Laboratory Methods in Chemistry I ***or*** CHEM2010 Practical Chemistry I
CHEM2720 Laboratory Methods in Chemistry II ***or*** CHEM2020 Practical Chemistry II

Restrictions: For Chemistry Double Majors only or with permission of the Department. Not to be taken if student has passed CHEM3505 Chemistry Research Project. Not to be taken with CHEM3950 Basic Project in Chemistry, BIOC3990 Biochemistry Project, BIOL3990 Biology Project, ECOL3990 Ecology Project, MICR3990 Microbiology Project or ENSC3900 Research Project in Environmental Science.

Description: This course consists of a yearlong research project for students pursuing a chemistry double major under the supervision of a member of staff. It is meant to provide the necessary training and skill development in the different areas of chemistry and comprises at least 138 hours of laboratory and/or computational work, and six (6) hours of orientation workshops, including library session (literature search), scientific report (word processing, Excel) and presentation (Power Point) preparation.

Method of Examination:

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

CHEM3990 – PROFESSIONAL PLACEMENT FOR CHEMISTS (3 Credits)

Pre-requisites: CHEM2700 Intermediate Inorganic Chemistry ***or*** CHEM2100 Inorganic Chemistry I
CHEM2705 Intermediate Organic Chemistry ***or*** CHEM2200 Organic Chemistry I
CHEM2710 Intermediate Physical Chemistry ***or*** CHEM2300 Physical Chemistry I
CHEM2730 Quantitative Chemical Analysis ***or*** CHEM2400 Analytical Chemistry I
CHEM2715 Laboratory Methods in Chemistry I ***or*** CHEM2010 Practical Chemistry I
CHEM2720 Laboratory Methods in Chemistry II ***or*** CHEM2020 Practical Chemistry II

Syllabus: The course provides a formal internship of at least 4 weeks (160 hours) duration at a private sector, public sector or non- Governmental organisation during which students undertake agreed upon activities relevant to his/her studies. They will work under the guidance of a workplace supervisor as well as an on- campus supervisor and will submit a report and make a presentation at the end of the internship. Through exposure to the working environment, students will acquire transferable skills that will be useful in any future employment sphere.

Method of Examination:

Placement Report	50%
Supervisor's Appraisal	35%
Oral Presentation	15%

CHEM3992 – SPECIAL TOPICS IN PHYSICAL CHEMISTRY (3 Credits)

Pre-requisites: CHEM2710 Intermediate Physical Chemistry or CHEM2300 Physical Chemistry I or CHEM2315 Physical Chemistry II

Restriction: Not to be taken if student has passed CHEM3300 Physical Chemistry II.

Syllabus: This course addresses topics in advanced spectroscopy and fundamental theoretical aspects of quantum mechanics, with a brief introduction to intermolecular forces. This course requires a solid foundation in basic mathematics, as well as the calculus. The aim of this course is to build on the foundations laid by the first-year Introductory Physical Chemistry course and the second-year Intermediate Physical Chemistry in order to deepen students' understanding of the behaviour of matter at the microscopic level. It is an elective for students pursuing a major in Chemistry. It is applicable to students who wish to enhance their understanding of the fundamental principles underlying much of Chemistry.

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%

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:

Assignment (s)	80%
In-course test	20%

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*** ENSC1000 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*** ENSC1000 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 ***OR*** ERSC2002 Climatology

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 ***OR*** ERSC2002 Climatology

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%

ENSC3020 CASE STUDY IN ENVIRONMENTAL SCIENCE (3 Credits)

Pre-requisites: The students must have completed at least 24 advanced credits (level 2/3) and projects will be awarded at the discretion of the supervisor.

Course Anti-requisite:

ENSC3900 Research Project in Environmental Science

Syllabus: This course provides an opportunity for students to take theoretical ideas learned and apply them directly to the world around them to raise awareness in environmental issues. It allows students to develop an idea, synthesise data and information, and develop this into a concept for dissemination. Students will be able to choose from but are not limited to the following options: 1. Primary Research, 2. Secondary Research, 3. Case Study Paper, 4. Service Learning Project, 5. Creative Project. Students are expected to spend a minimum of at least 36 hours of work on the project across a semester, meeting weekly with their supervisor(s). At the beginning of the course the students are expected to write a short proposal for their case study. At the end of the course students are required to provide a report summarising their study as well as an appropriate presentation (e.g. poster, power point, blog, video) to disseminate their work.

Teaching: The course is based on active learning. The student will independently gather information sources to develop the case study which will be kept in the form of a journal which will be assessed each week to ensure progress. Students will also be involved in weekly group meetings/discussions/tutorial sessions with their supervisor(s) who will guide them in the case study design, data collection/synthesis, and the analysis and interpretation of such data/information. Online content will provide the foundation of the course content which will be reinforced throughout weekly supervisor assessment of progress. A library session will be provided for students to assist them in developing their skills in searching online databases for relevant resources.

Method of Examination: The course will be assessed by means of 100% coursework as follows:

- Proposal 10%
- Concept Map 10%

- Project Report and Journal Assessment 40 %
- Presentation 20 %
- Supervisor Assessment 20%

ENSC3900 - RESEARCH PROJECT IN ENVIRONMENTAL SCIENCE (6 Credits)

Pre-requisites: A minimum of 6 credits from ENSC 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)

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

COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
MATH1152 Sets and Number Systems
MATH1190 Calculus A
MATH1195 Calculus B
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
ENSC2003 Sustainable Energy Systems
MATH2310 Abstract Algebra 1

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

LEVEL III (3 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I
COMP3360 Networks II
COMP3370 Software Engineering on a Large Scale
COMP3412 Scalable Enterprise Web Applications
COMP3420 Computer Graphics
COMP3440 E-Commerce
COMP3490 Research Project in Computer Science
COMP3495 Major Research Project in Computer Science*
COMP3499 Group Research Project in Computer Science

ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3235 Digital Communication Systems II
ELET3255 Wireless Communications
ELET3290 Semester Electronics Research Project
ELET3295 Major Electronics Research Project
ELET3298 Group Electronics Research Project
MATH3100 Multivariate Analysis
MATH3180 Introduction to Topology
MATH3190 Matrix Analysis
MATH3300 Research Project
MATH3375 Discrete & Computational Geometry
PHYS3420 Electromagnetic Theory I
PHYS3450 Fluid Mechanics
PHYS3455 Lasers and Optical Systems
PHYS3475 Fundamentals of Solid State Physics
PHYS3485 Theory of Statistical Mechanics
PHYS3490 Physics One-Semester Research Project

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 (3 Credits)

COMP3330 Database Management Systems I
COMP3365 Networks III
COMP3375 Software Testing and Quality
COMP3385 Framework Design For Advanced Web Development
COMP3415 Database Management Systems II
COMP3425 Mobile Applications for IOS Development
COMP3435 User-Interface Design
COMP3445 Computer Information Systems
COMP3450 Fundamentals of Artificial Intelligence
COMP3490 Research Project in Computer Science
COMP3499 Group Research Project in Computer Science

ELET3215 Microcontroller Technology
ELET3240 Digital Communication Systems III
ELET3250 Biomedical Instrumentation
ELET3260 Advanced Microprocessors & Systems
ELET3290 Semester Electronics Research Project
ELET3295 Major Electronics Research Project
ELET3298 Group Electronics Research Project
MATH3120 Numerical Analysis
MATH3140 Fourier Analysis & PDE
MATH3170 Advanced Algebra
MATH3300 Research Project
MATH3460 Statistical Theory II
PHYS3445 Fundamentals of General Relativity and Cosmology
PHYS3460 Physics of Sustainable Energy Systems
PHYS3465 Electromagnetic Theory II
PHYS3470 Biological Physics
PHYS3480 Theory of Quantum Mechanics

PHYS3495 Physics Two-Semester Research Project*	PHYS3490 Physics One-Semester Research Project PHYS3495 Physics Two-Semester Research Project*

6 Credits

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

METE2100 Dynamic Meteorology I

METE2110 Atmospheric Thermodynamics

METE2300 Hydrometeorology

LEVEL III

METE3100 Dynamic Meteorology II

METE3200 Synoptic Meteorology II

SEMESTER II

LEVEL I

METE1135 Introduction to Dynamic Meteorology

METE1125 Mete. Observations, Instruments & Basic Analysis

METE1305 Intro. To Climate Change and Society

LEVEL II

METE2120 Physical Meteorology

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

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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 (9 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2950 Computer Science Elective

COMP3360 Networks II

COMP3365 Networks III

COMP3450 Fundamentals of Artificial Intelligence

COMP3370 Software Engineering On A Large Scale

COMP3375 Software Testing and Quality

COMP3385 Framework Design For Advanced Web Development

COMP3412 Scalable Enterprise Web Applications

COMP3415 Database Management Systems II

COMP3420 Computer Graphics

COMP3425 Mobile Applications for iOS Devices

COMP3435 User Interface Design

COMP3440 E-Commerce

COMP3445 Computer Information Systems

COMP3490 Research Project in Computer Science

COMP3495 Major Research Project in Computer Science (6 Credits)

COMP3499 Group Research Project in Computer Science

MINOR IN COMPUTER SCIENCE *[Fifteen (15) Credits]:* Course Descriptions

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

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

AND at Most Six (6) Credits from Computer Science Elective Courses:

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2950 Computer Science Elective

COMP3360 Networks II

COMP3365 Networks III

COMP3450 Fundamentals of Artificial Intelligence

COMP3370 Software Engineering On A Large Scale

COMP3375 Software Testing and Quality

COMP3385 Framework Design For Advanced Web Development

COMP3412 Scalable Enterprise Web Applications

COMP3415 Database Management Systems II

COMP3420 Computer Graphics

COMP3425 Mobile Applications for iOS Devices

COMP3435 User Interface Design

COMP3440 E-Commerce

COMP3445 Computer Information Systems

COMP3490 Research Project in Computer Science

COMP3495 Major Research Project in Computer Science (6 Credits)

COMP3499 Group Research Project in Computer Science

MAJOR IN INFORMATION TECHNOLOGY: Course Descriptions

LEVEL I

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

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

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User-Interface Design

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses:

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2235 Networks I

COMP2245 Web Development Concepts, Tools and Practices

COMP2950 Computer Science Elective

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3360 Networks II

COMP3365 Networks III

COMP3450 Fundamentals of Artificial Intelligence

COMP3370 Software Engineering On A Large Scale

COMP3375 Software Testing and Quality

COMP3385 Framework Design For Advanced Web Development

COMP3412 Scalable Enterprise Web Applications

COMP3420 Computer Graphics

COMP3425 Mobile Applications for iOS Devices

COMP3440 E-Commerce

COMP3445 Computer Information Systems

COMP3490 Research Project in Computer Science

COMP3495 Major Research Project in Computer Science (6 Credits)

COMP3499 Group Research Project in Computer Science

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

COMP3330 Database Management Systems I

COMP3435 User Interface Design

COMP3415 Database Management Systems II

AND At Most Six (6) 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

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3360 Networks II

COMP3365 Networks III

COMP3450 Fundamentals of Artificial Intelligence

COMP3370 Software Engineering On A Large Scale

COMP3375 Software Testing and Quality

COMP3385 Framework Design For Advanced Web Development

COMP3412 Scalable Enterprise Web Applications

COMP3420 Computer Graphics

COMP3425 Mobile Applications for iOS Devices

COMP3440 E-Commerce

COMP3445 Computer Information Systems

COMP3490 Research Project in Computer Science

COMP3495 Major Research Project in Computer Science (6 Credits)

COMP3499 Group Research Project in Computer Science

DOUBLE MAJOR IN COMPUTER SCIENCE: Course Descriptions

LEVEL I

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

LEVEL II

COMP2210 Mathematics for Computer Science II

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2235 Networks I

COMP2611 Data Structures

LEVEL III (18 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP330 Database Management Systems I

COMP3360 Networks II

AND

COMP3490 Research Project in Computer Science

AND

Three (3) Level III credits from Computer Science

OR

COMP3495 Major Research Project in Computer Science (6 Credits)

OR

COMP3499 Group Research Project in Computer Science

AND

Three (3) Level III credits from Computer Science

AND at least Twenty-Four (24) Credits From Computer Science Elective Courses:

COMP2245 Web Development Concepts, Tools and Practices

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

COMP2950 Computer Science Elective

COMP3365 Networks III

COMP3450 Fundamentals of Artificial Intelligence

COMP3370 Software Engineering On A Large Scale

COMP3375 Software Testing and Quality

COMP3385 Framework Design For Advanced Web Development

COMP3412 Scalable Enterprise Web Applications

COMP3415 Database Management Systems II

COMP3420 Computer Graphics

COMP3425 Mobile Applications for iOS Devices

COMP3435 User-Interface Design

COMP3440 E-Commerce

COMP3445 Computer Information Systems

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

Old 4 Credit Course	***New 3 Credit 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
COMP3180 Algorithm Design and Analysis	COMP3310 Algorithms
COMP3100 Operating Systems	COMP3320 Design Principles of Operating Systems
COMP3155 Computer Networks II	COMP3360 Networks II
No Equivalent	COMP3365 Networks III
COMP3125 Artificial Intelligence	COMP3450 Fundamentals of Artificial Intelligence
COMP3140 Software Engineering II	COMP3370 Software Engineering on a Large Scale
COMP3165 Software Quality Assurance	COMP3375 Software Testing and Quality
COMP3170 Web-Based Applications	COMP3385 Framework Design for Advanced Web Development
No Equivalent	COMP3412 Scalable Enterprise Web Applications
COMP3260 Computer Graphics I	COMP3420 Computer Graphics
No Equivalent	COMP3425 Mobile Applications for iOS Devices
COMP3160 Database Management Systems	COMP3330 Database Management Systems I
No Equivalent	COMP3415 Database Management Systems II
COMP3220 Human-Computer Interaction	COMP3435 User-Interface Design
COMP3210 Electronic Commerce	COMP3440 E-Commerce
COMP3115 Information Systems	COMP3445 Computer Information Systems
COMP3910 Computer Science Research Project	COMP3490 Research Project in Computer Science
COMP3920 Computer Science Major Research	COMP3495 Major Research Project in Computer

Project (8 credits)	Science (6 credits)
COMP3930 Computer Science Group Research Project	COMP3499 Group Research Project in Computer Science

