

**THE UNIVERSITY  
OF THE  
WEST INDIES**

**CAVE HILL CAMPUS**



**FACULTY OF  
PURE AND APPLIED SCIENCES**

<http://www.cavehill.uwi.edu/fpas>

**HANDBOOK  
2007-2008**

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*This booklet gives information on Courses offered in the Faculty of Pure and Applied Sciences 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) Campuses.*

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

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## INTRODUCTION TO THE FACULTY

The University of the West Indies is a regional and international institution primarily serving the needs of the Commonwealth Caribbean. Established in 1948 at Mona, Jamaica, as a college in special relationship with the University of London, it received full university status in 1962, as an independent degree-granting institution. In 1960, a second campus was established at St Augustine, Trinidad, and in 1963 teaching started in Barbados, first at a temporary site at the Bridgetown Port and in 1964 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 Science & Technology before settling on the current name of the Faculty of Pure & Applied Sciences. Our full-time Academic Staff are mainly Caribbean nationals but we are also very much an international Faculty with about one third of our lecturers drawn from countries far and wide. Our degree programmes are well-respected regionally and internationally with many of our graduates working or pursuing further studies overseas. The Faculty comprises three sections:-

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

In the undergraduate BSc programme, courses are offered in all major scientific disciplines, with first year courses also taught at Tertiary Level Colleges in Antigua and St. Lucia. Students may Major in one or two disciplines and current enrollment in the Faculty is just over one thousand undergraduates, most of whom are full-time students.

Science graduates may register for the research degrees of M.Phil. and Ph.D. under the supervision of a member of the Academic Staff. The Faculty also offers two taught MSc programmes, the well-established MSc in Natural Resource and Environmental Management and the new MSc in Electronic Commerce.

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.

# CALENDAR

## 2007-2008

### SEMESTER DATES

ACADEMIC YEAR 2007/2008

#### SEMESTER I

Semester Begins	August 26, 2007
Registration Week	August 27 – August 31, 2007
Teaching Begins	September 03, 2007
Teaching Ends	November 30, 2007
Examinations Begin	December 05, 2007
Examinations End	December 21, 2007
Semester Ends	December 21, 2007

#### SEMESTER II

Semester Begins	January 13, 2008
Teaching Begins	January 14, 2008
Semester Break	February 24 – March 01, 2008
Teaching Resumes	March 03, 2008
Teaching Ends	April 18, 2008
Examinations Begin	April 23, 2008
Examinations End	May 14, 2008
Semester Ends	May 14, 2008

**FACULTY OF PURE AND APPLIED  
SCIENCES  
CAVE HILL CAMPUS STAFF LIST  
2007-2008**



**Professor C.M. Sean Carrington  
DEAN**



**Dr. Colin Depradine  
DEPUTY DEAN**



**Mr. Peter Gibbs  
DEPUTY DEAN (OUTREACH &  
RESEARCH)**

**ADMINISTRATIVE ASSISTANT:**

Ms. Kay Browne, B.Sc. 417-4311

**ADMINISTRATIVE ASSISTANT:**

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Ms. Gloria Harper 417-4312  
(Temporary)

**STENOGRAPHER/CLERK:**

Miss Shana Odle 417-4310  
(Temporary)

**OFFICE ASSISTANT:**

Mr. Anthony Howell 417-4312

**DEPARTMENT OF BIOLOGICAL &  
CHEMICAL SCIENCES**



**Dr. Louis Chinnery, BSc, DPhil (Ulster)  
SENIOR LECTURER & HEAD OF DEPARTMENT**

**STENOGRAPHER/CLERKS:** Ms. Cynthia Spooner  
Ms. Pauline Moore  
Ms. Susan Phillips

**BIOLOGICAL SCIENCES**

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BSc (Brist.), PhD (Nott.)  
Emeritus Professor of Biology

Louis Chinerry, BSc, DPhil (Ulst.)  
Senior Lecturer and  
Head of Department 417-4361/4323

Sarah L. Sutrina, BA (Colorado), PhD  
(Johns Hopkins)  
Senior Lecturer 417-4360

Angela Fields, BSc, PhD (UWI)  
Lecturer 417-4328

Marilaine Mota-Meira, Ing. (Curitiba)  
MSc, PhD (Laval)  
Lecturer 417-4859

Thea Scantlebury-Manning,  
BSc, PhD (Concordia)  
Lecturer 417-4356

Lyndon D. Waterman, BSc, PhD (UWI)  
Lecturer 417-4331

Francis Lopez, BSc, PhD (UWI)  
Lecturer in Sports Agronomy 417-4345

George Kaparakis, MSc (Aristotle),  
PhD (Nott.)  
Temporary Lecturer 417-4330

Suzanne Workman, BSc (Manch.) MPhil,  
PhD (UWI)  
Temporary Lecturer 417-4318

## CHEMISTRY

<sup>2</sup>Sean McDowell, BSc (UWI),  
PhD (Cantab)  
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CSci, CChem, FRSC  
Professor of Organic Chemistry  
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DSc (Russ. Acad. Sci.)  
Senior Lecturer  
417-4351

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(UWI) PhD (Dartmouth)  
Lecturer  
417-4336

Avril Williams, BSc PhD (UWI)  
Lecturer  
417-4342

<sup>1</sup> Assigned to post of Pro-Vice Chancellor, Research

<sup>2</sup>On Sabbatical Leave

**DEPARTMENT OF COMPUTER  
SCIENCE, MATHEMATICS  
AND PHYSICS**



**Professor Pranay Chaudhuri, BSc,  
BTech (Calcutta) ME, PhD (Jadavpur)  
PROFESSOR OF COMPUTER SCIENCE & HEAD  
OF DEPARTMENT**

**SECRETARY:** Ms. Wayney Weekes  
**STENOGRAPHER/CLERKS:** Mrs. Genevive Harris  
Mrs. Deidre Jemmott

**COMPUTER SCIENCE**

Pranay Chaudhuri, BSc, BTech (Calcutta),  
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Lecturer 417-4793

John Charlery, BSc (UWI), Dip.  
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PhD (UWI)  
Lecturer 417-4375

Thomas Edward, BSc, PhD (UWI) Lecturer	417-4792	Upindranath Singh, BSc, MPhil (UWI) MSc, PhD (Delaware) Senior Lecturer	417-4376
Paul Walcott, BSc, MPhil (UWI), PhD (City) Lecturer	417-4372	Janak Sodha, BSc MSc PhD (Manch.) Senior Lecturer	417-4573
Hussein Thompson, BSc (UWI) Assistant Lecturer	417-4558	Sujit Bag, BTech (Ind. Inst. Tech.), PhD (Leic.) Lecturer	417-4851
<b>MATHEMATICS</b>			
Charles Cadogan, BSc (Lond-UCWI) PhD (UWI), FTICA Emeritus Professor of Mathematics	417-4363	Carlos Hunte, BSc, MPhil, PhD (UWI) Lecturer	417-4382
Smail Mahdi, BSc, MSc (Constantine), PhD (Montreal) Senior Lecturer	417-4367	Hugh Atherly, BSc, MPhil (UWI) Temporary Assistant Lecturer	417-4790
Yefim Schwartzman, MA, PhD (Voronezh) Senior Lecturer	417-4797		
Jonathan R. Funk BSc, MSc (Sask.) PhD (McGill) Senior Lecturer	417-4383		
Hugh Millington, BSc (UWI), PhD (UBC), Dr. Habil. (Erlangen) Lecturer	417-4737		
<b>PHYSICS &amp; ELECTRONICS</b>			
L. Leo Moseley, BSc, MSc (UWI), PhD (Wales) Professor of Physics and Deputy Principal	417-4033		
Peter Gibbs, BSc, DipEd (UWI), MSc (Guelph) Senior Lecturer	417-4374		
Tane Ray, BSc, (Illinois), PhD (Boston) Senior Lecturer	417-4377		

**CENTRE FOR RESOURCE  
MANAGEMENT AND  
ENVIRONMENTAL STUDIES  
(CERMES)**

Secretary: Mrs. Bibi Selman



Robin Mahon, BSc (UWI), MSc, PhD (Guelph)  
Professor of Marine Affairs  
and Acting Director 417-4570/4339

Hazel Oxenford, BSc (Exeter), PhD (UWI)  
Professor of Marine Biology and Fisheries 417-4571

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Temporary Senior Lecturer 417-4344

Patrick McConney, BSc (Bangor),  
MES (Dalh.) PhD (UBC)  
Senior Lecturer 417-4725

Adrian Cashman, BSc (KCL), MSc,  
DIC (ICL) MSc (York), PhD (Sheff.)  
Lecturer 417-4829

Janice Cumberbatch, BSc (UWI),  
MSc (York)  
Lecturer 417-4569

**CARIBBEAN INSTITUTE FOR METEOROLOGY &  
HYDROLOGY\***

David Farrell, BSc (W. Ont.),  
MSc, PhD (Manitoba)  
Director 425-1367

Horace Burton, BSc, MSc (Florida State)  
Senior Lecturer 425-1362

Kathy-Ann Caesar, BSc (SUNY), MSc  
(Texas A & M)  
Lecturer 425-1362

Margarette Mayers-Ais, BSc,  
MPhil (UWI)  
Lecturer 425-1362

Kailas Narayan, BSc (Guyana), Post-Graduate Dip. (Delft) Lecturer	425-1362
Lawrence Pologne, BSc (UWI), MSc (Florida State) Lecturer	425-1362
Margaret Pestaina-Jeffers, BSc (UWI), MSc (McGill) Lecturer	425-1362
Adrian Trotman, BSc (UWI), MPhil (Reading) Lecturer	425-1362
Kim Whitehall, BSc (UWI) MPhil ( Reading) Lecturer	425-1362
Shawn Boyce BSc (UWI) MSc ( Newcastle) Assistant Lecturer	425-1362

\*Affiliate institution whose faculty teach our degree programme in Meteorology

## **REGISTRY OFFICERS AND PERSONNEL**

University Registrar	Mr. William Iton B.Sc. UWI, Dip McGill, LLM Essex
Campus Registrar	Mrs. Jacqueline Wade, JP, MSc
Campus Bursar	Mr. M.A.T. Webster, FCCA, MSc, IFIM
Senior Assistant Registrar (Student Affairs)	Mr. Desmond Crichlow, BSc, MSc
Senior Assistant Registrar (Graduate Studies and Research)	Mrs. Gail Carter-Payne, BSc, MBA
Senior Assistant Registrar (Staff)	Mr. Henri Brewster, BA, MA
Senior Assistant Registrar (Administration)	Mr. Kenneth Walters
Assistant Registrar (Examinations)	Miss Betty Thorpe, BSc, MSc, ACIS
Assistant Registrar (Records Management)	Mrs. Sharon Alexander Gooding BA, MA

## STAFF LIST – STUDENT AFFAIRS

### ADMISSIONS SECTION

Administrative Assistant  
Mrs. Paula Jarvis, BSc  
(Student Recruitment & Exchange)  
Summer School) 417-4862

Administrative Assistant  
Mrs. Deborah Knight  
(Admissions) 417-4122

Faculty Clerk  
Mrs. Denise Greenidge 417-4114

### EXAMINATIONS SECTION

Administrative Assistant  
Mrs. Eudene Spooner 417-4139

Administrative Assistant  
Mrs. Ingrid Lashley 417-4135

Faculty Clerk  
Miss Suzanne Chandler 417-4138

### RECORDS SECTION

Administrative Assistant  
Mrs. Marcia Powlett 417-4140

Stenographer/Clerk  
Miss Esther Layne, BSc  
(Transcripts & Academic Records) 417-4143

## **DISTANCE EDUCATION**

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Maureen Mullin  
Administrative Assistant 417-4131

## **CAMPUS BURSAR'S OFFICE**

Mrs. Maria Maynard  
Accounts Supervisor 417-4110  
(Students)

Accounts Clerks  
Mrs. Maxine Reifer 417-4109  
Miss Kathy Lashley 417-4109

## 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:

- (i) Certified evidence of all examinations passed;
- (ii) A signed statement from parent/guardian agreeing that the applicant shall become an undergraduate in the Faculty;
- (iii) A signed statement from parent/guardian or from a responsible Individual or authority that funds will be available for the payment of fees;
- (iv) An application fee of \$30 (Bds).

Students are encouraged to apply on-line at [www.cavehill.uwi.edu/apply](http://www.cavehill.uwi.edu/apply). Application forms may also be obtained from the Student Affairs Section at Cave Hill or other campuses of the UWI.

**Table 1: Minimum CAPE (or equivalent) qualifications for entry to 3-Year BSc Science Programmes**

<b><u>BSc Major in</u></b>	<b><u>Required CAPE Passes</u></b>
Biochemistry	Biology & Chemistry
Biology <sup>1</sup>	Biology & Chemistry
Ecology	Biology & Chemistry
Microbiology	Biology & Chemistry
Chemistry <sup>1</sup>	Chemistry & another subject
Computer Science <sup>1</sup>	Mathematics & another subject
Information Technology (IT)	Mathematics & another subject
Mathematics <sup>1</sup>	Mathematics & another subject
Electronics	Mathematics & Physics
Physics	Mathematics & Physics
Meteorology	Mathematics & Physics

**BSc Options<sup>2</sup>**

Computer Science (or IT)  
& Accounting  
Computer Science (or IT)  
& Management  
Mathematics & Economics  
  
Mathematics & Accounting  
  
Science & Management  
  
Science & Psychology

**Required CAPE Passes**

Mathematics & another  
subject  
Mathematics & another  
subject  
Mathematics & another  
subject  
Mathematics & another  
subject  
Mathematics &  
requirements as for the  
Science Major  
Requirements as for the  
Science Major

<sup>1</sup>Double Major also offered

<sup>2</sup>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 1<sup>st</sup> 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 39. 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.

## **PRIZES AWARDED ANNUALLY IN THE FACULTY OF PURE AND APPLIED SCIENCES**

### **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 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 Pure and applied Sciences 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 Prizewinner a three-month paid work attachment at SCL after graduation.

### **SYSTEMS CONSULTING LTD. (SCL) PRIZE IN MATHEMATICS**

The prize consists of a voucher of BDS \$ 500 to be spent on books on Mathematics and related fields.

Students must be graduating in the current year, have majored in Mathematics and have attained the highest average marks in the Mathematics courses relevant to the major with an overall average grade of at least B+.

**None of the courses should have been repeated.**

### **MOORE PARAGON PRIZE IN PHYSICS**

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

**None of the courses should have been repeated.**

### **MOORE PARAGON PRIZE IN ELECTRONICS**

This prize consists of a voucher for books and/or student materials of a value of **BDS \$500**. The prize will be awarded annually to the student who obtains the highest average

marks in the First Year courses offered in Electronics, provided that the student obtains, at least a B+ average and continues within the degree programme in the Faculty of Pure and Applied Sciences, Cave Hill.

**None of these courses should have been repeated.**

### **FACULTY PRIZE**

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

### **DEAN'S PRIZES, FACULTY OF PURE AND APPLIED SCIENCES**

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

- (a) have obtained at least an A average grade over 64 credits in the Faculty of Pure and Applied Sciences courses at Levels II/III.
- (b) 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**

The prize is open to undergraduate students registered for a major in Biology, Chemistry or their sub-disciplines in the Department of Biological and Chemical Sciences.