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

ELET1205 Computer-Aided Design

MATH1190 Calculus A

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

LEVEL II

At Least Twelve (12) Credits (Four 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

PHYS2400 Mathematical Methods in Physics I

LEVEL III

At Most Eighteen (18) Credits (Six Courses) From:

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

MINOR IN ELECTRONICS ***(FIFTEEN LEVELS II/III 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

PHYS2400 Mathematical Methods in Physics I

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

MINOR IN MEDICAL ELECTRONICS ***[Fifteen (15) Credits]:*** Course Descriptions

ELET2225 Discrete Component Electronics

ELET2240 Sensor & Actuation Devices

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3250 Biomedical Instrumentation

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

Equivalences 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
ELET2100 Microprocessors I	ELET2215 Microprocessor Systems
ELET2150 Automation Technology	ELET2235 Automation Technology and Applications
ELET3210 Sensors & Actuator Technology	ELET2240 Sensors and Actuation Devices
ELET3041 Microcontrollers & Applications	ELET3215 Microcontroller Technology
ELET3110 Control & Instrumentation	ELET3220 Control Systems
ELET3130 Introduction to Digital Signal Processing (DSP)	ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3151 Digital Communications II	ELET3235 Digital Communication Systems II
None	ELET3240 Digital Communication Systems III
ELET2140 Medical Instrumentation	ELET3250 Biomedical Instrumentation
None	ELET3255 Wireless Communications
None	ELET3260 Advanced Microprocessors and Systems
ELET3160 Electronics Research Project	ELET3290 Semester Electronics Research Project
ELET3160 Electronics Research Project	ELET3295 Major Electronics Research Project
ELET3160 Electronics Research Project	ELET3298 Group Electronics Research Project

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 an 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

MATH3543 Abstract Algebra 2

MATH3545 Linear Algebra 2

MATH3550 Real Analysis 2

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND Three (3) Credits) from Mathematics Elective Courses:

MATH2325 Elementary Number Theory

MATH2330 Probability Theory 1

MATH2335 Statistics 1

MATH3555 Complex Analysis

MATH3560 Introduction to Metric Spaces & Topology

MATH3565 Probability Theory 2

MATH3570 Statistics 2

MATH3575 Introduction to Numerical Analysis

MATH3580 Fourier Analysis with Partial Differential Equations

MATH3600 Topics in Discrete & Computational Geometry

MATH3605 Introduction to Graph Theory

MATH3620 Financial Mathematics 1

MATH3621 Financial Mathematics 2

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

LEVEL II

MATH2204 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

MATH2204 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra 1

MATH2315 Linear Algebra 1

MATH2321 Real Analysis 1

MATH2330 Probability Theory 1

MATH2335 Statistics 1

LEVEL III

MATH3543 Abstract Algebra 2

MATH3545 Linear Algebra 2

MATH3550 Real Analysis 2

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND Twenty-Seven (27) credits from Mathematics Elective Courses

MATH2325 Elementary Number Theory

MATH3555 Complex Analysis

MATH3560 Introduction to Metric Spaces & Topology

MATH3565 Probability Theory 2

MATH3570 Statistics 2

MATH3575 Introduction to Numerical Analysis

MATH3580 Fourier Analysis with Partial Differential Equations

MATH3600 Topics in Discrete & Computational Geometry

MATH3605 Introduction to Graph Theory

MATH3590 Research Project in Mathematics

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

Previous 4-Credit Course	***New 3-Credit 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 (and part of MATH1195)
MATH1130 Calculus II	MATH1195 Calculus B (and part of MATH2304)
No Equivalence	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 1 (and part of MATH3550)
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
MATH3100: Multivariate Analysis	*No Equivalence*
MATH3120: Numerical Analysis	MATH3575: Introduction to Numerical Analysis
MATH3130: Optimization Theory	*No Equivalence*
MATH3140: Fourier Analysis & PDE	MATH3580: Fourier Analysis with Partial Differential Equations
MATH3150: Complex Variables 1	MATH3555: Complex Analysis
MATH3170: Advanced Algebra	MATH3543: Abstract Algebra 2
MATH3180: Introduction to Topology	MATH3560: Introduction to Metric Spaces
MATH3190: Matrix Analysis	MATH3545: Linear Algebra 2
MATH3220: Sampling Theory	*No Equivalence*
MATH3300: Mathematics Research Project	MATH3590: Research Project in Mathematics
MATH3375: Discrete & Computational Geometry	MATH3600: Introduction to in Discrete & Computational Geometry
MATH3400: Graph Theory	MATH3605: Introduction to Graph Theory
MATH3450: Statistical Theory 1	MATH3565: Probability Theory 2
MATH3460: Statistical Theory 2	MATH3570: Statistics 2
No Equivalence	MATH3620: Financial Mathematics 1
No Equivalence	MATH3621: Financial Mathematics 2

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

METE1125 Meteorological Observations, Instruments & Basic Analysis

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

LEVEL II

METE2110 Atmospheric Thermodynamics (3 Credits)

METE2120 Physical Meteorology (3 Credits)

METE2100 Dynamic Meteorology I (4 Credits)

METE2200 Synoptic Meteorology I (4 Credits)

PHYS2400 Mathematical Methods in Physics (3 Credits)

LEVEL III

METE3100 Dynamic Meteorology II (4 Credits)

METE3200 Synoptic Meteorology II (4 Credits)

METE3300 Tropical Meteorology (4 Credits)

AND at Least Four (4) Credits from:

METE2300 Hydrometeorology (4 Credits)

METE3400 Weather Radar and Satellites (4 Credits)

METE3500 Bioclimatology (4 Credits)

MINOR IN METEOROLOGY *[Fifteen (15) Level II/III Credits]:* Course descriptions

METE1110 Introduction to Oceans and Climate

METE1125 Meteorological Observations, Instruments & Basic Analysis

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

METE2100 Dynamic Meteorology I (4 Credits)

METE2200 Synoptic Meteorology I (4 Credits)

AND Three (3) Credits from:

METE2110 Atmospheric Thermodynamics (3 Credits)

METE2120 Physical Meteorology (3 Credits)

AND Four (4) Credits from:

METE3100 Dynamic Meteorology II (4 Credits)

METE3200 Synoptic Meteorology II (4 Credits)

METE3300 Tropical Meteorology (4 Credits)

Equivalences Between Old and New Meteorology Courses for the Purpose of Fulfilling Major and Minor Requirements

OLD 4-CREDIT COURSE	***NEW 3-CREDIT 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
METE2000 Physical Meteorology I	METE2110 Atmospheric Thermodynamics
METE2001 Physical Meteorology II	METE2120 Physical Meteorology

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

PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

AND Six (6) Credits From Physics Elective Courses:

ELET2215 Microprocessor Systems
ELET2220 Circuit Simulation and Applications
ELET2225 Discrete Component Electronics
ELET2230 Digital Communication Systems I
ELET2235 Automation Technology and Applications
ELET2240 Sensor and Actuation Devices
ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3235 Digital Communication Systems II
ELET3240 Digital Communication Systems III
ELET3250 Biomedical Instrumentation
ELET3255 Wireless Communications
ELET3260 Advanced Microprocessors and Systems
PHYS2425 Computational Methods in Physics
PHYS3445 Fundamentals of General Relativity and Cosmology
PHYS3450 Fluid Mechanics
PHYS3455 Lasers and Optical Systems
PHYS3460 Physics of Sustainable Energy Systems
PHYS3465 Electromagnetic Theory II
PHYS3470 Biological Physics
PHYS3475 Fundamentals of Solid State Physics
PHYS3490 Physics One-Semester Research Project
PHYS3495 Physics Two-Semester Research Project

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

Twelve Credits (12) Credits From:

PHYS2400 Mathematical Methods in Physics I

PHYS2405 Mathematical Methods in Physics II

PHYS2410 Modern Physics

PHYS2415 Theory of Classical Mechanics

AND at Most Three (3) Credits From:

PHYS2420 Advanced Physics Laboratory I

PHYS2425 Computational Methods in Physics

PHYS2420 Advanced Physics Laboratory I

PHYS2425 Computational Methods in Physics

PHYS3420 Electromagnetic Theory I

PHYS3445 Fundamentals of General Relativity and Cosmology

PHYS3450 Fluid Mechanics

PHYS3455 Lasers and Optical Systems

PHYS3460 Physics of Sustainable Energy Systems

PHYS3465 Electromagnetic Theory II

PHYS3470 Biological Physics

PHYS3475 Fundamentals of Solid State Physics

PHYS3480 Theory of Quantum Mechanics

PHYS3485 Theory of Statistical Mechanics

Equivalences 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
No Equivalent	PHYS1220 Physics IV: Magnetism, Electromagnetic Waves and Optics
PHYS2100 Mathematical Methods in Physics	PHYS2400 Mathematical Methods in Physics I
PHYS2101 Quantum Mechanics and Special Relativity	PHYS2410 Modern Physics
PHYS2102 Solid State Physics	PHYS3475 Fundamentals of Solid State 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
PHYS2107 Advanced Physics/Technology Laboratory II	Any Physics Elective
No Equivalent	PHYS2405 Mathematical Methods in Physics II
PHYS3100 Quantum Mechanics	PHYS3480 Theory of Quantum Mechanics
PHYS3101 Electrodynamics	PHYS3420 Electromagnetic Theory I
PHYS3102 Optics and Lasers	PHYS3455 Laser and Optical Systems
PHYS3103 Astrophysics	PHYS3445 Fundamentals of General Relativity and Cosmology

PHYS3105 Statistical Mechanics	PHYS3485 Theory of Statistical Mechanics
PHYS3106 Physics Research Project	PHYS3490 Physics One-Semester Research Project
PHYS3107 Fundamentals of Phyotvoltaic Systems	PHYS3460 Physics of Sustainable Energy Systems
None	PHYS3450 Fluid Mechanics
None	PHYS3465 Electromagnetic Theory II
None	PHYS3470 Biological Physics
None	PHYS3495 Physics Two-Semester Research Project

PROGRAMME STRUCTURE

COMPUTER SCIENCE, ELECTRONICS, INFORMATION TECHNOLOGY, MATHEMATICS, PHYSICS AND METEOROLOGY

BSc COMPUTER SCIENCE

LEVEL I (24 CREDITS)

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

AND

9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

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

LEVEL III (9 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Thirty (30) Levels II/III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY

LEVEL I (24 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

AND

9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

COMP2611 Data Structures

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

LEVEL III (9 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS

LEVEL I (24 CREDITS)

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

ELET1205 Computer-Aided Design

MATH1190 Calculus A

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (12 Credits)

At Least Twelve (12) Credits from:

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation & Applications

ELET2225 Discrete Component Electronics

ELET2230 Digital Communication Systems I

ELET2235 Automation Technology & Applications

ELET2240 Sensors & Actuation Devices

PHYS2400 Mathematical Methods in Physics

AND at Most Eighteen (18) Credits from:

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS

LEVEL I (24 CREDITS)

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

AND

9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

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

LEVEL III (12 Credits)

MATH3543 Abstract Algebra II
MATH3545 Linear Algebra II
MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND* 3 Credits from *Mathematics Elective Courses

***AND* Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.**

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSC MATHEMATICS (DOUBLE)

LEVEL I (24 CREDITS)

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1230 Introductory Applied Statistics I

MATH1235 Python Programming & Mathematical Software

***AND* 6 Level I Credits from any Faculty**

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

MATH2330 Probability Theory I

MATH2335 Statistics I

LEVEL III (12 Credits)

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND* 27 Credits from Levels II/III *Mathematics Elective Courses

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc METEOROLOGY

LEVEL I (24 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

<u>AND</u>

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (17 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

LEVEL III (12 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

<u>AND</u> at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

<u>AND</u> Twenty-Seven (27) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

#4 Credit Courses

BSc PHYSICS

LEVEL I (24 CREDITS)

PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1205 Physics II: Rotation, Waves and Thermodynamics
PHYS1210 Physics III: Electric Fields, Currents and Circuits
MATH1190 Calculus A
MATH1195 Calculus B

AND

9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

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 (9 Credits)

PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

AND at least Six (6) Credits from Physics Elective Courses

AND Thirty (30) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE DOUBLE

LEVEL I (24 CREDITS)

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

AND

9 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (18 Credits)

COMP2210 Mathematics for Computer Science II
COMP2611 Data Structures
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2235 Networks I

LEVEL III (18 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I
COMP3360 Networks II

AND

COMP3490 Research Project in Computer Science

AND

Three (3) Level III credits from Computer Science

OR

COMP3495 Major Research Project in Computer Science

OR

COMP3499 Group Research Project in Computer Science

AND

Three (3) Level III credits from Computer Science

AND* at least Twenty-Four (24) Credits from Level II/III *Computer Science Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE AND ELECTRONICS

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics
ELET1205 Computer-Aided Design
MATH1190 Calculus A

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

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

<u>AND</u> at Least Twelve (12) Credits from:

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

LEVEL III (9 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I

<u>AND</u> at least Six (6) Credits (including at least one Level III course) from <u>Computer Science Elective Courses</u>

<u>AND</u> at Most Eighteen (18) Credits from:

ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3235 Digital Communication Systems II
ELET3240 Digital Communication Systems III
ELET3250 Biomedical Instrumentation
ELET3255 Wireless Communications
ELET3260 Advanced Microprocessors & Systems
ELET3290 Semester Electronics Research Project
ELET3295 Major Electronics Research Project
ELET3298 Group Electronics Research Project

<u>AND</u> 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

<u>OR</u>

FOUN1008 An Introduction to Professional Writing

<u>AND</u>

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

BSc COMPUTER SCIENCE AND MATHEMATICS

LEVEL I (30 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

COMP2210 Mathematics for Computer Science II

COMP2611 Data Structures

COMP2220 Computer System Architecture

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

LEVEL III (21 Credits)

COMP3310 Algorithms

COMP3320 Design Principles of Operating Systems

COMP3330 Database Management Systems I

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND 3 Credits from Mathematics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc COMPUTER SCIENCE AND METEOROLOGY

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
METE1110 Introduction to Oceans & Climate
METE1125 Meteorological Observations, Instruments and Basic Analyses
METE1130 Introduction to Physical Meteorology
METE1135 Introduction to Dynamic Meteorology
MATH1190 Calculus A
MATH1195 Calculus B

LEVELS II & III (63 CREDITS)

LEVEL II (32 Credits)

COMP2210 Mathematics for Computer Science II
COMP2611 Data Structures
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
METE2110 Atmospheric Thermodynamics
METE2120 Physical Meteorology
METE2100 Dynamic Meteorology I #
METE2200 Synoptic Meteorology I #
PHYS2400 – Mathematical Methods in Physics I

LEVEL III (21 Credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I
METE3100 Dynamic Meteorology II #
METE3200 Synoptic Meteorology II#
METE3300 Tropical Meteorology#

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#
METE3400 Weather Radar and Satellites#
METE3500 Bioclimatology#

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

#4 Credit Courses

BSc COMPUTER SCIENCE AND PHYSICS

LEVEL I (30 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1205 Physics II: Rotation, Waves and Thermodynamics
PHYS1210 Physics III: Electric Fields, Currents and Circuits
MATH1190 Calculus A
MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

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

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I
PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND at least Six (6) Credits from Physics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS AND INFORMATION TECHNOLOGY

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics
ELET1205 Computer-Aided Design
MATH1190 Calculus A

LEVELS II & III (60 CREDITS)

LEVEL II (15 credits)

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

AND At Least Twelve (12) Credits from:

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

LEVEL III (9 credits)

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND at Most Eighteen (18) Credits from:

ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3235 Digital Communication Systems II
ELET3240 Digital Communication Systems III
ELET3250 Biomedical Instrumentation
ELET3255 Wireless Communications
ELET3260 Advanced Microprocessors & Systems
ELET3290 Semester Electronics Research Project
ELET3295 Major Electronics Research Project
ELET3298 Group Electronics Research Project

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS AND MATHEMATICS

LEVEL I (30 CREDITS)

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

ELET1205 Computer-Aided Design

MATH1141 Introductory Linear Algebra & Analytical Geo.