Eligible students shall be finalist who have gained the requisite level II credits for their major and degree in 4 semesters or 6 semesters for lower level matriculants.

The value of the Prize shall be BDS \$1,000.00.

## GLOSSARY TO THE REGULATIONS

TERM	DEFINITION
1. Science Faculties	- The Faculties of Pure and Applied Sciences at Cave Hill and Mona and the Faculty of Science and Agriculture at St. Augustine.
2. 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.
3. Subject	- An area of study traditionally assigned to the purview of a department.
4. Course	- A body of knowledge circumscribed by a syllabus to be imparted to students by sundry teaching methods and usually followed by an examination.
5. Faculty Courses	- All courses except Foundation and Co-curricular courses.
6. In-Faculty Courses	- All Faculty courses originating in the Science Faculties.
7. Out-of-Faculty Courses	- All Faculty courses originating in Faculties other than the Science Faculties.

8. Foundation Courses	- Broad-based courses, three of which must be taken, and which provide a general foundation of knowledge.	13. Major	- 32 credits from prescribed courses at Levels 2 & 3 (as defined)
9. 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.	14. Minor	- 16 credits of prescribed courses at Levels 2 & 3 (as defined).
		15. Option	- A prescribed programme, comprising in-Faculty and, in some cases, out-of-Faculty courses, leading to a specific degree.
10. Level	- A measure of the standard of a course, designated at UWI by the first digit in the course number.	16. Elective	- .A course within a programme taken by choice of the student.
		17. Marginal Failure	- A score for the overall examination of a course which is not more than 5 marks below the minimum pass mark or that course.
11. Part	- A stage of a programme: (i) Part I (Introductory Stage) comprises Preliminary and Level I Courses (ii) Part II (Advanced Stage) comprises Level 2 and 3 courses	18. 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.
12. Credit	- A measure of the workload required of students. Credit Hour = 1 hour lecture/tutorial/ problem class Per week OR 2 hours laboratory session per week, for a Semester.	19. 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.

- 20.Pre-requisite - A course which must be passed before another course for which it is required may be pursued.
21. Anti-requisites - Two courses of which credit may be granted for only one.
- 22.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).
- 23.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.
- 24.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.

# GENERAL REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE

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

## A. Qualification for Admission

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

**and**

(a) Have obtained passes in two two-Unit subjects at CAPE, both Units at Grade V or better (or equivalent). One of the CAPE subjects must be an Approved Science subject (see Appendix Ia).

**or**

(b) Have an approved Associate Degree with a GPA of 2.5 (or equivalent) or higher, from a Tertiary Level Institution.

**(N.B.** Candidates must also satisfy Departmental Requirements).

## B. Outline of the Degree Programme

3. The degree of BSc 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 general degree with a single major** (32 credits from Levels 2 and 3) or a **double major** in two Science disciplines (2x32 credits from Levels 2 and 3). (See Appendix II for a list of Science Majors offered).
  - (b) **A general degree with a single major plus**
    - (i) one or two minors from other distinct Science disciplines (each **16** credits from Levels 2 and 3) or
    - (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.**
  - (c) **Options** comprising a prescribed set of departmental, inter-departmental or inter-faculty courses which satisfy the requirements for a specific degree (see Appendix VI).
  - (d) **Special Degrees** offered by the Science Faculties as listed by the respective departments. (Mona only)
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 2 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 Science Faculties' degrees, 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 **101** credits from Level 1, 2 and 3 Faculty and Foundation courses for the general degree as follows:

Level 1	24
Level 2 and Level 3	60
Level 1 to Level 3 (additional)	8
Foundation courses	<u>9</u>
	<u>101</u>

(i) A minimum of **16** credits (18 credits at Mona) at Level 1 **and 32** credits at Levels 2 and 3 must be taken from in-Faculty courses.

(ii) Specific Options or Programmes (e.g. Special degrees, Double Majors or Major/Minor combinations) may require more than **101** credits (see Appendix VI)

(iii) Exemptions from specific parts of the degree programme may be obtained under the provisions of Section I: Exemptions & Transfers (below).

(c) have a Cumulative GPA of at least **1.00**.

### 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. No allowances, with respect to attendance at classes, laboratories, tutorials or examinations, will be made for students on the basis of conditions of their employment.**

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

### D. Progress through the Programme

12. (a) Students admitted into the four-year degree programme (Reg.1) 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 **12** credits of Level 1 courses.
- (b) Students admitted into the three-year degree programme (Reg.2) who satisfy the pre-requisites, may register for **12** credits in **one** of the Preliminary subjects offered in the Science Faculties or by Distance, for the purpose of obtaining prerequisites for entry into certain Level 1, 2 or 3 courses.
- (c) Students may not register for Preliminary courses in a subject which overlaps substantially with any CAPE/GCE A-Level courses (or equivalent) previously passed.
13. (a) Full-time Part I students are required to register for a minimum of **fifteen** credits from Faculty courses per semester plus **one** Foundation course, that is, **33** credits over Semesters I and II.
- (b) In order to satisfy the minimum requirement for entry to Part II, a student must normally pass a minimum of **24** credits in Level 1 Faculty courses. At least **16** of these credits (18 at Mona and 15-16 in Agriculture) must be from in-Faculty courses.
- (c) A student who has passed the minimum number of required in-Faculty Level 1 credits in the first two semesters of full-time study may, on the recommendation of the Dean and subject to Reg.14, be allowed to register for a limited number of Part II courses.
- (d) Exemptions from some courses may be obtained on the basis of the regulations contained in Section I, Exemptions & Transfers.
- (e) The minimum number of credits for which a full-time Part II student must register in any one semester is 13.
- (f) The normal load for a full-time Part II student is 16 advanced course credits per semester, plus one Foundation course, that is, 35 credits over Semesters I and II.
14. The maximum number of credits for which a student may register is as follows:
- (a) In the case of Part I students:
- (i) for full-time registration, **18** credits from Preliminary/ Introductory level courses in any one semester, plus **one** Foundation course per semester, that is, **42** credits over Semesters I and II.
- (ii) for part-time registration, **12** credits per semester from Faculty courses, plus **one** Foundation course, that is, **27** credits over Semesters I and II.
- (b) In the case of Part II students:
- (i) for full-time registration, with the permission of the Dean, **20** credits from Faculty courses plus **one** Foundation course per semester.
- (ii) for part-time registration, **12** credits per semester from Faculty courses, plus **one** Foundation course, that is, **27** credits over Semesters I and II.

- (c) Full-time students who require more than **20** but not more than **24** credits in order to graduate, have satisfied all Foundation course requirements, and are exempt from coursework in at least one course may, with the Dean's permission, register for the required credits.

- 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. 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.

- 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 Part II student who marginally fails a course needed for advancement or 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 **eight** credits may be gained through Supplementary Orals.
- 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.
  - (a) In the event that such a candidate has satisfied the examiners in the theory or practical coursework, the candidate may, on the recommendation of the relevant Department, be exempted from the theory or practical 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).

- (b) A Part I student who fails a course twice will not normally be allowed to repeat this course again. Examinations associated with the Summer Programme are counted as repeats; Supplemental Examinations are not.

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

#### F. GPA\* and Class of Degree

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

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\* The table for conversion of numerical marks to letter grades for GPA purposes is presented in Appendix V (Table 2).

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 and Enforced Withdrawals**

28. For the purposes of Regulations 29 & 30 below, any semester in which a student is registered part-time including the Summer session, 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. Students will be required to withdraw from the Faculty if in any two successive semesters they fail to gain passes in Faculty courses equivalent to at least:

**Part I**                      Eleven (11) credits, if registered full-time.  
Six (6) credits, if registered part-time.

**Part II**                      Eight (8) credits, if registered full-time.  
Four (4) credits, if registered part-time.