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis

AND At Least Twelve (12) Credits from:

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation & Applications

ELET2225 Discrete Component Electronics

ELET2230 Digital Communication Systems I

ELET2235 Automation Technology & Applications

ELET2240 Sensors & Actuation Devices

PHYS2400 Mathematical Methods in Physics

LEVEL III (12 Credits)

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND at Most Eighteen (18) Credits from:

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

AND 3 Credits from Levels II and III Mathematics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS AND METEOROLOGY

LEVEL I (33 CREDITS)

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

ELET1205 Computer-Aided Design

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

LEVELS II & III (63 CREDITS)

LEVEL II (17 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

***AND* At Least Twelve (12) Credits from:**

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation & Applications

ELET2225 Discrete Component Electronics

ELET2230 Digital Communication Systems I

ELET2235 Automation Technology & Applications

ELET2240 Sensors & Actuation Devices

#4 Credit Courses

LEVEL III (12 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

***AND* at Most Eighteen (18) Credits from:**

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3250 Biomedical Instrumentation

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

***AND* at LEAST Four (4) Credits from:**

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS AND PHYSICS

LEVEL I (30 CREDITS)

ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics
ELET1205 Computer-Aided Design
PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1205 Physics II: Rotation, Waves and Thermodynamics
PHYS1210 Physics III: Electric Fields, Currents and Circuits
MATH1190 Calculus A
MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (15 Credits)

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

***AND* At Least Twelve (12) Credits from:**

ELET2215 Microprocessor Systems
ELET2220 Circuit Simulation & Applications
ELET2225 Discrete Component Electronics
ELET2230 Digital Communication Systems I
ELET2235 Automation Technology & Applications
ELET2240 Sensors & Actuation Devices

LEVEL III (9 Credits)

PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

***AND* at Most Eighteen (18) Credits from:**

ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3230 Essentials of Digital Signal Processing (DSP)
ELET3235 Digital Communication Systems II
ELET3240 Digital Communication Systems III
ELET3250 Biomedical Instrumentation
ELET3255 Wireless Communications
ELET3260 Advanced Microprocessors & Systems
ELET3290 Semester Electronics Research Project
ELET3295 Major Electronics Research Project
ELET3298 Group Electronics Research Project

***AND* at least Six (6) Credits from Levels II and III**

Physics Elective Courses

***AND* 9 CREDITS: FOUNDATION COURSES**

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY AND MATHEMATICS

LEVEL I (30 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

COMP2611 Data Structures

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

LEVEL III (21 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Electives Courses

AND 3 Credits from Mathematics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY AND METEOROLOGY

LEVEL I (33 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists

COMP1180 Mathematics for Computer Science I

COMP1205 Computing I

COMP1210 Computing II

COMP1215 UNIX

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

MATH1190 Calculus A

MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (32 Credits)

COMP2611 Data Structures

COMP2225 Software Engineering

COMP2232 Object-Oriented Programming Concepts

COMP2410 Computing in the Digital Age

COMP2415 Information Technology Engineering

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

LEVEL III (21 Credits)

COMP3330 Database Management Systems I

COMP3415 Database Management Systems II

COMP3435 User Interface Design

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND at LEAST Four (4) Credits from the following ELECTIVES:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites##

METE3500 Bioclimatology#

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

#4 Credit Courses

BSc INFORMATION TECHNOLOGY AND PHYSICS

LEVEL I (30 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1205 Physics II: Rotation, Waves and Thermodynamics
PHYS1210 Physics III: Electric Fields, Currents and Circuits
MATH1190 Calculus A
MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

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

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design
PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

AND at least Six (6) Credits (including at least one Level III course) from Information Technology Elective Courses

AND at least Six (6) Credits from Physics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc MATHEMATICS AND METEOROLOGY

LEVEL I (27 CREDITS)

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

LEVELS II & III (63 CREDITS)

LEVEL II (32 Credits)

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

PHYS2400 – Mathematical Methods in Physics I

LEVEL III (24 Credits)

MATH3543 Abstract Algebra 2

MATH3545 Linear Algebra 2

MATH3550 Real Analysis 2

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces and Topology

AND 3 Credits from Mathematics Elective Courses

AND at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

 # 4-Credit Courses

BSc MATHEMATICS AND PHYSICS

LEVEL I (24 CREDITS)

MATH1141 Introductory Linear Algebra & Analytical Geometry

MATH1190 Calculus A

MATH1195 Calculus B

MATH1152 Sets and Number Systems

MATH1235 Python Programming & Mathematical Software

PHYS1200 Physics I: Mechanics of Transitional Motion

PHYS1205 Physics II: Rotation, Waves and Thermodynamics

PHYS1210 Physics III: Electric Fields, Currents and Circuits

LEVELS II & III (60 CREDITS)

LEVEL II (30 Credits)

MATH2304 Multivariable Calculus

MATH2305 Differential Equations

MATH2310 Abstract Algebra I

MATH2315 Linear Algebra

MATH2321 Real Analysis I

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 (18 Credits)

MATH3543 Abstract Algebra II

MATH3545 Linear Algebra II

MATH3550 Real Analysis II

PHYS3420 Electromagnetic Theory I

PHYS3480 Theory of Quantum Mechanics

PHYS3485 Theory of Statistical Mechanics

AND

MATH3555 Complex Analysis

OR

MATH3560 Introduction to Metric Spaces & Topology

AND 3 Credits from Mathematics Elective Courses

AND at least Six (6) Credits from Physics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc METEOROLOGY AND PHYSICS

LEVEL I (27 CREDITS)

METE1110 Introduction to Oceans & Climate

METE1125 Meteorological Observations, Instruments and Basic Analyses

METE1130 Introduction to Physical Meteorology

METE1135 Introduction to Dynamic Meteorology

PHYS1200 Physics I: Mechanics of Transitional Motion

PHYS1205 Physics II: Rotation, Waves and Thermodynamics

PHYS1210 Physics III: Electric Fields, Currents and Circuits

MATH1190 Calculus A

MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (29 Credits)

METE2110 Atmospheric Thermodynamics

METE2120 Physical Meteorology

METE2100 Dynamic Meteorology I #

METE2200 Synoptic Meteorology I #

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 (21 Credits)

METE3100 Dynamic Meteorology II #

METE3200 Synoptic Meteorology II#

METE3300 Tropical Meteorology#

PHYS3420 Electromagnetic Theory I

PHYS3480 Theory of Quantum Mechanics

PHYS3485 Theory of Statistical Mechanics

AND at LEAST Four (4) Credits from:

METE2300 Hydrometeorology#

METE3400 Weather Radar and Satellites#

METE3500 Bioclimatology#

AND at least Six (6) Credits from Physics Elective Courses

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

#4-Credit Courses

BSc COMPUTER SCIENCE WITH MEDICAL ELECTRONICS

LEVEL I (27 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics

LEVELS II & III (60 CREDITS)

LEVEL II (21 credits)

COMP2210 Mathematics for Computer Science II
COMP2611 Data Structures
COMP2220 Computer System Architecture
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
ELET2225 Discrete Component Electronics
ELET2240 Sensors & Actuation Devices

LEVEL III (18 credits)

COMP3310 Algorithms
COMP3320 Design Principles of Operating Systems
COMP3330 Database Management Systems I
ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3250 Biomedical Instrumentation

AND at least Six (6) Credits (including at least one Level III course) from Computer Science Elective Courses

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

BSc ELECTRONICS WITH MEDICAL ELECTRONICS

LEVEL I (24 CREDITS)

ELET1200 Basic Circuit Analysis

ELET1210 Digital Electronics I

ELET1215 Digital Electronics II

ELET1220 Introduction to Electronics

ELET1205 Computer-Aided Design

MATH1190 Calculus A

AND

6 Level I Credits from any Faculty

LEVELS II & III (60 CREDITS)

LEVEL II (6 Credits)

ELET2225 Discrete Component Electronics

ELET2240 Sensors & Actuation Devices

AND At Least Twelve (12) Credits from:

ELET2215 Microprocessor Systems

ELET2220 Circuit Simulation & Applications

ELET2230 Digital Communication Systems I

ELET2235 Automation Technology & Applications

PHYS2400 Mathematical Methods in Physics

LEVEL III (9 Credits)

ELET3215 Microcontroller Technology

ELET3220 Control Systems

ELET3250 Biomedical Instrumentation

AND at Most Eighteen (18) Credits from:

ELET3230 Essentials of Digital Signal Processing (DSP)

ELET3235 Digital Communication Systems II

ELET3240 Digital Communication Systems III

ELET3255 Wireless Communications

ELET3260 Advanced Microprocessors & Systems

ELET3290 Semester Electronics Research Project

ELET3295 Major Electronics Research Project

ELET3298 Group Electronics Research Project

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization

*FOUN1301 Law, Governance and Society

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

BSc INFORMATION TECHNOLOGY WITH MEDICAL ELECTRONICS

LEVEL I (27 CREDITS)

COMP1170 Entrepreneurship for Computer Scientists
COMP1180 Mathematics for Computer Science I
COMP1205 Computing I
COMP1210 Computing II
COMP1215 UNIX
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

COMP2611 Data Structures
COMP2225 Software Engineering
COMP2232 Object-Oriented Programming Concepts
COMP2410 Computing in the Digital Age
COMP2415 Information Technology Engineering
ELET2225 Discrete Component Electronics
ELET2240 Sensors & Actuation Devices

LEVEL III (18 Credits)

COMP3330 Database Management Systems I
COMP3415 Database Management Systems II
COMP3435 User Interface Design
ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3250 Biomedical Instrumentation

AND at least Six (6) Credits (including at least one Level III course) from <u>Information Technology Elective Courses</u>

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes
OR
FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

*A student may substitute <u>one</u> of these with a Foreign Language course.

BSc PHYSICS WITH MEDICAL ELECTRONICS

LEVEL I (27 CREDITS)

PHYS1200 Physics I: Mechanics of Transitional Motion
PHYS1205 Physics II: Rotation, Waves and Thermodynamics
PHYS1210 Physics III: Electric Fields, Currents and Circuits
ELET1200 Basic Circuit Analysis
ELET1210 Digital Electronics I
ELET1215 Digital Electronics II
ELET1220 Introduction to Electronics
MATH1190 Calculus A
MATH1195 Calculus B

LEVELS II & III (60 CREDITS)

LEVEL II (21 Credits)

ELET2225 Discrete Component Electronics
ELET2240 Sensors & Actuation Devices
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 (18 Credits)

ELET3215 Microcontroller Technology
ELET3220 Control Systems
ELET3250 Biomedical Instrumentation
PHYS3420 Electromagnetic Theory I
PHYS3480 Theory of Quantum Mechanics
PHYS3485 Theory of Statistical Mechanics

AND at least Six (6) Credits from Physics Elective Courses

AND Fifteen (15) Levels II and III credits from any Faculty. Three (3) of these credits can come from a Co-Curricular Course.

AND 9 CREDITS: FOUNDATION COURSES

FOUN1001 Exposition For Academic Purposes

OR

FOUN1008 An Introduction to Professional Writing

AND

*FOUN 1101 Caribbean Civilization
*FOUN1301 Law, Governance and Society

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

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 (or MATH1101 Basic Mathematics I)

Anti-requisite: COMP2105 Discrete Mathematics

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 (or MATH1101 Basic Mathematics I)

AND

COMP1210 Computing II (or COMP1115 Computer Programming II)]

OR

[ELET1210 Digital Electronics I (or ELET1110 Digital Electronics)]

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 (or COMP1115 Computer Programming 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 (or COMP1115 Computer Programming 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 (or COMP1115 Computer Programming II)
AND
COMP1215 UNIX (or COMP1125 Introduction to 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 (or COMP1130 Web Technology Fundamentals)

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 (or COMP1115 Computer Programming 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 TECHNOLOGY ENGINEERING (3 Credits)

Pre-requisite: COMP1210 Computing II (or COMP1115 Computer Programming 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 (or COMP1115 Computer Programming II)

AND

COMP1215 UNIX (COMP1125 Introduction to 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 (3 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

COMP3310 - ALGORITHMS (3 Credits)

Pre-requisites: COMP2210 Mathematics for Computer Science II (or COMP2105 Discrete Mathematics)

AND

COMP2611 Data Structures (or COMP2115 Information Structures)

Anti-requisite: COMP3180 Algorithm Design and Analysis

Syllabus: Analysis of Algorithms: Time and Space Complexities; Algorithm Design Techniques (Brute-force, Divide and Conquer, Preprocessing, Dynamic Programming, Greedy Algorithms); Limits of Computability (Lower Bounds, Tractable and Intractable Problems, Dealing with NP-Completeness); Empirical measurements of performance.