30. (a) A student whose Semester Grade Point Average is less than or equal to **0.75** 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 or equal

to **0.75** will be required to withdraw from the Faculty.

31. (a) Students admitted to the programme under Reg.2 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.1 shall complete the requirements for the degree in a minimum of **eight** or a maximum of **twelve** semesters of full-time study.

(c) Students who cannot complete the programme within the maximum periods given in (a) and (b) above will normally be required to withdraw from the Faculty at the end of the academic year in which the maximum is reached.

32. In the event that a student has exhausted the maximum periods mentioned in Reg.31 above, but still requires for the completion of the degree programme,

**Either:**

(a) passes in courses totalling no more than **eight** 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.

34. For the purposes of Regulations 28 to 32 above, any semester for which a student has obtained Leave of Absence from the Faculty shall not be counted (see Reg.25).

35. Notwithstanding Regulations 28 to 33 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.

36. 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.

37. 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 UWI Grade Point Average Regulation 11, courses pursued at an institution other than the UWI during the period of withdrawal may be eligible for credit.

(e) Courses pursued in the UWI Summer School during the period of withdrawal shall be included in all relevant grade point average calculations if the student re-enters the UWI.

#### **I. Exemptions and Transfers**

37. Holders of degrees from approved universities, or candidates who have partially fulfilled the requirements of such degrees, may apply to the Board for Undergraduate Studies, through the Faculty Board of the candidate's campus, for exemption from Level 1 courses. Each such application will be considered on its own merit.

38. Students on transfer between different BSc degree programmes or from other programmes of study within the University may, on the basis of passes already obtained, and on the recommendation of the Departments concerned, be exempted from some or all of the Level 1 courses, and some of the Level 2 and/or Level 3 courses. Students exempted from all Level 1 courses may complete the degree programme in a minimum of four or a maximum of eight semesters of full-time study from the time of transfer. Students exempted from all Level 1 courses and some Level 2 and/or Level 3 courses may complete the degree

programme in a minimum of two semesters of full-time study from the time of transfer.

39. (a) A student who wishes to take academic courses as an exchange/transfer student at an institution other than the UWI and to apply those credits toward the degree must obtain written approval in advance from the Dean. Failure to obtain written approval in advance may preclude the acceptance of the credits.
- (b) A student must have a minimum GPA of **3.00** by the end of Semester II to be approved as an exchange/transfer student in the following academic year.
- (c) Where the course to be taken is to be substituted for a UWI course, the content of the course must be certified by the relevant Department as being equivalent to the UWI course. Course outlines and syllabuses must be provided by the student in order to permit the evaluation of the course content.
- (d) A student may **not** take courses for degree credit at an institution other than the UWI during the semester (including the succeeding summer) in which he or she completes or is expected by the Faculty to complete the requirements for graduation from the UWI.

#### **J. Aegrotat Degree**

40. (a) A candidate who, by reason of illness, was prevented from attending examinations or part of the examinations associated with a Level 2 or 3 course in the year of anticipated graduation may apply to

the Board for Undergraduate Studies through the University Registrar, for an Aegrotat pass in the course. Such an application will be granted only if all the following conditions are satisfied:

- (i) The appropriate Head of Department reports that, on the basis of the candidate's performance during the period preceding the examinations, the candidate was expected to pass the examinations concerned and has satisfactorily completed any associated course work.
- (ii) The application reaches the University Registrar not later than **30** days after the date of the last paper in the examination concerned.
- (iii) The application is accompanied by a medical certificate attesting to the illness and issued by a medical practitioner recognized for this purpose by the University.
- (b) No grade will be awarded in respect of an Aegrotat pass, and a candidate having been awarded an Aegrotat pass will not be allowed to re-enter the examination for the course concerned on a subsequent occasion. An Aegrotat pass may not be used to satisfy a pre-requisite for other Level 2 and/or Level 3 courses.
- (c) A student who, having satisfactorily completed the degree programme, includes Aegrotat passes in courses counted for the degree programme, will

be eligible for the award of an Aegrotat degree if both of the following conditions are satisfied:

- (i) The courses in which Aegrotat passes have been granted (and which need to be counted toward the award of the degree) are equivalent to no more than **24** credits.
- (ii) No more than **16** credits mentioned in (i) above arise from courses making up the candidate's major.
- (iii) The Aegrotat degree will be awarded without Honours.

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## APPENDICES

### APPENDIX I

**a) List of approved Science CAPE / GCE A-Level subjects.**

Applied Mathematics \*  
Biology  
Botany  
Chemistry  
Computer 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  
Environmental Sciences  
Geography  
Information Technology (General)  
Integrated Science  
Physics

## APPENDIX II

### List of Majors in the UWI Science Faculties:

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

\* Offered at Cave Hill

## APPENDIX III

### FOUNDATION COURSES

FOUN0100	–	Fundamentals of Written English
<sup>1</sup> FOUN1001	–	English for Academic Purposes
<sup>1</sup> FOUN1008	–	Rhetoric II: Writing for Special Purposes
FOUN1101	–	Caribbean Civilization
<sup>2</sup> FOUN1210	–	Science, Medicine & Technology in Society
FOUN1301	–	Law, Governance, Economy & Society

<sup>1</sup> Both courses cannot be taken – students must choose one or the other

<sup>2</sup> Not **normally** available to Science Faculty Students

### **FOUN0100 FUNDAMENTALS OF WRITTEN ENGLISH (0 Credits)**

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

### **FOUN1001 ENGLISH FOR ACADEMIC PURPOSES (3 Credits)**

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

**FOUN1008 RHETORIC II; WRITING FOR  
SPECIAL PURPOSES (3 Credits)**

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

**FOUN1101 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.

**FOUN1210 SCIENCE, MEDICINE AND TECH-  
NOLOGY 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.

**FOUN1301 LAW, GOVERNANCE, ECONOMY AND  
SOCIETY (3 Credits)**

This is a multi-disciplinary course of the Faculty of Social Sciences which is designed mainly for non-Social Sciences students. The course will introduce students to some of the

major institutions in Caribbean society. It will expose them to both historical and contemporary aspects of Caribbean society, including Caribbean legal, political and economic systems. In addition, Caribbean culture and Caribbean social problems are discussed.

## APPENDIX IV

### FPAS CREDIT TABLE

The following table describes the approximate weekly contact hours for one-semester (thirteen 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. A normal full-time load in Part I is **16-18** credits per semester (excluding Foundation courses). A normal load for a student in Part II (Advanced) is **16** credits (four 4-credit courses) per semester (excluding Foundation courses).

		LABORATORY COURSES (WEEKLY HOURS)			NON-LABORATORY COURSES (WEEKLY HOURS)		CREDITS
		LECTURE	TUTORIAL	LABORATORY	LECTURE	TUTORIAL	
PART I	PRELIM	3	1	4-6	5	1	6
	LEVEL 1	3	1	4-6	5	1	6
		2	1	2-3	3	1	4
PART II	LEVELS 2 & 3	2	1	2-3	3	1	4

## APPENDIX V

### GRADING SYSTEM

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

Grade	Mark (%)	QP	Grade	Mark (%)	QP
A+	86 – 100	4.3	C+	53 – 56	2.3
A	70 – 85	4.0	C	50 – 52	2.0
A-	67 – 69	3.7	C-	47 – 49	1.7
B+	63 – 66	3.3	D+	43 – 46	1.3
B	60 – 62	3.0	D	40 – 42	1.0
B-	57 – 59	2.7	F	0 – 39	0

**Table 2: GPA to Honours Conversion**

Class of Honours	Cumulative GPA
First	3.60 and above
Upper Second	3.00 – 3.59
Lower Second	2.00 – 2.99
Pass	1.00 – 1.99

## APPENDIX VI

### OPTIONS IN CONJUNCTION WITH OTHER FACULTIES

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

#### COMPUTER SCIENCE AND ACCOUNTING:

##### LEVEL I

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost and Management Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

##### AND

ELET1110	Digital Electronics
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**OR**  
FOUR (4) Level I Credits from any Faculty

##### AND

FOUN1001	English For Academic Purposes
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**OR**  
FOUN1008 Rhetoric II: Writing for Special Purposes

##### LEVEL II

COMP2105	Discrete Mathematics
COMP2115	Information Structures
COMP2125	Computer Architecture
COMP2145	Software Engineering I
ACCT2014	Financial Accounting I
ACCT2015	Financial Accounting II
MGMT2023	Financial Management
FOUN1101	Caribbean Civilization

##### LEVEL II ACCOUNTING ELECTIVES

##### AND Six (6) Credits From:

ACCT2018	Government Accounting
MKTG2001	Principles of Marketing
MGMT2005	Microcomputer Applications for Business
MGMT2008	Organisational Behaviour
MGMT2020	Managerial Economics
MGMT2006	Management Information Systems I
MGMT2021	Business Law I

##### LEVEL III

COMP3100	Operating Systems
COMP3180	Algorithm Design and Analysis
ACCT2017	Intermediate Cost Accounting
ACCT3043	Auditing
FOUN1301	Law, Governance and Society

##### AND Either

ACCT3040	Accounting Theory
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**OR**

ACCT3041      Advanced Financial Accounting

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

COMP2135      Systems Software  
 COMP2150      Computer Networks I  
 COMP2160      Object-Oriented Programming  
 COMP3115      Information Systems  
 COMP3125      Artificial Intelligence  
 COMP3135      Programming Languages  
 COMP3140      Software Engineering II  
 COMP3155      Computer Networks II  
 COMP3160      Database Management SYSTEMS  
 COMP3170      Web-Based Applications  
 COMP3190      Special Topics In Computer Science  
 COMP3200      Compiler Theory  
 COMP3210      Electronic Commerce  
 COMP3910      Computer Science Research Project

**LEVEL III ACCOUNTING ELECTIVES****AND Six (6) Credits From:**

ACCT3015      Accounting Information Systems  
 ACCT3039      Cost & Management Accounting II  
 ACCT3040      Advanced Accounting Theory  
 ACCT3041      Advanced Financial Accounting  
 ACCT3044      Advanced Auditing  
 MGMT3023      Independent Study  
 MGMT3240      Managerial Communications  
 MGMT3048      Financial Management II  
 MGMT3049      Financial Institutions and Markets  
 MGMT3052      Taxation and Tax Management  
 MGMT3072      Services Sector Accounting

**COMPUTER SCIENCE WITH ACCOUNTING****LEVEL I**

COMP1105      Computer Programming I  
 COMP1115      Computer Programming II  
 MATH1100      Basic Mathematics  
 MATH1110      Applied Statistics  
 ACCT1002      Introduction to Financial Accounting  
 ACCT1003      Cost & Management Accounting I  
 ECON1001      Introduction to Microeconomics  
 ECON1002      Introduction to Macroeconomics  
 MGMT1001      Principles of Management And  
 ELET1110      Digital Electronics

**OR**

FOUR (4) Level I Credits from this Faculty

**LEVEL II**

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

**LEVEL III**

COMP3100      Operating Systems  
 COMP3180      Algorithm Design and Analysis  
 ACCT3043      Auditing

**AND**

ACCT3040      Accounting Theory

**OR**

ACCT3041      Advanced Financial Accounting

**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In CS
COMP3210	Electronic Commerce
COMP3220	Compiler Theory
COMP3910	Computer Science Research Project

**AND Fourteen (14) Level II/III Credits**

**AND**

FOUN 1008 Rhetoric II: Special Purposes

**OR**

FOUN 1001 English for Acad. Purposes

**AND**

FOUN 1101 Caribbean Civilization

FOUN 1301 Law, Governance and Society

**COMPUTER SCIENCE AND MANAGEMENT:**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost and Management Accounting I
ECON1001	Introduction to Microeconomics

ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110	Digital Electronics
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**OR**

FOUR (4) Level I Credits from any Faculty

**AND**

FOUN1001	English for Academic Purposes
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**OR**

FOUN1008	Rhetoric II: Writing for Special Purposes
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**LEVEL II**

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

**AND**

FOUN1101	Caribbean Civilization
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**LEVEL III**

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

**AND**

FOUN1301	Law, Governance and Society
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**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I

COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In CS
COMP3210	Electronic Commerce
COMP3220	Compiler Theory
COMP3910	Computer Science Research Project

**AND Nine (9) Credits from LEVEL III Electives:**

ACCT3015	Accounting Information Systems
ACCT3039	Advanced Management & Cost Accounting
MGMT3011	Management Information Systems II
MGMT3018	Industrial Relations
MGMT3022	Organisational Development
MGMT3033	Business, Government and Society
MGMT3037	International Business
MGMT3038	Cross-National Management
MGMT3045	Business Law II
MGMT3048	Financial Management II
MGMT3049	Financial Institutions and Markets
MGMT3052	Taxation and Tax Management
MGMT3053	International Financial Management
MGMT3056	Project Management
MGMT3058	New Venture Management
MGMT3075	Public Enterprise Management
MGMT3076	Managing Financial Institutions
MKTG3000	Marketing Management
MKTG3001	International Marketing Management
MKTG3002	Marketing Research
MKTG3009	Services Marketing

**COMPUTER SCIENCE WITH MANAGEMENT**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost & Management Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110	Digital Electronics
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**OR**

FOUR (4) Level I Credits from this Faculty

**LEVEL II**

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

**LEVEL III**

COMP2105	Discrete Mathematics
COMP2115	Information Structures
COMP2125	Computer Architecture
COMP2145	Software Engineering I
MKTG2001	Principles of Marketing
MGMT2006	Management Inform. Systems I
MGMT2008	Organizational Behaviour
MGMT2023	Financial Management
COMP3100	Operating Systems
COMP3180	Algorithm Design and Analysis
MGMT3017	Human Resources Management

**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In Computer Science
COMP3210	Electronic Commerce
COMP3220	Compiler Theory
COMP3910	Computer Science Research Project

**AND**

Fourteen (14) Level II/III credits

**AND**

FOUN1008 Rhetoric II: Special Purposes

**OR**

FOUN1001 English for Acad. Purposes

**AND**

FOUN1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

**INFORMATION TECHNOLOGY AND ACCOUNTING:**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost and Management Accounting I

ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110 Digital Electronics

**OR**

FOUR (4) Level I Credits from any Faculty

**AND**

FOUN1001 English for Academic Purposes

**OR**

FOUN1008 Rhetoric II: Writing for Special Purposes

**LEVEL II**

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

**AND**

FOUN1101 Caribbean Civilization

**LEVEL II ACCOUNTING ELECTIVES AND Six (6) Credits From:**

ACCT2018	Government Accounting
MKTG2001	Principles of Marketing
MGMT2005	Microcomputer Applications for Business
MGMT2008	Organisational Behaviour
MGMT2020	Managerial Economics
MGMT2006	Management Information Systems I
MGMT2021	Business Law I

**LEVEL III**

FOUN1301	Law, Governance and Society
COMP3160	Database Management Studies

COMP3170	Web-Based Applications
ACCT2017	Intermediate Cost Accounting
ACCT3043	Auditing
<b>AND</b>	
ACCT3040	Accounting Theory
<b>OR</b>	
ACCT3041	Advanced Financial Accounting

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

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In CS
COMP3200	Compiler Theory
COMP3210	Electronic Commerce
COMP3910	Computer Science Research Project