Teaching: Two (2) 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%

COMP3320 - DESIGN PRINCIPLES OF OPERATING SYSTEMS (3 Credits)

Pre-requisites: COMP2220 Computer System Architecture (or COMP2125 Computer Architecture)

AND

COMP2611 Data Structures (or COMP2115 Information Structures)

Anti-requisite: COMP3100 Operating Systems

Syllabus: Characteristics of Modern Operating Systems; Operating System Structure and Architecture; Process Management (processes and threads, process creation and termination, process synchronization, CPU scheduling, deadlocks); Memory Management (memory allocation schemes, memory partitioning, paging, virtual memory, segmentation); File management (file organization, file system implementation, file system examples, mass storage; Device Management (I/O devices, device drivers, I/O design issues, disk-scheduling); Protection and Security (security threats (program and network threats), protection mechanisms, trusted systems).

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

Method of Examination:

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

COMP3330 – DATABASE MANAGEMENT SYSTEMS I (3 Credits)

Pre-requisite: COMP2611 Data Structures (or COMP2115 Information Structures)

Anti-requisite: COMP3160 Database Management Systems

Syllabus: Precursors to Relational Databases. Requirements Gathering, Database Design and ERDs. Normalization – Closures, Functional Dependencies and Keys, Joins and decomposition, Integrity constraints. Introduction to SQL. Database maintenance. Stored Procedures, Transactions and Triggers. Database drivers.

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%

COMP3360 - NETWORKS II (3 Credits)

Pre-requisite: COMP2235 Networks I (or COMP2150 Computer Networks 1)

Anti-requisite: COMP3155 Computer Networks II

Syllabus: Routing. Router Design and Implementation. Routing algorithms. Internet Protocol (IP). Subnets. Internet Control Message Protocol (ICMP). Internet Group Management Protocol (IGMP). Sockets. Socket programming. Transmission Control Protocol (TCP). User Datagram Protocol (UDP). Stream Control Transmission Protocol (SCTP). Congestion control. Congestion control algorithms. Quality of Service (QoS).

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%

COMP3365 - NETWORKS III (3 Credits)

Pre-requisite: COMP3360 Networks II (or COMP3155 Computer Networks 2)

Anti-requisite: None

Syllabus: Network modeling and measurement. Hypertext Transfer Protocol (HTTP). Domain Name System (DNS). Dynamic Host Configuration Protocol (DHCP). File Transfer Protocol (FTP). Simple Mail Transfer Protocol (SMTP). Internet Message Access Protocol (IMAP). Post Office Protocol (POP). Simple Network Management Protocol (SNMP). Network time protocol (NTP). Border Gateway Protocol (BGP). Peer-to-Peer (P2P) networks. Streaming Audio and Video. Voice over IP (VoIP). Content Delivery Network (CDN).

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%

COMP3370 - SOFTWARE ENGINEERING ON A LARGE SCALE (3 Credits)

Pre-requisites: COMP2225 Software Engineering (or COMP2145 Software Engineering I)

Anti-requisite: COMP3140 Software Engineering II

Syllabus: The Challenges of Engineering Large Systems; Introduction to Modelling and Class Diagrams; Reverse engineering; Software Architecture; Approaches to Project Management; Project Selection and Feasibility Analysis; Project Cost Estimation; Planning, Resource Scheduling and Control Techniques; Software Validation and Deployment; The Team Environment.

Teaching: Two (2) 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%

COMP3375 - SOFTWARE TESTING AND QUALITY (3 Credits)

Pre-requisites: COMP2225 Software Engineering (or COMP2145 Software Engineering I)

Anti-requisite: COMP3165 Software Quality Assurance

Syllabus: What Is Software System Quality? Software Quality Product and Process Metrics; Measuring and Analysing Customer Satisfaction Fundamentals; The Objectives and Limits of testing; Test Types and the Software Development Process; Reporting and Analysing Errors; Specific Testing Skills; The Problem Tracking System; Test Case Design; Testing Tools; Test Planning and Test Documentation.

Teaching: Two (2) 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%

COMP3385 - FRAMEWORK DESIGN FOR ADVANCED WEB DEVELOPMENT (3 Credits)

Pre-requisites: COMP2445 Web Development Concepts, Tools and Practices (or COMP2155 - Building Web Applications)

Anti-requisite: COMP 3170 Web-based Applications

Syllabus: ***Design Patterns*** (Design patterns and principles, Design Patterns for flexible object programming, Database patterns, Design patterns in JavaScript);

Version Control (Configuring and using open source version control systems); Web Services (Introduction to SOAP and XML-RPC, The REST architectural style, RESTful web services);

API Design (The API design process, Characteristics and guidelines for API design);

Client-side JavaScript framework design (Framework styles: structure, helper methods, plugins etc., Prototype classes, inheritance, class implementation, Selector Engines, Animations and touch, Cross-domain requests with AJAX, Feature detection, Chained APIs);

Server-side framework design (Framework styles: layered, pipe-and-filter, Common framework features: scaffolding, internationalization, fall-back data validation, session management; Web services; Controllers; Data abstraction; Templating systems (themes); security; authentication; error handling).

Teaching: Two (2) 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%

COMP3412 - SCALABLE ENTERPRISE WEB APPLICATIONS (3 Credits)

Pre-requisites: COMP3330 Database Management Systems I (or COMP3160 Database Management Systems)

AND

COMP3385 Framework Design for Advanced Web Development

Anti-requisite: None

Syllabus: Design patterns for flexible object-oriented programming; Enterprise design patterns; Good and bad design and coding practices; Continuous integration; Designing scalable web applications (Scalability patterns and best practices, Scalability challenges, Scalability testing and anti-patterns); Caching for web applications (Caching concepts, design, caching anti-patterns and strategies); Enterprise Web Applications Security; Enterprise Web Application Testing; Application Deployment to the cloud; Performance of Enterprise Web Applications; Web analytics-based performance improvement.

Teaching: Two (2) 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%

COMP3415 – DATABASE MANAGEMENT SYSTEMS II (3 Credits)

Pre-requisite: COMP3330 Database Management Systems I (or COMP3160 Database Management Systems)

Anti-requisite: None

Syllabus: Physical Data Access Methods. Query Processing and Optimization. Concurrency Control, Recovery. Client Server and Distributed Databases - Failures in a Distributed Environment, Commit Protocols, Replication. Data Warehousing and Online Analytical Processing - Operational Data versus Decision Support Data, Decision Support Database Requirements, Components of a Decision Support System. Data Lakes and Data Vaults. Data Vault Modelling. Big Data Databases and NoSQL. Data mining.

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%

COMP3420 - COMPUTER GRAPHICS (3 Credits)

Pre-requisites: COMP2611 Data Structures (or COMP2115 Information Structures)

Anti-requisite: COMP3260 Computer Graphics I

Syllabus: Raster graphics; Coordinate systems and transformations; The viewing frustum; The graphics pipeline and toolkits; Clipping and culling; Lighting and shadows; Transparency and blending; Texture mapping; Local shading models; Environment mapping techniques; Shaders; Animation and particles; Portable Network Graphics (PNG) programming; OpenGL programming.

Teaching: Two (2) 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%

COMP3425 - MOBILE APPLICATIONS FOR iOS DEVICES (3 Credits)

Pre-requisites: COMP2611 Data Structures (or COMP2115 Information Structures)

AND

COMP2225 Software Engineering (or COMP2145 Software Engineering 1)

Anti-requisite: None

Syllabus: Program Development on the XCode IDE; Swift programming; Xcode and Interface Builder; Cocoa Design Patterns; Views and the View Hierarchy; Memory Management; Text Input and Delegation; View Controllers; Interaction with UIControls; UITableView and UITableViewController; Orientation and iOS Device Sensors; Testing and Debugging.

Teaching: Two (2) 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%

COMP3435 – USER-INTERFACE DESIGN (3 Credits)

Pre-requisites: COMP2611 Data Structures (or COMP2115 Information Structures)

AND

COMP2225 Software Engineering (or COMP2145 Software Engineering 1)

Anti-requisite: COMP3220 Human Computer Interaction

Syllabus: 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***;*** Future directions of user interface design.

Teaching: Two (2) 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%

COMP3440 – E-COMMERCE (3 Credits)

Pre-requisites: COMP2245 Web Development Concepts, Tools and Practices (or COMP2155 - Building Web Applications)

Anti-requisite: COMP 3210 Electronic Commerce

Syllabus: Introduction to e-commerce; Definition of e-commerce, e-business, m-commerce and e-governance; Advantages/disadvantages of e-commerce; Waves of e-commerce; SWOT analysis; business objectives and international issues facing e-commerce; Planning e-commerce initiatives; Identifying products and services; Business plans; E-Commerce legislation and Internet law; Borders and jurisdiction; Website design, usability, evaluation and creation; User interface design; Internetworking and the world wide web; client-side programming; server-side programming;; Processing payments and order fulfilment; Securing e-commerce initiatives; Computer, server and communication channel security; Marketing website and promoting products and services; Revenue models, marketing strategies, customer relationship models and web advertising.

Teaching: Two (2) 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%

COMP3445 – COMPUTER INFORMATION SYSTEMS (3 Credits)

Pre-requisites: COMP2225 Software Engineering (or COMP2145 Software Engineering I)
AND
COMP2245 Web Development Concepts and Practices (or COMP2155 - Building Web Applications)

Anti-requisite: COMP 3115 Information Systems

Syllabus: Definitions of information and system concepts; IS frameworks; Types of information systems; Information systems in society, business and industry; Software issues and trends: Databases and business intelligence; E-business and mobile commerce; ICT in e-business and business process performance; The personal and social impact of computers; Network and telecommunication systems; Societal and ethical issues relating to information systems; Enterprise, information and decision support systems; Knowledge management systems, knowledge management workers; artificial intelligence, expert systems; and virtual reality; Characteristics of information systems professionals; information system careers; Information and specification; design, implementation and re-engineering of information systems; Systems theory; decision support; information systems strategies; role of information and IT; and role of people using, developing and managing systems; Information and organisational systems; ICT Micro enterprises and entrepreneurship; digital divide; the informal sector; Health information systems.

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

Method of Examination:

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

COMP3450 – FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE (3 Credits)

Pre-requisite: COMP2210 Mathematics for Computer Science II (or COMP2105 Discrete Mathematics)

AND

COMP2611 Data Structures (or COMP2115 Information Structures)

Anti-requisite: COMP3125 Artificial Intelligence

Syllabus: Intelligent agents. Search algorithms. Knowledge representation. Machine learning. Probabilistic reasoning.

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%

COMP3490 – RESEARCH PROJECT IN COMPUTER SCIENCE (3 Credits)

Pre-requisite: None

Anti-requisite: COMP3910 Research Project

Syllabus: This course provides students with the opportunity to develop a research project to solve a real-world or research-based problem. Students are given the opportunity to embark on a project that uses the skills learned during Computer Science courses. This course provides students with an opportunity to develop their research skills by collaborating with a Computer Science faculty member.

Teaching: Students are required to meet regularly with their supervisors to discuss their research projects.

Method of Examination:

Project Proposal	20%
Final Presentation	20%
Final Report	60%

COMP3495 – MAJOR RESEARCH PROJECT IN COMPUTER SCIENCE (6 Credits)

Pre-requisite: None

Anti-requisite: COMP3920 Computer Science Major Research Project

Syllabus:	This course provides students with the opportunity to develop a research project to solve a real-world or research-based problem. Students are given the opportunity to embark on a project that uses the skills learned during Computer Science courses. They will take this course from Semester I through Semester II. This course provides students with an opportunity to develop their research skills by collaborating with a Computer Science faculty member.
Teaching:	Students are required to meet regularly with their supervisors to discuss their research projects.

Method of Examination:

Project Proposal	20%
Final Presentation	20%
Final Report	60%

COMP3499 – GROUP RESEARCH PROJECT IN COMPUTER SCIENCE (3 Credits)

Pre-requisite:	None
Anti-requisite:	COMP3930 Computer Science Group Research Project
Syllabus:	This course provides students with the opportunity to develop a research project to solve a real-world or research-based problem. Students are given the opportunity to embark on a project that uses the skills learned during Computer Science courses. They will complete the project in groups ranging from 2 to 4 persons. This course provides students with an opportunity to develop their research skills by collaborating with a Computer Science faculty member.
Teaching:	Students are required to meet regularly with their supervisors to discuss their research projects.

Method of Examination:

Project Proposal	20%
Final Presentation	20%
Final Report	60%

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 (or ELET1110 – Digital Electronics)

Syllabus: Architecture of 8-bit CPU's e.g. INTEL 8085, Instruction set, Registers and their uses, Operation, Busses, Addressing, Data flow, Control section, Interrupts, Stack, Branching, Subroutines, Loops, Serial I/O, Interfacing, Port and memory mapping, Polling, Handshaking, Parallel ports, Serial communications (RS-232), A/D and basic D/A interfacing, device control with simple examples, comparison with other 8-bit CPU's.

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 (or ELET1100 – 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 (or ELET1100 – 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 (or ELET1110 Digital Electronics)

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.

LEVEL III ELECTRONICS COURSES

ELET3215 – MICROCONTROLLER TECHNOLOGY (3 Credits)

Pre-requisite: ELET2215 – Microprocessor Systems (or ELET2100 – Microprocessors I)

Syllabus: Architecture of 8-, 16- and 32-bit microcontrollers: Hardware, Instruction set, Registers and their uses and operation, Busses, Address and Data Addressing, Data flow, Control section; Microcontroller Peripherals: I/O Ports, Serial and Parallel modules, RS232 module, A/D and D/A modules; Interrupts and Polling, Stack and its operation, Branching, Subroutines, Loops; Serial I/O: Interfacing, Port and memory mapping, Handshaking, Parallel ports; Advanced Microcontroller Features: Direct Memory Access (DMA) peripherals, Real-time Operating System (RTOS) concepts and operation.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3220 – CONTROL SYSTEMS (3 Credits)

Pre-requisite: ELET2120 – Discrete Device Electronics (or ELET2225 – Discrete Component Electronics)

Syllabus: Introduction to dynamic systems and control, Modelling of physical systems, including linearization, System transfer functions, Analysis of system response, Feedback and multiple subsystems, Stability analysis of a system, Steady state errors, Time response of systems and design specifications, Frequency response techniques and designs specifications, Definition and construction of the Root Locus, Compensation using the Root Locus, Compensations and PID controller implementation.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3230 – ESSENTIALS OF DIGITAL SIGNAL PROCESSING DSP (3 Credits)

Pre-requisite: MATH1190 – Calculus A OR COMP1180 – Mathematics for Computer Science I OR COMP2150 – Computer Networks I

Syllabus: Introduction to DSP; Basic Digital Signals; Impulse Response and Convolution; Difference Equations; Fourier Analysis; Fourier Transform; Sampling; Discrete Fourier Transform (DFT); Digital Frequency; Frequency Response; Discrete Time Fourier Transform (DTFT); Parseval's Theorem; Z-Transform; Zeros and Poles; Inverse Z-Transform; Filter Design.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3235 – DIGITAL COMMUNICATION SYSTEMS II (3 Credits)

Pre-requisite: ELET2230 – Digital Communication Systems I (or ELET2130 Digital Communications)

Syllabus: Introduction to Error-Control Coding; Information Throughput; Information Theory Recap; Shannon's Channel Coding Theorem; Block Codes and Coding Theorem; Linear Block Codes; Cyclic Codes; Convolutional Codes; Viterbi Algorithm; Trellis Coded Modulation (TCM); TCM Decoder; Low Density Parity Check Codes (LDPC) Encoder; LDPC Decoder.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3240 – DIGITAL COMMUNICATION SYSTEMS III (3 Credits)

Pre-requisite: ELET3235 – Digital Communication Systems II

Syllabus: Signals, Phasors, & Spectrum; Exponential Fourier Series; Power and Bandwidth; Fourier Transform; Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT); Additive White Gaussian Noise (AWGN); Power Spectral Density (PSD); Energy Spectral Density (ESD); Band Limited White Noise Analysis; Recap of MPSK; Quadrature Amplitude Modulation (QAM); Orthogonal Frequency Division Multiplexing (OFDM); OFDM Based on QAM; Frequency Shift Keying (FSK); Comparison of Modulation Schemes.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3250 – BIOMEDICAL INSTRUMENTATION (3 Credits)

Pre-requisite: ELET2240 – Sensors and Actuation Devices (or ELET3210 Sensors & Actuator Technology)

Syllabus: Introduction to Anatomy and physiology: Elementary ideas of cell structure include basic Haematology; Overview of Medical Electronics Equipment: Concepts and components of biosensors and biomedical instrumentation; Preparation of Biosensors: Bimolecular materials used in biosensors and their properties; Types of Biosensors and their applications: Enzyme based biosensors (glucose and cholesterol), micro immuno-biosensors and their characteristics, application of biosensors in the environment, bacterial and viral analysis, food and beverage production and analysis, clinical diagnosis using Photometrics and ElectroChemiLuminescence (ECL); Electrodes: Bio-electric signals, electrodes, electrode tissue interface, contact impedance, types of electrodes, electrodes used for ECG and EEG; Bio-Medical Recorders: Block diagram descriptions and applications of typical instruments for ECG, EEG, and EMG machines; Patient Monitoring Systems: Heart, pulse, blood pressure, and respiration rate measurements, principle of the defibrillator and pace mark, use of microprocessor in patent monitoring; Safety Aspects of Medical Instruments: Gross current shock, micro current shock, special designs for safety consideration and standards including biohazardous nature of Biomedical Instrumentation.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3255 – WIRELESS COMMUNICATIONS (3 Credits)

Pre-requisite: ELET2225 – Discrete Component Electronics (or ELET2120 Discrete Device Electronics)

AND

ELET2230 – Digital Communication Systems I (or ELET2130 Digital Communications)

Syllabus: Harmonic content of complex waveforms; Mixing versus modulation of waveforms; AM, FM and PM of carrier waves and associated sideband spectra produced; Superheterodyne receivers and circuits; Transmission lines and antenna principles; Propagation of radio waves, noise limitations, multipath reception; High frequency circuit design techniques for microwave oscillators and amplifiers; Overview of cellular telephone system based on GSM; The multiple access scheme based on OFDM.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3260 – ADVANCED MICROPROCESSORS & SYSTEMS (3 Credits)

Pre-requisite: ELET2215 – Microprocessor Systems

Syllabus: Architecture: 32-bit architecture; 64-bit architecture; pipelining; multimedia extensions; coprocessors; DMA; Multiprocessors; Hardware processing: Hardware descriptive languages; soft processors; FPGAs;

CPLDs; Logic Blocks; Operating Systems: Stack and its operation, Branching, Subroutines, Loops, Realtime Operating Systems, Threads, Processes, Remote Login, Windows, Unix, Lunix, Programming languages; Applications & Future Concepts; Embedded systems, Mobile cellular modems, Nanotechnology, Quantum technology.

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

Method of Examination:

Final Theory Examination (2 hours):	60%
In-Course tests/assignments:	20%
Laboratory:	20%

ELET3290 – SEMESTER ELECTRONICS RESEARCH PROJECT (3 Credits)

Pre-requisite: None

Syllabus: The material will be based on the topic selected.

Teaching: The course is comprised 100% research over a total of forty-eight (48) hours of practical work over the course of twelve weeks.

Method of Examination:

Students will be assessed by means of two (2) oral presentations to a general audience and a final written report as follows:

Mid-semester Oral Presentation	10%
Final Oral Presentation	30%
Final Written Report	60%

ELET3295 – MAJOR ELECTRONICS RESEARCH PROJECT (6 Credits)

Pre-requisite: None

Syllabus: The material will be based on the topic selected.

Teaching: The course is comprised of 100% research over a total of ninety-six (96) hours of practical work over the course of twenty-four (24) weeks.

Method of Examination:

Students will be assessed using four (4) oral presentations to a general audience and a final written report as follows:

Mid-semester 1 Oral Presentation:	5%
End of Semester 1 Oral Presentation:	10%
Mid-semester 2 Oral Presentation:	5%
Final Oral Presentation:	15%
Final Written Report:	65 %

ELET3298 – GROUP ELECTRONICS RESEARCH PROJECT (6 Credits)

Pre-requisite: None

Syllabus: The material will be based on the topic selected.

Teaching: Limited to groups of 2 or 3 students. The course is comprised of 100% research over a total of ninety-six (96) hours of practical work over the course of twenty-four (24) weeks.

Method of Examination:

Students will be assessed using four (4) oral presentations to a general audience and a final written report as follows:

Mid-semester 1 Oral Presentation:	5%
End of Semester 1 Oral Presentation:	10%
Mid-semester 2 Oral Presentation:	5%
Final Oral Presentation:	15%
Final Written Report:	65%

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%

MATH1235 PYTHON PROGRAMMING & MATHEMATICAL SOFTWARE (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent.
(No prerequisite programming knowledge is necessary for this course.)

Anti-requisite: None

Syllabus: INTRODUCTION TO SAGE & SAGEMATHCLOUD: using Sage as a calculator; functions; matrices; solving problems symbolically; differentiation and integration in Sage

PYTHON PROGRAMMING: loops and conditional expressions; lists, tuples, dictionaries and arrays; subroutines; program flow and good practice in programming

PLOTTING IN SAGE: graphing functions & integrals; axes labeling; contour plots and level sets; parametric plots; loglog plots

ELEMENTARY STATISTICS USING R: descriptive statistics; data visualization; interaction of R and Sage

ELEMENTS OF GEOGEBRA: Toolbar, simple construction, measurements, classical triangle centers (medians, centroid, altitudes, orthocenter)

ADVANCED TECHNIQUES IN GEOGEBRA: Check boxes, Pythagorean theorem

Teaching: Two (2) hours of lectures and one (1) tutorial session

Method of Examination:

In-course Test(s)/Assignment(s)	100%

MATH1230 INTRODUCTORY APPLIED STATISTICS 1 (3 Credits)

Pre-requisite: CAPE Pure Mathematics Units 1 and 2 or MATH0101 & MATH0102 Preliminary Mathematics 1 & 2 or equivalent.

Anti-requisite: None

Syllabus:

OVERVIEW AND DESCRIPTIVE STATISTICS: population, samples and processes; pictorial and tabular methods in descriptive statistics; measures of location and measures of variability components

PROBABILITY: sample spaces and events; axioms, interpretations and properties of probability; counting techniques and conditional probability

DISCRETE RANDOM VARIABLES AND PROBABILITY DISTRIBUTION: random variables; probability distributions for discrete random variables; binomial probability distribution; hypergeometric, negative binomial distribution and Poisson probability distribution

CONTINUOUS RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS: continuous random variables and probability density functions; cumulative distribution functions and expected values; normal distribution

POINT ESTIMATION: some basic general concept of point estimation

STATISTICAL INTERVALS BASED ON A SINGLE SAMPLE: basic properties of confidence intervals; large-sample confidence intervals for a population mean and proportion; intervals for a population mean and proportion; intervals based on a normal population distribution; confidence intervals for the variance and standard deviation of a normal population

TESTS OF HYPOTHESES BASED ON A SINGLE SAMPLE: hypotheses and test procedures; test about a population mean; tests concerning a population proportion; P-values and some comments on selecting a test procedure

INFERENCE BASED ON TWO SAMPLES: Z-tests and confidence intervals for a difference between two population means; two sample t-test and confidence interval; analysis of paired data; inferences concerning a difference between population proportions and inferences concerning two population variances

THE ANALYSIS OF VARIANCE: single-factor ANOVA

SIMPLE LINEAR REGRESSION AND CORRELATION: simple linear regression model; estimating model parameters; inferences about the slope parameter; prediction of future Y values and correlation

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

Method of Examination:

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

LEVEL II MATHEMATICS COURSES

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%

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.

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.

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%

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; Runge-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%

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 1 & 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%

MATH2204 – 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%

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%

LEVEL III MATHEMATICS COURSES

MATH3543 – ABSTRACT ALGEBRA II (3 Credits)

Prerequisites: MATH2310 Abstract Algebra 1 & MATH2315 Linear Algebra 1

Syllabus:

REVISION OF GROUPS: basic axioms and examples; centralizers, normalizers, stabilizers and kernels; subgroups generated by subsets of a group; the lattice of subgroups of a group; cosets and Lagrange's theorem; isomorphism theorems; composition series; transpositions and the alternating group

GROUP ACTIONS: group actions and permutation representation; groups acting on themselves; Cayley's Theorem; class equation; automorphisms; the Sylow Theorems; simplicity of A_n

DIRECT PRODUCTS AND ABELIAN GROUPS: direct products; Fundamental Theorem of Finitely Generated Abelian Groups; table of groups of small order; recognizing direct products; semidirect products

FURTHER TOPICS IN GROUP THEORY: p-groups; nilpotent groups; solvable groups; free groups; application of groups of medium order

POLYNOMIAL RINGS: polynomial rings over fields; polynomial rings that are unique factorization domains; irreducibility criteria.

FIELD THEORY: field extensions; algebraic extensions; splitting fields and algebraic closures; cycloctomic polynomials and extensions

Teaching: Two lectures and one tutorial per week.

Method of Examinations:

Coursework	50%
One 2-hour written paper	50%

MATH3545 – LINEAR ALGEBRA II (3 Credits)

Pre-requisite: MATH2310 AbstractAlgebra 1 & MATH2315 Linear Algebra 1 & MATH2305 Differential Equations

Syllabus:

PRELIMINARIES: revision of matrices; change of basis and similarity; special types of matrices; invariant subspaces; determinants; tensor products.

INNER PRODUCT SPACES: inner products (in □^{n}); orthogonal complement and projection onto a subspace; unitary transformations; Gram-Schmidt Process and QR factorization; linear functionals and dual spaces.

DIAGONALIZATION & TRIANGULARIZATION: characteristic polynomial; algebraic & geometric multiplicity of eigenvalues; diagonalizability; triangularization theorem; Geršgorin Circle Theorem; eigenvalues of AB and BA.

JORDAN NORMAL FORM: reduction to block diagonal form; nilpotent matrices; Jordan Form of a general matrix; Cayley-Hamilton Theorem and minimal polynomial; Weyr normal form; applications: quadratic surfaces, functions of matrices, linear recurrence relations, and stability of certain systems of ordinary differential equations.

NORMAL MATRICES: unitary similarity; normal matrices and the Spectral Theorem; conditions for unitary similarity.

HERMITIAN MATRICES: conjugate bilinear forms; properties of Hermitian Matrices; positive definite matrices; simultaneous row and column operations; polar factorization and Singular Value Decomposition

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

Method of Examination:

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

MATH3550- REAL ANALYSIS II (3 Credits)

Pre-requisite: MATH2321 Real Analysis 1

Syllabus:

THE DERIVATIVE: Derivatives and Intermediate Value Property, the Mean Value Theorem, Continuous Nowhere-Differentiable Functions.

SEQUENCES AND SERIES OF FUNCTIONS: Uniform Convergence of a Sequence of Functions, Uniform Convergence and Differentiation, Series of Functions, Power Series, Taylor Series.

THE RIEMANN INTEGRAL: the Definition of the Riemann Integral, Integrating Functions with Discontinuities, Properties of the Integral, the Fundamental Theorem of Calculus, Lebesgue's Criterion for Riemann Integrability.

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

Method of Examination:

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

MATH3555 – COMPLEX ANALYSIS (3 Credits)

Pre-requisite: MATH3550 Real Analysis 2

Syllabus:

THE COMPLEX NUMBER PLANE: algebra, geometry and topology of complex numbers; stereographic projection; curves and regions.

FUNCTIONS OF A COMPLEX VARIABLE: functions, limits and continuity; (complex) differentiability; Cauchy Riemann equations; harmonic functions and introduction to conformal mapping.

INTEGRATION IN THE COMPLEX PLANE: path integrals; Cauchy's theorem and Cauchy-Goursat theorem; Cauchy's formulae; applications: Liouville's theorem, Gauss' fundamental theorem of algebra, maximum modulus theorem, applications in fluid dynamics, logarithms & multi-functions.