**LEVEL III ACCOUNTING ELECTIVES**

**AND Six (6) Credits From:**

MGMT3240	Managerial Communications
MGMT3023	Independent Study
ACCT3041	Advanced Financial Accounting
MGMT3072	Services Sector Accounting
MGMT3049	Financial Institutions and Markets
ACCT3015	Accounting Information Systems
ACCT3039	Cost & Management Accounting II
ACCT3040	Advanced Accounting Theory
ACCT3044	Advanced Auditing
MGMT3048	Financial Management II
MGMT3052	Taxation and Tax Management

**INFORMATION TECHNOLOGY WITH ACCOUNTING**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost & Management Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110	Digital Electronics
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**OR**

FOUR (4) Level I Credits from this Faculty

**LEVEL II**

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

**LEVEL III**

COMP3160	Database Management Studies
COMP3170	Web-Based Applications
ACCT3043	Auditing

**AND**

ACCT3040	Accounting Theory
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**OR**

ACCT3041	Advanced Financial Accounting
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**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software

COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In CS
COMP3200	Compiler Theory
COMP3210	Electronic Commerce
COMP3910	Computer Science Research Project

**AND Fourteen (14) Level II/III Credits**

**AND**

FOUN 1008 Rhetoric II: Special Purposes

**OR**

FOUN 1001 English for Academic Purposes

**AND**

FOUN 1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

**INFORMATION TECHNOLOGY AND MANAGEMENT:**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost and Management Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110 Digital Electronics

**OR**

FOUR (4) Level I Credits from any Faculty

**AND**

FOUN1001 English for Academic Purposes

**OR**

foun1008 Rhetoric II: Writing for Special Purposes

**LEVEL II**

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

**AND**

FOUN1101 Caribbean Civilization

**LEVEL III**

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

**AND**

FOUN1301 Law, Governance and Society

**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis

COMP3190	Special Topics In Computer Science
COMP3200	Compiler Theory
COMP3210	Electronic Commerce
COMP3910	Computer Science Research Project

**AND Nine (9) Credits from Level III Electives:**

ACCT3015	Accounting Information Systems
ACCT3039	Advanced Management & Cost Accounting
MGMT3011	Management Information Systems II
MGMT3018	Industrial Relations
MGMT3022	Organisational Development
MGMT3033	Business, Government and Society
MGMT3037	International Business
MGMT3038	Cross-National Management
MGMT3045	Business Law II
MGMT3048	Financial Management II
MGMT3049	Financial Institutions and Markets
MGMT3052	Taxation and Tax Management
MGMT3053	International Financial Management
MGMT3056	Project Management
MGMT3058	New Venture Management
MGMT3075	Public Enterprise Management
MGMT3076	Managing Financial Institutions
MKTG3000	Marketing Management
MKTG3001	International Marketing Management
MKTG3002	Marketing Research
MKTG3009	Services Marketing

**INFORMATION TECHNOLOGY WITH  
MANAGEMENT**

**LEVEL I**

COMP1105	Computer Programming I
COMP1115	Computer Programming II
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Introduction to Financial Accounting

ACCT1003	Cost & Management Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management

**AND**

ELET1110	Digital Electronics
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**OR**

FOUR (4) Level I Credits

**LEVEL II**

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

**LEVEL III**

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

**AND Eight (8) Credits (including AT LEAST one Level III course) from:**

COMP2125	Computer Architecture
COMP2135	Systems Software
COMP2150	Computer Networks I
COMP3100	Operating Systems
COMP3115	Information Systems
COMP3125	Artificial Intelligence
COMP3135	Programming Languages
COMP3140	Software Engineering II
COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis
COMP3190	Special Topics In CS
COMP3200	Compiler Theory
COMP3210	Electronic Commerce

COMP3910 Computer Sci. Research Project

**AND Fourteen (14) Level II/III credits**

**AND**

FOUN 1008 Rhetoric II: Special Purposes

**OR**

FOUN 1001 English for Academic Purposes

**AND**

FOUN 1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

**MATHEMATICS AND ACCOUNTING**

**LEVEL I**

ACCT1002 Introduction to Financial Accounting

ACCT1003 Cost & Mangt. Accounting I

ECON1001 Introduction to Microeconomics

ECON1002 Introduction to Macroeconomics

MGMT1001 Principles of Management

MATH1100 Basic Mathematics

MATH1110 Applied Statistics

MATH1120 Calculus I

MATH1130 Calculus II

**AND**

COMP1105 Computer Programming I

**OR**

COMP1005 Computer Applications

**LEVEL II**

MATH2100 Abstract Algebra

MATH2110 Linear Algebra

MATH2120 Analysis & Methods I

MATH2130 Ord. Differential Equations

ACCT2014 Financial Accounting I

ACCT2015 Financial Accounting II

MGMT2023 Financial Management

**AND Six (6) Credits From:**

MKTG2001 Principles of Marketing

MGMT2005 Microcomputer Appl. for Business

MGMT2008 Organisational Behaviour

MGMT2020 Managerial Economics

MGMT2006 Managt. Inform. Systems I

ACCT2018 Government Accounting

MGMT2021 Business Law I

**LEVEL III**

**Two Level III MATH courses**

**Two Level II/III MATH courses**

ACCT2017 Intermediate Cost Accounting

ACCT3043 Auditing

**AND**

ACCT3040 Accounting Theory

**OR**

ACCT3041 Advanced Financial Accounting

**AND Six (6) Credits From:**

ACCT3015 Accounting Info. Systems

ACCT3039 Cost & Managt. Accounting II

ACCT3040 Advanced Accounting Theory

ACCT3041 Adv. Financial Accounting

ACCT3044 Advanced Auditing

MGMT3023 Independent Study

MGMT3240 Managerial Communications

MGMT3048 Financial Management II

MGMT3049 Fin. Institutions and Markets

MGMT3052 Taxation and Tax Mangt.

MGMT3072 Services Sector Accounting

**FOUN**

FOUN 1008 Rhetoric II: Special Purposes

**OR**

FOUN 1001 English for Academic Purposes

**AND**

FOUN 1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

## MATHEMATICS WITH ACCOUNTING

### **LEVEL I**

ACCT1002	Introduction to Financial Accounting
ACCT1003	Cost & Mangt. Accounting I
ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
MGMT1001	Principles of Management
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
MATH1120	Calculus I
MATH1130	Calculus II

### **AND**

COMP1105 Computer Programming I

### **OR**

COMP1005 Computer Applications

### **LEVEL II**

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

### **LEVEL III**

**Two Level III MATH courses**

**Two Level II/III MATH courses**

ACCT3043 Auditing

### **AND**

ACCT3040 Accounting Theory

### **OR**

ACCT3041 Adv. Financial Accounting

**AND Fourteen (14) Level II/III credits**

### **AND**

FOUN 1008 Rhetoric II: Special Purposes

### **OR**

FOUN 1001 English for Academic Purposes

### **AND**

FOUN 1101 Caribbean Civilization  
FOUN1301 Law, Governance and Society

## MATHEMATICS AND ECONOMICS

### **LEVEL I**

MATH1100	Basic Mathematics
MATH1120	Calculus I
MATH1130	Calculus II
MATH1110	Applied Statistics
COMP1105	Computer Programming I
ECON1001	Introd. to Microeconomics
ECON1002	Introd. to Macroeconomics

**AND Four (4) Level I Credits from this Faculty**

### **LEVEL II**

MATH2100	Abstract Algebra
MATH2110	Linear Algebra
MATH2120	Analysis & Methods I
MATH2130	Ord. Differential Equations
ECON2000	Intermed. Microeconomics I
ECON2001	Intermed. Microeconomics II
ECON2002	Intermed. Macroeconomics I
ECON2003	Intermed. Macroeconomics II
ECON2008	Statistical Methods I

### **LEVEL III**

ECON3049 Econometrics I

**Four Level II/III ECON courses**

**Two Level III MATH courses**

**Two Level II/III MATH courses**

### **AND**

FOUN 1008 Rhetoric II: Special Purposes

### **OR**

FOUN 1001 English for Acad. Purposes

### **AND**

FOUN 1101 Caribbean Civilisation  
FOUN1301 Law, Governance and Society

## MATHEMATICS WITH ECONOMICS

### **LEVEL I**

MATH1100	Basic Mathematics
MATH1120	Calculus I
MATH1130	Calculus II
MATH1110	Applied Statistics
COMP1105	Computer Programming I
ECON1001	Intro. to Microeconomics
ECON1002	Intro. to Macroeconomics

### **AND Four (4) Level I Credits**

### **LEVEL II**

MATH2100	Abstract Algebra
MATH2110	Linear Algebra
MATH2120	Analysis & Methods I
MATH2130	Ord. Differential Equations
ECON2000	Intermed. Microeconomics I
ECON2001	Intermed. Microeconomics II
ECON2002	Intermed. Macroeconomics I
ECON2003	Intermed. Macroeconomics II

### **AND One Level II/III ECON course**

### **LEVEL III**

#### **Two Level III MATH courses**

#### **Two Level II/III MATH courses**

#### **AND Fifteen Level II/III credits**

### **AND**

FOUN 1008 Rhetoric II: Special Purposes

### **OR**

FOUN 1001 English for Acad. Purposes

### **AND**

FOUN 1101 Caribbean Civilisation

FOUN1301 Law, Governance and Society

## SCIENCE AND MANAGEMENT

### **LEVEL I**

#### **Required Level 1 Courses for Science Major Plus**

MATH1100	Basic Mathematics
MATH1110	Applied Statistics
ACCT1002	Intro. to Financial Accounting
ACCT1003	Cost & Mangt. Accounting I
ECON1001	Intro. to Microeconomics
ECON1002	Intro. to Macroeconomics
MGMT1001	Principles of Management

### **LEVELS II & III**

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

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

#### **AND Nine (9) Credits from LEVEL III ELECTIVES**

ACCT3015	Accounting Info. Systems
ACCT3039	Adv. Mangt. & Cost Account.
MGMT3011	Mangt. Info. Systems II
MGMT3018	Industrial Relations
MGMT3022	Organisational Development
MGMT3033	Business, Govt. and Society
MGMT3037	International Business
MGMT3038	Cross-National Management
MGMT3045	Business Law II
MGMT3048	Financial Management II
MGMT3049	Financial Instit. and Markets
MGMT3052	Taxation and Tax Mangt.
MGMT3053	Intl. Financial Management
MGMT3056	Project Management
MGMT3058	New Venture Management

MGMT3075 Public Enterprise Mangt.  
MGMT3076 Managing Fin. Institutions  
MKTG3000 Marketing Management  
MKTG3001 Intl. Marketing Management  
MKTG3002 Marketing Research  
MKTG3009 Services Marketing

**AND**

FOUN1008 Rhetoric II: Special Purposes

**OR**

FOUN1001 English for Acad. Purposes

**AND**

FOUN1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

**SCIENCE WITH MANAGEMENT**

**LEVEL I**

**Required Level 1 Courses for Science Major Plus**

MATH1100 Basic Mathematics  
MATH1110 Applied Statistics  
ACCT1002 Introd. to Financial Accounting  
ACCT1103 Cost & Mangt. Accounting I  
ECON1001 Introd. to Microeconomics  
ECON1002 Introd. to Macroeconomics  
MGMT1001 Principles of Management

**LEVELS II & III**

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

MKTG2001 Principles of Marketing  
MGMT2006 Mangt. Info. Systems I  
MGMT2008 Organisational Behaviour  
MGMT2023 Financial Management  
MGMT3017 Human Resources Management

**And Fourteen (14) Level II/III Credits**

**AND**

FOUN1008 Rhetoric II: Special Purposes

**OR**

FOUN1001 English for Acad. Purposes

**AND**

FOUN1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

## **B. Programmes with the Faculty of Humanities & Education**

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

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

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

### **SCIENCE AND PSYCHOLOGY**

#### **LEVEL 1**

**Twenty-four (24) credits from Level 1 Science Courses Plus PSYC1003**

Introduction to Psychology

#### **And**

PSYC1004 Introduction to Social Psychology

#### **Or**

PSYC1010 Essentials of Social Psychology

#### **LEVELS II & III**

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

PSYC2003 Physiological Psychology  
PSYC2012 Developmental Psychology  
PSYC2010 Statistics And Research Design I  
PSYC2014 Statistics And Research Design II

PSYC2004 Personality Theory & Assessment I  
PSYC3004 Experimental and Applied Psychology  
PSYC2020 Pathopsychology  
PSYC3011 Research Paper In Psychology\*  
(6 credits)

#### **AND ONE of the following Electives:**

PSYC2009 Learning Theory And Practice  
PSYC3006 Philosophical Psychology  
PSYC3013 Contemporary Issues In Social Psychology  
PSYC3014 Industrial & Organisational Psychology  
PSYC3017 Personality Theory & Assessment II  
PSYC3018 Forensic Psychology  
PSYC3019 Clinical & Counselling Psychology  
ECOL3452 Behavioural Ecology

#### **AND**

FOUN1008 Rhetoric II: Special Purposes

#### **OR**

FOUN1001 English for Acad. Purposes

#### **AND**

FOUN1101 Caribbean Civilization  
FOUN1301 Law, Governance and Society

\*Students registered for a Science Research Project course (BIOC3950, BIOL3950, CHEM3500, CHEM3505, COMP 3910, ECOL3950, ELET 3160, MATH3300, MICR3950, PHYS3106) must replace PSYC3011 by 6 credits from the electives listed above.

### **SCIENCE WITH PSYCHOLOGY**

#### **LEVEL I**

**Twenty-four (24) credits from Level I Science Courses Plus**

PSYC1003 Introduction to Psychology

#### **And**

PSYC1004 Introduction to Social Psychology

#### **Or**

PSYC1010 Essentials of Social Psychology

## **LEVELS II & III**

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

PSYC2003	Physiological Psychology
PSYC2012	Developmental Psychology
PSYC2010	Statistics And Research Design I
PSYC2009	Learning Theory And Practice
PSYC3016	Research Project In Psychology (Minor)

### **AND Fifteen (15) Level II/III credits**

#### **AND**

FOUN1008 Rhetoric II: Special Purposes

#### **OR**

FOUN1001 English for Acad. Purposes

#### **AND**

FOUN1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

## **SCIENCE WITH SPANISH**

### **LEVEL I**

#### **Twenty-four (24) credits from Level I Science Courses Plus**

SPAN1001	Spanish Language IA
SPAN1002	Spanish Language IB

## **LEVELS II & III**

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

SPAN2001	Spanish Language IIA
SPAN2002	Spanish Language IIB
SPAN2214	Hispanic Culture
SPAN3502	Business Spanish
SPAN3503	Spanish for Tourism

### **AND Fifteen (15) Level II/III credits**

#### **AND**

FOUN1008 Rhetoric II: Special Purposes

#### **OR**

FOUN1001 English for Acad. Purposes

#### **AND**

FOUN1101 Caribbean Civilization

FOUN1301 Law, Governance and Society

## **SCIENCE WITH EDUCATION**

### **LEVEL I**

#### **Twenty-four (24) credits from Level I Science Courses plus**

EDPSI001 Introduction to Human Development

## **LEVELS II & III**

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

EDCU2101	Introduction to Curriculum, Theory, Planning & Practice
EDRS2201	Introduction to Research Methods
EDSO3102	Social Context of Education
<b>And ONE of the following-</b>	
EDPH2016	Philosophy of Education
EDME2211	Testing, Measurement & Evaluation I
EDMA2111	The Structure and Nature of Mathematics
EDSC2110	The Structure and Nature of Science
EDEA2304	Introduction to Educational Administration
EDSE2924	Introduction to Special Education