SEQUENCES AND SERIES: sequences of complex functions; power series & Cauchy-Taylor theorem; the identity theorem and the maximum principle; analytic continuation; Laurent series.

RESIDUE CALCULUS: isolated singularities; theorem of Casorati-Weierstrass and Picard's theorem; meromorphic functions; the residue theorem; evaluation of real integrals; evaluation of infinite sums.

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

Method of Examination:

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

MATH3560 – INTRODUCTION TO METRIC SPACES & TOPOLOGY (3 Credits)

Pre-requisites: MATH3550 Real Analysis 2

Syllabus:

DEFINITION & EXAMPLES: inequalities (Hölder, Minkowski, Cauchy-Schwarz); definition of a metric space; examples including Euclidean metric, discrete metric, space of all bounded sequences, ℓ^p-spaces, space of bounded/continuous functions.

SEQUENCES AND COMPLETION: sequences in metric spaces; Cauchy sequences in metric spaces; completion of a metric space.

TOPOLOGY: open and closed sets; relationship metric space – topological space; subspaces; countability axioms and separability; Baire's Category Theorem.

CONTINUITY: continuous mappings; extension theorems; real and complex-valued continuous functions; uniform continuity; homeomorphisms, equivalent metrics and isometry; uniform convergence of sequences of functions.

CONTRACTIONS: contraction mappings and applications (e.g., Picard's theorem, inverse function theorem)

COMPACT SETS: bounded sets and compactness; characterizations of compactness; continuous functions on compact spaces; locally compact sets; compact sets in special metric spaces
CONNECTED SETS: connectedness; local connectedness; path-connectedness.

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

Method of Examination:

In-class Tests/Assignments	50%

Final Theory Examination (2 hours)	50%

MATH3565 – PROBABILITY THEORY 2 (3 Credits)

Pre-requisite: MATH2330 Probability Theory 1 & MATH2335 Statistics 1 & MATH2304 Multivariable Calculus & MATH2321 Real Analysis 1

Syllabus:

PROPERTIES OF EXPECTATION: Expectation of Sums of Random variables, Moments of Number of Events that Occur, Covariance, Variance of Sums, and Correlations, Conditional Expectation, Conditional Expectation and Prediction, Moment Generating Functions including Joint Moment Generating Functions, Additional Properties of Normal Random Variables, which will include The Multivariate Normal Distribution and The Joint Distribution of Sample Mean and Sample Variance .

LIMIT THEOREMS: Chebyshev's Inequality and the Weak Law of Large Numbers, The Central Limit Theorem, The Strong Law of Large Numbers and Bounding the Error Probability When Approximating a Sum of Independent Bernoulli Random Variables by a Poisson Random Variable.

FURTHER TOPICS IN PROBABILITY: The Poisson Process, Markov Chains, Surprise, Uncertainty, Entropy, and an Introduction to Coding Theory and Entropy.

SIMULATIONS: General Techniques for Simulation Continuous Random Variables, Simulating from Discrete Distributions and Variance Reduction Techniques.

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

Method of Examination:

Class tests/computer assignments	50%
Final Theory Examination (2 hour)	50%

MATH3570 – STATISTICS 2 (3 Credits)

Pre-requisite: MATH2335 Statistics 1 & MATH3565 Probability Theory 2

Syllabus:

ESTIMATION AND INTRODUCTORY BAYESIAN INFERENCE: Prior and Posterior Distribution, Conjugate Prior Distributions and Bayes Estimators.

FURTHER TOPICS IN ESTIMATION: Multi-parameter Case Estimation and testing, The EM-Algorithm, and Completeness and Uniqueness of Estimator Sufficiency.

OPTIMAL TESTS OF HYPOTHESES: Most Powerful Tests, Uniformly Most Powerful Tests, Likelihood Ratio Tests and The Sequential Probability Ratio Test.

SIMPLE COMPARATIVE EXPERIMENTS: Inferences About the Differences in Means, Inferences About the Differences in Means, Paired Comparison Designs.

RANDOMIZED BLOCKS, LATIN SQUARES AND RELATED DESIGNS: Statistical Analysis of the RCBD Model Adequacy Checking, Estimating Model Parameters and the General Regression Significance Test, The Latin Square Design, The Graeco-Latin Square Design and Balanced Incomplete Block Design

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

Method of Examination:

Class tests/computer assignments	50%
Final Theory Examination (2 hour)	50%

MATH3575 – INTRODUCTION TO NUMERICAL ANALYSIS (3 Credits)

Pre-requisite: MATH2305 Differential Equations & MATH2315 Linear Algebra 1 & MATH3550 Real Analysis 2

Syllabus:

MACHINE ARITHMETIC: real numbers, machine numbers and rounding; machine arithmetic and error propagation in arithmetic operations; cancellation errors.

APPROXIMATION AND INTERPOLATION: least square approximations, inner products, least square errors, convergence; examples of orthogonal systems; polynomial interpolation (e.g., Lagrange, Chebyshev, Hermite); approximation and interpolation by spline functions.

NUMERICAL DIFFERENTIATION AND INTEGRATION: numerical differentiation (formula for unequally spaced points); numerical integration by composite trapezoidal and Simpson's rule; Newton-Cotes and Gauss formulae; applications of the Gauss Quadrature Rule.

NONLINEAR EQUATIONS: examples, iteration, convergence and efficiency; methods of bisection and Sturm sequences; secant and Newton's method (including acceleration); fixed point iteration; contraction mapping principle.

INITIAL VALUE PROBLEMS FOR ODEs: types of differential equations; existence and uniqueness; description of one-step methods: Euler's method, improved Euler's method, Runge-Kutta methods; stability, convergence and asymptotics of global error; error monitoring and step control; stiff problems.

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

Method of Examination:

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

MATH3580 – FOURIER ANALYSIS WITH PARTIAL DIFFERENTIALS EQUATIONS (3 Credits)

Pre-requisite: MATH2305 Differential Equations & MATH2315 Linear Algebra 1 & MATH3550 Real Analysis 2

Syllabus:

GENESIS OF FOURIER ANALYSIS: vibrating string, derivation and solution of the wave equation; the heat equation: derivation of the heat equation and steady-state heat equation in the disc.

BASIC PROPERTIES OF FOURIER SERIES: examples; uniqueness of Fourier series; convolutions; good kernels; Cesàro and Abel summability.

CONVERGENCE OF FOURIER SERIES: mean-square convergence of Fourier series; relation to pointwise convergence; an example of a continuous function with diverging Fourier series.

SOME APPLICATIONS OF FOURIER SERIES: isoperimetric inequality; Weyl's equidistribution theorem; an example of a continuous but nowhere differentiable function; the heat equation on the circle.

FOURIER TRANSFORM ON □: definition of the Fourier transform; Schwartz space; Fourier inversion; Plancherel formula; application to some partial differential equations; Poisson summation formula; Heisenberg uncertainty principle.

FINITE FOURIER ANALYSIS: Fourier inversion theorem and Plancherel identity on $\square_N$; fast Fourier transform.

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

Method of Examination:

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

MATH3590 - MATHEMATICS RESEARCH PROJECT (3 Credits)

Pre-requisite: This course can be taken by students in the Double Major in Mathematics programme who have successfully completed all the second year core Mathematics courses, or by exchange students in Mathematics who have completed the courses on offer at Cave Hill (or equivalent) at their respective home institutions.

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

Syllabus:

Utilize research methods to formulate suitable solutions to an applied or pure problem in Mathematics/Statistics.

Analyse in detail a given applied or pure problem in Mathematics/Statistics and provide solutions to the problem.

Use the LaTeX system in mathematical writing.

Present mathematical research both orally and in writing.

Teaching: Students are required to meet with their supervisors regularly (at least 6 times per semester) to discuss their research. They will research an advanced topic/problem including looking for. appropriate literature give a final oral presentation and write a final report. Students will be informed of the deadlines for the submission of the project proposal and final report and the week of the final oral presentations.

Ideally, students should contact a potential supervisor at the end of the semester prior to the semester they wish to take this course in to discuss the suitability of their project.

Method of Examination:

either

AMS-style Oral Mid-Semester Presentation (12 min plus 3 min for questions) 15%

or

Preparation of an DIN-A0 conference-style poster *(either will be assessed by members of staff no later than the 7th week of the semester)*

Final Oral Presentation: 25%

Final Report: 60%

MATH3600 – INTRODUCTION TO DISCRETE AND COMPUTATIONAL GEOMETRY (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems & MATH1235 Python Programming & Mathematical Software & 12 credits from Level II & III Mathematics courses

Syllabus:

POLYGONS: Polygonal Jordan curves, Triangulations, Art Gallery Theorem, Scissors Congruence & Hilbert's Third Problem.

CONVEX HULLS: Convexity, Algorithms (Incremental Algorithm, Gift Wrapping, Divide-and-Conquer).

TRIANGULATIONS: Construction, the Flip Graph, Associahedron, Delaunay Triangulation.

VORONOI DIAGRAMS: Voronoi Geometry, Duality and the Delaunay Triangulation.

CURVES: Medial Axis, Straight Skeleton, Applications (Ricci flow, surface reconstruction etc.)

Teaching: Two (2) lectures and one tutorial per week

Method of Examination:

In-class Test(s)/Assignment(s)	50%
Final Theory Examination (2 hour)	50%

MATH3605 – INTRODUCTION TO GRAPH THEORY (3 Credits)

Pre-requisite: MATH1152 Sets and Number Systems & MATH1235 Python Programming & Mathematical Software & 12 credits from Level II & III Mathematics courses

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:

BASICS: Subgraphs, Components, Degrees of Vertices, Minors, Paths and Connectedness, Bipartite Graphs, Dual graphs, Isomorphisms, Examples of various graphs.

PATHS: Eulerian and Hamiltonian graphs.

DIRECTED GRAPHS: Orientable Graphs, Connectedness and Strong Connectedness, Tournaments.

TREES: Properties of Trees, Centers and Centroids, Counting the Number of Spanning Trees, Cayley's theorem.

CONNECTIVITY: Vertex Cuts and Edge Cuts, Connectivity and Edge-Connectivity.

MATCHINGS: Hall's marriage theorem.

NETWORKS: Flows, Ford-Fulkerson algorithm, maximum flow & minimum cut theorem.

GRAPH COLOURINGS: Vertex Colorings, Triangle-free Graphs, Edge Colorings.

PLANARITY: Planar and Nonplanar Graphs, K_5 and $K_{3;3}$, the Four-Color Theorem and Heawood's Five-Color Theorem.

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

Method of Examination:

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

MATH3620 – FINANCIAL MATHEMATICS 1 (3 Credits)

Pre-requisite: MATH2304 Multivariable Calculus & MATH2330 Probability Theory 1 & MATH2315 Linear Algebra 1 & MATH2335 Statistics 1

Course Co-requisite(s): MATH3565 Probability Theory 2.

Syllabus:

INTEREST RATE MEASURMENTS: Time Value of Money, Compound Interest, Simple Interest, Present Value, Future Value, Accumulation Functions, Effective Interest Rate, Nominal Interest Rate, Periodic Interest, Convertible Interest, Discount Rate, Nominal Discount Rate, Conversion of Nominal Interest Rate to Discount Rate, Accumulation Functions, Continuous Interest, Force of Interest, Constant Force of Interest, and Equation of Value.

VALUATION OF ANNUITIES: Annuities, Annuity Immediate, Annuity Due, Unit Annuity, Timelines, Geometric Series, Future Value of Annuities, Perpetuities, Annuities with Level Payments, Continuous Annuities, Annuities with Varying Payments, Increasing Annuities, Decreasing Annuities, Annuities with Arithmetic Progression, Annuities with Geometric Progression, Deferred Annuities, Variable Annuities, and Reinvestment Problems.

LOAN REPAYMENTS: Amortization, Amortization Table, Amortization with Variable Payments, Amortization with Level Payments, Prospective Method, Retrospective Method, Amortization with Arithmetic Payments, Amortization with Geometric Payments, Amortization with Monthly Payments, Instalment Loan, Sinking Fund, Net Interest, Sinking Fund Deposit, Sinking Fund Balance, Capitalization of Interest, and Negative Amortization.

BOND VALUATION: Bonds, Face Value, Par Value, Coupon Rate, Redemption Value, Premium Bond, Discount Bond, Bond Price, Premium- Discount Formula for Bonds, Makeham's Formula, Amortization of Premium, Amortization of Discount, Amount for Accumulation of Discount, Negative Amortization of Discount, Callable Bond, Call Provisions, Pricing Bonds between Payment Dates, Price-Plus Accrued, Flat Price, Settlement Date, Market Price, Accrued Interest and True Price.

MEASURING THE RATE OF RETURN ON AN INVESTMENTS: Internal Rate of Return, Cash Flow, Modified Internal Rate of Return, Borrowing Projects, Time Weighted Rate, Dollar Weighted Rate, Investment Year Method, Portfolio Method, New Money Rate and Net Present Value.

THE TERM STRUCTURE OF INTEREST RATES: Term Structure of Interest Rates, Zero Coupon Bond, Risk-Free Rates, Spot Rate, Yield Curve, Treasury STRIP bond, Inverted Yield Curve, Flat Yield Curve, Law of One Price, Forward Rate and Implied Forward Rate.

CASHFLOW DURATION AND IMMUNIZATION: Assets, Liabilities, Liability Management, Matching Assets and Liabilities, Duration, Interest Rate Risk, Weighted Average, Macaulay Duration, Modified Duration, Volatility, Macaulay Duration of Coupon Bond, Taylor Series, Price Function P(i), Convexity, Change in Price, Duration of Portfolio, Parallel Shift in Yield Curve, Immunization, Present Value Matching, Duration Matching, Greater Convexity for Assets, Fully Immunized, Stocks, Dividends, Price of Stock, Mutual Funds and Certificate of Deposit.

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

Method of Examination:

Class tests/computer assignments	50%
Final Theory Examination (2 hour)	50%

MATH3621 – FINANCIAL MATHEMATICS 2 (3 Credits)

Pre-requisite: MATH3620 Financial Mathematics 1 & MATH3565 Probability Theory 2

Syllabus:

INTRODUCTION TO DERIVATIVES: Derivative Security, Hedging, Bid-ask Spread and Long Position in Stock.

INSURANCE, HEDGING, AND SIMPLE STRATEGIES: Forward Contract, Spot Price, Stock Index, Cash Settlement, Long Forward, Short Forward, Payoff for Forward, Profit for Forward, Zero Coupon Bond Profit, Call Option, European Option, American Option, Bermudan Option, Premium, Written Call Option, Put Option, Written Put Option, In the Money Option, At the Money Option, Out of the Money Option, Insurance, Options S and Equity Linked CD.

INSURANCE, COLLARS, AND OTHER STRATEGIES: Floor Strategy, Cap Strategy, Covered Call, Covered Put, Parity, Put-Call, Covered Put, Parity, Put-Call, Synthetic Forward, Spread, Bull Spread, Bear Spread, Box Spread, Collar, Collar, Hedging with Zero Cost Collar, Straddle, Strangle and Equity Linked Notes (Marshall & Isley).

FORWARDS, FUTURES, AND SWAPS: Prepaid Forward Price, Arbitrage Pricing, Forward Contract on Stock, Pricing , Forward Premium, Synthetic Stock, Hedging with a Synthetic Stock, Cash and Carry Hedge, Quasi Arbitrage, Cost of Carry, Lease Rate, Futures Contracts, Clearing House, Open Outcry, Mark to Market, S&P 500 Futures Prices Compared and Quanto Index Contracts.

INTEREST RATE FORWARDS AND FUTURE: Spot Rate, Forward Interest Rate, Zero-Coupon Bonds, Implied Forward Rate, Forward Rate Agreement (FRA) and Eurodollars.

THE TERM STRUCTURE OF INTEREST RATES: Term Structure of Interest Rates, Zero Coupon Bond, Risk-Free Rates, Spot Rate, Yield Curve, Treasury STRIP bond, Inverted Yield Curve, Flat Yield Curve, Law of One Price, Forward Rate and Implied Forward Rate.

SWAPS: Swap, Oil, Swap Payments, Dealer as Swap Counterparty, Swap, Market Value, Interest Rate Swap, Swap Rate R, Swap Curve, Accreting Swap, Amortizing Swap, and Swap Rate General Formula.

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

Method of Examination:

Class tests/computer assignments	50%
Final Theory Examination (2 hour)	50%

PHYSICS

PRELIMINARY PHYSICS COURSES

PHYS0070 - PRELIMINARY PHYSICS I (6 Credits)

Pre-requisite: None

Syllabus: SI system and standard units, dimensional analysis, vectors (graphical and analytical) Equilibrium, Newton's first law, third law, friction, motion in a straight line, average and instantaneous velocity & acceleration, accelerated motion, free fall, relative velocity Motion in a plane, projectiles, circular motion, centripetal force, Newton's second law & applications. Gravitation, mass and weight, satellite motion. Work & kinetic energy, gravitational & elastic potential energy, dissipative and conservative forces, power, simple machines moments & torque, couples. Stress, strain, elastic moduli, force constant, Hooke's law, simple harmonic motion (basic concepts), SHM & circular motion, mass-spring system, simple pendulum, pressure in a fluid, pressure gauges, Archimedes principle, surface tension, pressure difference across surface film, contact angle and capillaries, Bernoulli's equation (applications), viscosity, Stoke's law, Reynold's number. The temperature concept, thermometers, scales, thermal expansion and stress. Heat capacity, phase changes, conduction, convection, radiation, Stefan-Boltzman law, ideal radiator, solar energy, ideal gas, equation of state, phase diagrams, triple and critical points, vapour pressure, effect of dissolved substances on freezing and boiling point, first law of thermodynamics, energy and work, work and heat, adiabatic, isochoric, isothermal and isobaric processes, internal energy, molecular theory of motion, kinetic theory of ideal gas. Mechanical waves, waves, mathematical representation, waves at boundaries, standing waves, interference of sound waves, beats, sound intensity, the decibel, the ear & hearing, quality and pitch, Doppler effect, ultrasonics and applications.

Teaching: Three (3) lectures, one tutorial per week and 52 hours of practical work.

Method of Examination:

Final Theory Examination (3 hours)	70%
In-course Tests/Assignments	20%
Practical Reports	10%

PHYS0071 - PRELIMINARY PHYSICS II (6 Credits)

Pre-requisite: None

Syllabus: Charge, Coulomb's law, insulators and conductors. Electric field, lines of force,electric potential, potential differences, electron volt (Millikan's experiment, CRO). Capacitance, series and parallel combination, energy in a charge capacitor. Dielectrics, current Resistivity, resistance, EMF, work and power, resistors in series and parallel. Kirchhoff's laws, Wheatstone bridge and potentiometer. The magnetic field, lines of force, magnetic flux, motion in a magnetic field. Thomson's measurement of e/m, isotopes and spectrography. Force on conductor. Torque on a current loop. The d.c. motor, pivoted-coil galvanometer. Magnetic field of a long straight wire. Force between parallel conductors, the ampere, induced EMF. Faraday's law, Lenz's law. Eddy currents. The nature of light, speed of light (experimental). Waves and rays. Refraction and reflection. Snell's law. Total internal reflection. Dispersion. Single surface images Reflection from plane and spherical surfaces, refraction at plane and spherical surfaces. Focal point and length. Graphical and analytical methods. Images as objects. Thin lens, diverging lens, lensmaker equation. Aberrations, the eye, defects of vision. Magnifier, camera, projector, compound microscope, telescope, etc. Atomic nucleus, nuclear radiation. Isotopes and isobars, binding energy and stability. Alpha, beta and gamma rays. Decay law, decay constant. Half life, activity, radioactivity series, radioactive shielding, radiation and the life sciences.

Teaching: Three (3) lectures, one tutorial per week and 52 hours of practical work.

Method of Examination:

Final Theory Examination (3 hours)	70%
In-course Tests/Assignments	20%
Practical Reports	10%

LEVEL I PHYSICS COURSES

PHYS1200 – PHYSICS I: MECHANICS OF TRANSLATIONAL MOTION (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2

Co-requisite: PHYS1205 Physics II: Rotation, Waves and Thermodynamics

Objectives: Fundamentals of kinematics and dynamics of classical particles

Syllabus: Kinematics: Displacement, velocity and acceleration vectors. Constant acceleration in one dimension. Scalar and cross products. Projectile motion. Vector treatment of uniform circular motion. Dynamics: Force, mass, Newton’s laws of motion. Static and kinetic friction; drag force. Centripetal force. Energy: Kinetic energy, work and the work-energy theorem. Work by gravity and springs; work done by a general variable force. Potential energy, conservative forces, conservation of mechanical energy, potential energy curves, energy and friction. Centre of mass, Newton’s second law for a system of particles. Momentum: Linear momentum, impulse, conservation of linear momentum. Inelastic and elastic collisions in one dimension. Collisions in two dimensions. Systems with varying mass; rockets.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during first six (6) weeks of Semester I.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests/Assignments	20%
Practical Reports	20%

PHYS1205 – PHYSICS II: ROTATION, WAVES AND THERMODYNAMICS (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2.

Co-requisite: PHYS1200 Physics I: Mechanics of Translational Motion.

Objectives: Fundamentals of rotation, mechanical waves and thermodynamics.

Syllabus: Rotation: Rotational variables, angular velocity and angular acceleration. Constant angular acceleration. Relation between linear and angular variables. Kinetic energy of rotation, rotational inertia and torque. Newton's second law applied to rotating systems. Rolling motion as a combination of translation and rotation. Angular momentum, rigid body rotation. Conservation of angular momentum, precession of a gyroscope. Waves: Simple harmonic motion. Energy in simple harmonic motion. Transverse and longitudinal waves. Traveling waves energy and power transmitted. Wave equation, superposition and interference of waves, standing waves and the Doppler effect. Thermodynamics: Temperature, heat and the first law of thermodynamics. Ideal gas equation of state and properties. Absorption of heat by liquids and solids. Mean free path, pressure, temperature and RMS speed. Adiabatic expansion of ideal gas. Second law of thermodynamics and entropy. Heat engines, refrigerators; efficiencies of real engines and refrigerators.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during second six (6) weeks of Semester I.

Method of Examination:	Final Theory Examination (2 hours)	60%
	In-class Tests/Assignments	20%

Practical Reports	20%

PHYS1210 – PHYSICS III: ELECTRIC FIELDS, CURRENTS AND CIRCUITS (3 Credits)

Pre-requisite: CAPE Physics Units 1 & 2 and CAPE Pure Mathematics Units 1 & 2.

Co-requisite: PHYS1220 Physics IV: Magnetism, Electromagnetic Waves and Optics.

Objectives: Fundamentals of electric fields, electric potential, current, resistors and capacitors, simple circuits.

Syllabus: Electric fields: Electric charge and Coulomb's law. Electric field lines and Electric dipoles. Integration of charge distributions. Electric flux and Gauss' law. Electric potential and potential energy. Potential due to discrete and continuous charge distributions. Capacitance. Capacitors in series and parallel. Energy stored in capacitors, dielectrics. Currents and Circuits: Electric current and current density. Resistance and resistivity. Ohm's law, microscopic view. Power in electric circuits. Electromotive force (emf), work and energy. Calculation of currents in single and multiple-loop circuits. Ammeters and voltmeters. *RC* circuits.

Teaching: Three (3) one-hour lectures, one (1) hour of tutorial and four (4) hours of practical per week. Course runs during first six (6) weeks of Semester II.

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests/Assignments	20%
Practical Reports	20%

PHYS1220 – PHYSICS IV: MAGNETISM, 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 (3 Credits)

Pre-requisites: None

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

LEVEL III PHYSICS COURSES

PHYS3420 – ELECTROMAGNETIC THEORY I (3 Credits)

Pre-requisite: PHYS2405 Mathematical Methods in Physics II.

Objectives: Fundamentals of quantitative electromagnetic theory treated with vector calculus and differential equations.

Syllabus: Scalar product, vector product, triple products, transformation properties of vectors, gradient, divergence and curl, vector identities, Laplacian, divergence theorem, Stokes' theorem, spherical and cylindrical coordinates, Dirac delta function, Coulomb's law, electric field, continuous charge distributions, Gauss' law, electric potential, Laplace's equation, Poisson's equation, boundary conditions, energy of assembling charge distributions, conductors and induced charge, capacitors, Earnshaw's theorem, uniqueness theorems, method of images, applications of separation of variables to Laplace's equation in Cartesian, cylindrical and spherical coordinate systems, multipole expansion of the electric potential, electric field of a dipole, Lorentz force law, currents, Biot-Savart law, divergence and curl of the magnetic field, Ampere's law, magnetic vector potential, magnetic boundary conditions, multipole expansion of the vector potential, electromotive force, Ohm's law, drift velocity, motional emf, Faraday's law, induced electric field, inductance, energy in magnetic fields, displacement current, Maxwell's equations, continuity equation and conservation of charge.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Practical Assignments	20%

PHYS3445 – FUNDAMENTALS OF GENERAL RELATIVITY AND COSMOLOGY (3 Credits)

Pre-requisite: PHYS2410 Modern Physics; PHYS2405 Mathematical Methods in Physics II.

Objectives: Mathematical treatment of special and general relativity with an introduction to Cosmology.

Syllabus: Review of special relativity, Einstein's postulates, Lorentz transformations, four-vectors, velocity, momentum and energy, addition of velocities, four-velocity, light cone, proper time, time dilations, Doppler effect, Lorentz invariance, conservation laws, invariance of electric charge, covariance of electrodynamics. General relativity: time dilation in a gravitational field, rank of tensors, covariant and contravariant four-vectors, metric and Kronecker tensors, invariant equations, tensor algebra, tensor calculus, principle of equivalence, principle of general covariance, generally covariant forms of Maxwell's equations, curvature tensor, geometric analogies, Einstein's field equations, weak field, gauge invariance. Cosmology: measurements of cosmological distances, red shifts, standard model of cosmology, stellar equilibrium and collapse, Newtonian stars, white dwarfs, Chandrasekhar limit, neutron stars, supermassive stars, gravitational collapse, black holes, Schwarzschild solution, cosmological principle, tests of Einstein's theory, generation and detection of gravitational waves, early history of the universe, inflation, age of the universe, cosmic microwave background, curvature and the fate of the universe.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3450 – FLUID MECHANICS (3 Credits)

Pre-requisite: PHYS2415 Theory of Classical Mechanics.

Objectives: Fundamentals of the principles and theory of fluid mechanics.

Syllabus: Density, pressure, fluids in equilibrium, pressure gauges, Pascal's principle, Archimedes principle, buoyancy, types of flow, equation of continuity, Bernoulli's equation, scalars, vectors, tensors, contraction and multiplication, force on a surface, gradient, divergence and curl, divergence theorem, Stokes' theorem, particle and field description of fluid motion, flow lines, fluid acceleration and Galilean transformation, strain, rotation rates, simple plane flows, Reynold's transport theorem, conservation of mass, stream functions, conservation of momentum, constitutive equation for a Newtonian fluid, Navier- Stokes momentum equation, noninertial frame of reference, conservation of energy, boundary conditions, Kelvin and Helmholtz theorems, vorticity equation in an inertial frame of reference, interaction of vortices, exact solutions of steady laminar flow, elementary lubrication theory, similarity solutions for incompressible viscous flow, oscillations, low Reynold's number flow past a solid sphere.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3455 – LASERS AND OPTICAL SYSTEMS (3 Credits)

Pre-requisite: PHYS2400 Mathematical Methods in Physics I.

Objectives: Advanced quantitative study of principles of optics and lasers.

Syllabus: Complex representation of waves, plane waves, spherical waves, converging and diverging waves, paraxial approximation, Michelson interferometer, Fabry-Perot interferometer, addition of propagating waves, division of wave front, amplitude interferometers, multiple coherent oscillators, Huygens' principle, Fresnel formulation, Rayleigh-Sommerfeld diffraction, Fresnel and Fraunhofer diffraction, rectangular apertures, circular apertures, Rayleigh's criterion, Fresnel diffraction from straight edges, Cornu spiral, polarization, quarter and half wave plates, retarders, circular polarizers, Jones calculus, Mueller calculus, Faraday effect, Kerr effect, Pockel effect, Fourier optics, intensity impulse response, resolution, incoherent transfer function, point spread function, optical transfer function, modulation transfer function, lasers, population inversion, stimulated emission, Einstein's coefficients, solid state, gas, liquid and dye lasers, tunable, high power, high stability and short pulse lasers, width of spectral lines, gain of a lasing medium, Doppler, natural and collision broadening of spectral lines, axial and longitudinal modes of a laser cavity.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3460 – PHYSICS OF SUSTAINABLE ENERGY SYSTEMS (3 Credits)

Pre-requisite: PHYS2415 Theory of Classical Mechanics

Objectives: An in-depth survey of renewable energy systems: wind turbines, photovoltaics, hydroelectric, wave energy, ocean thermal energy conversion, storage.

Syllabus: Global energy system: social, economic and environmental impact. Wind turbines: wind resource assessment, wind turbine aerodynamics, airfoils, Betz coefficient, wind turbine control, turbine dynamics, small-scale wind power. Solar systems: solar radiation, geometric effects, atmospheric effects, spectrum, insolation, design, construction and operating principles of solar collectors, flat plate collectors, heat transfer characteristics. Hydroelectric plants: Precipitation, run-off, classification of hydroelectric power plants, design, construction and operation of dams, spillways, canals, penstocks, surge tanks, drift tubes, selection of turbine, speed and pressure regulation, governing, starting and stopping water turbines. Marine energy: ocean thermal energy conversion and sea water air conditioning, wave energy conversion,. Electrical integration: centralized versus embedded generation, electric grids, demand curves and penetration from renewables, demand side management-deferrable loads, multiple voltages, generator characteristics and usage. Energy storage: energy densities, efficiency, lifetime, batteries, fuel cells, compressed air turbines, flywheels.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3465 – ELECTROMAGNETIC THEORY II (3 Credits)

Pre-requisite: PHYS3420 Electromagnetic Theory I

Objectives: A quantitative study of advanced topics in electromagnetic theory that builds on the principles learned
in PHYS3420 (Electromagnetic Theory I).

Syllabus: Electric and Magnetic Fields in Matter: Atomic polarizability, electric field of a polarized object, bound charge, electric filed inside a dielectric, electric displacement, Gauss' law in the presence of dielectrics, susceptibility and permittivity, boundary value problems with linear dielectrics, energy and forces in dielectrics, torques and forces on magnetic dipoles, paramagnetism, effect of magnetic fields on atomic orbits, diamagnetism, magnetization, bound currents and their physical interpretation, auxiliary field, boundary conditions, linear and nonlinear media, ferromagnetism. Conservation Laws: Continuity equation, Poynting's theorem, momentum in electromagnetic fields, Maxwell's stress tensor, conservation of momentum, conservation of angular momentum. Electromagnetic Waves: Properties of waves and the wave equation, boundary conditions, reflection and transmission, Snell's law, polarization, monochromatic plane waves, energy and momentum in electromagnetic waves, electromagnetic waves in media, absorption and dispersion, wave guides, coaxial transmission lines. Potentials and Radiation: Gauge transformations, Coulomb and Lorentz gauges, retarded potentials, Jefimenko's equations, Lienard-Wiechert potentials, field due to a moving charge, electric dipole radiation, power radiated by moving point charges.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3470 – BIOLOGICAL PHYSICS (3 Credits)

Pre-requisite: PHYS3485 Theory of Statistical Mechanics.

Objectives: An exploration of the connection between physics and biological systems at all levels: molecular,
organelle, cellular, organism and population.

Syllabus: Biological systems overview: prokaryotes, eukaryotes, organelles, ATP, DNA, tRNA, mRNA, proteins, enzymes, ribosomes, mitochondria, membranes, endoplasmic reticulum, microtubules, multicellular organisms, intercellular communication, cell differentiation, populations, evolution. Statistical mechanics and living systems: biological order, osmotic flow, Gibbs free energy, entropy, Boltzmann distribution, self-assembly of lipid bilayers, protein folding, aggregation, diffusion. Filaments in cells: elasticity of polymers, resistance of stretching from entropy, actin, cytoskeleton, microtubules, filament networks. Membranes: bilayer compression and bending resistance, thermal fluctuations and membrane shape, folding, locomotion, interactions between membranes. Molecular machines: transport in the cell, molecular motors and flagella, active pumping, sodium-potassium pumps, mitochondria and ATP synthesis. Information theory and evolving populations: information in living systems, acquisition of information through evolution, predator-prey relationships and the Lotka-Volterra equations.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3475 – FUNDAMENTALS OF SOLID STATE PHYSICS (3 Credits)

Pre-requisite: PHYS2410 Modern Physics.

Objectives: A thorough grounding in the study of thermal, acoustic and electro-optical properties of crystals and amorphous solids

Syllabus: Bravais lattices, crystal planes and directions, Miller indices, types and classifications of crystal structure, interatomic forces and bonding, Bragg's law, scattering from atoms and crystals, reciprocal lattice, x-ray diffraction, experimental techniques of diffraction, Ewald construction, elastic waves, phonons, density of states function, Einstein and Debye specific heats, limitations of Einstein and Debye models, conduction electrons, properties of the free electron gas, thermal conductivity, electrical conductivity, heat capacity of conduction electrons, Fermi surface, Hall effect, limitations of the free electron model, Bloch's theorem, Brillouin zones, density of states, nearly free electron model, calculations of energy bands, metals, insulators, semiconductors, velocity and effective mass of Bloch electron, crystal momentum, holes, electrical conductivity, semiconductor statistics.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3480 – THEORY OF QUANTUM MECHANICS (3 Credits)

Pre-requisite: PHYS2410 Modern Physics; PHYS2405 Mathematical Methods in Physics II

Objectives: Fundamentals of the formal theory of quantum mechanics with advanced mathematical treatment

Syllabus: Schrodinger's equation, statistical interpretation of wave function, expectation values, normalization, momentum operator, Ehrenfest's theorems, Heisenberg's uncertainty principle, stationary states, construction of time dependent wave function from stationary states, infinite square well, harmonic oscillator, ladder operators, free particle, group velocity, versus phase velocity, Gaussian wave packet, finite square well, Hilbert space, inner products, eigenfunctions, eigenvalues, Dirac notation, Hermitian operators, Hermitian conjugate, continuous spectra, generalized uncertainty principle, commutators, time dependence of expectation values, spectral decomposition, Schrodinger's equation in three dimensions, solution in spherical coordinates, angular and radial solutions, spherical infinite potential well, hydrogen atom, angular momentum operators, commutation relations, ladder operators for angular momentum, normalization, Pauli spin matrices, electron in a magnetic field, Larmour frequency, addition of angular momenta.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3485 – THEORY OF STATISTICAL MECHANICS (3 Credits)

Pre-requisite: PHYS2410 Modern Physics; PHYS2400 Mathematical Methods in Physics I

Objectives: Fundamentals of the formal theory of statistical mechanics with advanced mathematical treatment and some applications.

Syllabus: Probable configurations of systems using spin models, entropy introduced as the logarithm of the number of accessible states, thermal equilibrium, temperature introduced as the derivative of entropy with respect to energy, law of increase of energy for isolated systems, Boltzmann distribution, partition function, internal energy and heat capacity, pressure, Helmholtz free energy, quantum concentration, entropy of mixing, Planck distribution for a single mode, number of modes in a cavity, energy density and total internal energy, Stefan-Boltzmann law of radiation, energy flux density, equivalence of a black body to the cavity, absorptivity and emissivity, chemical potential, ideal gas, internal and external chemical potential with examples, derivation of the Gibbs distribution with examples, Fermi and Bose distributions, classical limit, derivation of properties of the ideal gas in the classical limit, entropy and the Sackur-Tetrode equation, heat capacity, internal energy, equation of state, ground state of the Fermi gas, Fermi energy, density of states, heat capacity of an electron gas, applications of the Fermi gas to white dwarf stars, Einstein condensation and the Einstein condensation temperature.

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

Method of Examination:

Final Theory Examination (2 hours)	60%
In-class Tests	20%
Tutorial Assignments	20%

PHYS3490 – PHYSICS ONE-SEMESTER RESEARCH PROJECT (3 Credits)

Pre-requisite: Restricted to final year students majoring in Physics.

Objectives: Application and development of Physics knowledge to research area for one-semester duration

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 (3 credits) and must therefore reach that standard in terms of content and research effort. The research will be summarized in a written report by the student of approximately thirty (30) pages.

The report submitted at the end of the semester will summarize the results and contain the following: introduction, method, apparatus, data, analysis of results including calculated uncertainties of the results, conclusion. An oral presentation shall be delivered by the student at the end of the semester to a panel of faculty members which includes the supervisor.

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

Method of Examination:

Written Report	70%
Oral Examination	30%

PHYS3495 – PHYSICS TWO-SEMESTER RESEARCH PROJECT (6 Credits)

Pre-requisite: Restricted to final year students majoring in Physics.

Objectives: Application and development of Physics knowledge to research area for two-semester duration

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 two Faculty courses (6 credits) and must therefore reach that standard in terms of content and research effort. The research during the first semester will be summarized in a written report by the student of approximately thirty (30) pages. The report submitted at the end of the semester will mainly concern the background for the research and progress that has been made during that semester. An oral presentation shall be delivered on these topics at the end of the semester to a panel of faculty members which includes the supervisor. At the end of the second semester, a final written report, also containing approximately thirty (30) pages, shall be submitted containing the following: introduction, method, apparatus,, data, analysis of results including calculated uncertainties of the results, conclusion. A final oral presentation shall be delivered by the student at the end of the second semester to a panel of faculty members which includes the supervisor.

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

Method of Examination:

Written Report	(Semester I)	35%
Oral Examination	(Semester I)	15%
Written Report	(Semester II)	35%
Oral Examination	(Semester II)	15%

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: METE1125: Meteorological Observations and Basic Analysis
METE1130: Introduction to Physical Meteorology
METE1135 Introduction to Dynamic Meteorology
(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(or METE1110) and METE1305 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

METE2110 – ATMOSPHERIC THERMODYNAMICS (3 Credits)

Pre-requisites: MATH1190 Calculus A & MATH1195 Calculus B (or MATH1120 Calculus I & MATH1130 Calculus II); METE1110 Introduction to Oceans and Climate; METE1125 Meteorological Observations, Instruments and Basic Analysis; METE1130 Introduction to Physical Meteorology and METE1135 Introduction to Dynamic Meteorology (or METE1000 Introduction to Physical Meteorology & Weather Observations, METE1100 Introduction to Dynamic Meteorology & Weather Systems and METE1200 Oceans & Climate or METE1010 Introduction to Meteorology I and METE1011 Introduction to Meteorology II).

Syllabus: Atmospheric composition. Equation of state for dry air. The first law of thermodynamics. Entropy. Thermodynamic diagrams. Equation of state for moist air. Vapour content of moist air. Thermodynamics of moist unsaturated air. Saturation. The pseudoadiabatic process. Hydrostatic equilibrium. Special atmospheres and the standard atmosphere. Dry adiabatic and pseudoadiabatic lapse rates. Buoyancy forces. Stability criteria for dry air and for moist air. Convective instability. Buoyant convection.

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

Method of Examination:

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

METE2120 - PHYSICAL METEOROLOGY (3 Credits)

Pre-requisites: MATH1190 Calculus A & MATH1195 Calculus B (or MATH1120 Calculus I & MATH1130 Calculus II); METE1110 Introduction to Oceans and Climate; METE1125 Meteorological Observations, Instruments and Basic Analysis; METE1130 Introduction to Physical Meteorology and METE1135 Introduction to Dynamic Meteorology (or METE1000 Introduction to Physical Meteorology & Weather Observations, METE1100 Introduction to Dynamic Meteorology & Weather Systems and METE1200 Oceans & Climate or METE1010 Introduction to Meteorology I and METE1011 Introduction to Meteorology II).

Syllabus: Nucleation. Growth of cloud droplets by condensation and by collision and coalescence. Elementary growth models. Formation and growth of ice crystals. Drop size distribution functions. Widespread and convective precipitation. Electromagnetic radiation. Black body and laws of blackbody radiation. Scattering, reflection, absorption and emission of radiation in the atmosphere. Electronic, vibrational, and rotational transitions. Solar constant. Undepleted and depleted solar radiation. Determination of terrestrial radiation. Cloud destabilization and nocturnal development of thunderstorms. Mean heat balance of earth-atmosphere system. Atmospheric greenhouse effect. Meridional transfer processes. Selected optical phenomena. Atmospheric electricity. Atmospheric ozone.

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

Method of Examination:

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

METE2100 - DYNAMIC METEOROLOGY I (4 Credits)

Pre-requisites: MATH1190 Calculus A & MATH1195 Calculus B (or MATH1120 Calculus I & MATH1130 Calculus II); METE1110 Introduction to Oceans and Climate; METE1125 Meteorological Observations, Instruments and Basic Analysis; METE1130 Introduction to Physical Meteorology and METE1135 Introduction to Dynamic Meteorology (or METE1000 Introduction to Physical Meteorology & Weather Observations, METE1100 Introduction to Dynamic Meteorology & Weather Systems and METE1200 Oceans & Climate or METE1010 Introduction to Meteorology I and METE1011 Introduction to Meteorology II).

Co- requisites: PHYS2400 Mathematical Methods in Physics I

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: MATH1190 Calculus A & MATH1195 Calculus B (or MATH1120 Calculus I & MATH1130 Calculus II); PHYS2400 Mathematical Methods in Physics I ; METE1110 Introduction to Oceans and Climate; METE1125 Meteorological Observations, Instruments and Basic Analysis; METE1130 Introduction to Physical Meteorology and METE1135 Introduction to Dynamic Meteorology (or METE1000 Introduction to Physical Meteorology & Weather Observations, METE1100 Introduction to Dynamic Meteorology & Weather Systems and METE1200 Oceans & Climate or METE1010 Introduction to Meteorology I and METE1011 Introduction to Meteorology 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: MATH1190 Calculus A & MATH1195 Calculus B (or MATH1120 Calculus I & MATH1130 Calculus II);

Syllabus: The hydrological cycle and water balance concepts. Precipitation measurement and analysis. Interception and interception loss. Evaporation and evapo-transpiration measurement and estimation. Infiltration measurement and estimation. Rainfall-runoff processes.

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: METE2110 Atmospheric Thermodynamics, METE2120 Physical Meteorology (or 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: METE1110 Introduction to Oceans and Climate or 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 Assignment & Computer Exercises	30%