#### **And ONE of the following-**

EDTK3304	Media & Technology in Education
EDTE3001	Issues in Teacher Education

### **AND Eighteen (18) Level II/III credits**

**AND**

FOUN1008

Rhetoric II: Special Purposes

**OR**

FOUN1001

English for Acad. Purposes

**AND**

FOUN1101

Caribbean Civilization

FOUN1301

Law, Governance and Society

## DEPARTMENT OF BIOLOGICAL AND CHEMICAL SCIENCES

### SEMESTER I

#### PRELIMINARY

CHEM0615 Preliminary Chemistry I  
BIOL0051 Biology I

#### YEAR I

BIOL1051 Biodiversity I  
BIOL1151 Introductory Genetics  
CHEM1010 Fundamentals of Chemistry  
ERSC1002 Oceans and Climate

#### YEAR II

BIOC2351 Biochemistry I  
BIOL2053 Physiology of Plants and Animals  
BIOL2151 Genetics I  
ECOL2451 Population Ecology  
ECOL2453 Caribbean Island Biogeography  
MICR2251 General Microbiology  
CHEM2010 Practical Chemistry I  
CHEM2100 Inorganic Chemistry I  
CHEM2200 Organic Chemistry

#### YEAR III

BIOC3251 Microbial Biochemistry  
BIOC3354 Biochemistry of Human Disease  
BIOL3152 Bioinformatics  
ECOL3452 Behavioural Ecology  
ECOL3454 Fisheries Biology  
MICR3059 Immunobiology  
MICR3253 Biology of Viruses  
CHEM3200 Organic Chemistry II  
CHEM3300 Physical Chemistry II  
CHEM3415 Analytical Chemistry III  
CHEM3500 Chemistry Project

### SEMESTER II

CHEM0625 Preliminary Chemistry II  
BIOL0052 Biology II

BIOL1052 Biodiversity II  
BIOC1351 Introductory Biochemistry  
CHEM1020 Introductory Chemistry  
ERSC1001 Dynamic Earth

BIOC2352 Biochemistry II  
BIOL2152 General Molecular Biology  
ECOL2452 Community Ecology  
ECOL2454 Marine Biology  
MICR2252 Eukaryotic micro-organisms  
CHEM2300 Physical Chemistry I  
CHEM2020 Practical Chemistry II  
CHEM2400 Analytical Chemistry I

BIOC3352 Biochemistry III  
BIOL3053 Developmental Physiology  
ECOL3451 Human Ecology and Conservation  
MICR3251 Food Microbiology  
MICR3252 Microbial Ecology  
MICR3258 Pathogenic micro-organisms  
CHEM3100 Inorganic Chemistry II  
CHEM3135 Bio-Inorganic Chemistry  
CHEM3145 Bonding in Inorganic Chemistry  
CHEM3210 Bioorganic & Medicinal Chemistry  
CHEM3500 Chemistry Project

## YEAR-LONG COURSES

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

## DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS AND PHYSICS

### SEMESTER I

#### PRELIMINARY

MATH0101	Preliminary Mathematics I
PHYS0070	Preliminary Physics I

#### YEAR I

COMP1005	Computer Applications
COMP1105	Computer Programming I
COMP1115	Computer Programming II
ELET1100	Circuit Analysis
ELET1110	Digital Electronics
MATH1100	Basic Mathematics
MATH1120	Calculus I
PHYS1100	Mechanics
PHYS1102	Optics, Thermodynamics & Modern Physics

#### YEAR II

COMP2105	Discrete Mathematics
COMP2115	Information Structures
COMP2125	Computer Architecture
COMP2145	Software Engineering I
COMP2150	Computer Networks I
ELET2100	Microprocessors I
ELET2110	Circuit Simulation
MATH2100	Abstract Algebra
MATH2120	Analysis and Methods
MATH2140	Introduction to Probability
PHYS2100	Mathematical Methods in Physics

### SEMESTER II

#### PRELIMINARY

MATH0102	Preliminary Mathematics II
PHYS0071	Preliminary Physics II

COMP1105	Computer Programming I
COMP1115	Computer Programming II
COMP1130	Web Technology Fundamentals
ELET1120	Basic Electronics
MATH1100	Basic Mathematics
MATH1110	Applied Statistics
MATH1130	Calculus II
PHYS1101	Electricity and Magnetism

COMP2105	Discrete Mathematics
COMP2115	Information Structures
COMP2125	Computer Architecture
COMP2160	Object-Oriented Programming
ELET2120	Discrete Device Electronics
ELET2130	Digital Communications I
MATH2110	Linear Algebra
MATH2130	Ordinary Differential Equations
MATH2150	Mathematical Statistics – Statistical Inference
PHYS2103	Classical Mechanics
PHYS2105	Computational Physics I

PHYS2101	Quantum Mechanics and Special	PHYS2107	Advanced Physics / Technology Laboratory II
PHYS2102	Solid State Physics		
PHYS2106	Advanced Physics/Technology Laboratory I		

### YEAR III

COMP3100	Operating Systems	COMP3115	Information Systems
COMP3135	Programming Languages	COMP3125	Artificial Intelligence
COMP3140	Software Engineering II	COMP3155	Computer Networks II
COMP3180	Algorithm Design and Analysis	COMP3160	Database Management Systems
COMP3210	Electronic Commerce	COMP3170	Web-based Applications
COMP3910	Computer Science Research Project	COMP3910	Computer Science Research Project
ELET3120	Communication Circuits	ELET3100	Microprocessors II
ELET3130	Introduction to DSP	ELET3110	Control and Instrumentation
ELET3151	Digital Communications II	ELET3140	Microcomputers and Control
ELET3160	Electronics Research Project	ELET3160	Electronics Research Project
MATH3130	Optimization Theory	MATH3100	Multivariate Analysis
MATH3150	Complex Variables I	MATH3120	Numerical Analysis
MATH3160	Number Theory	MATH3170	Advanced Algebra
MATH3190	Matrix Analysis	PHYS3101	Electrodynamics
PHYS3100	Quantum Mechanics	PHYS3105	Statistical Mechanics
PHYS3102	Optics and Lasers	PHYS3106	Physics Research Project
PHYS3106	Physics Research Project		

## METEOROLOGY

### SEMESTER I

#### YEAR I

METE1010	Introduction to Meteorology
METE2000	Physical Meteorology I
METE2100	Dynamic Meteorology I
METE3100	Dynamic Meteorology II
METE3200	Synoptic Meteorology II

### SEMESTER II

#### YEAR 2

METE1011	Introduction to Meteorology II
METE2001	Physical Meteorology II
METE2200	Synoptic Meteorology I
METE3300	Tropical Meteorology
METE3400	Weather Radars and Satellites
METE3410	Applications of Meteorology

**COURSES TYPICALLY OFFERED AT SUMMER  
SCHOOL OF RELEVANCE TO SCIENCE STUDENTS**

**FACULTY OF HUMANITIES AND EDUCATION**

FOUN1101	Caribbean Civilization
FOUN1001	English for Academic Purposes
FOUN1008	Rhetoric II – Writing for Special Purposes
PSYC1003	Introduction to Psychology
PSYC1004	Introduction to Social Psychology
PSYC2009	Learning Theory and Practice

**FACULTY OF PURE AND APPLIED SCIENCES**

BIOC1351	Introductory Biochemistry
BIOL0051	Biology I
BIOL0052	Biology II
BIOL1051	Biodiversity I
BIOL1052	Biodiversity II
BIOL1151	Introductory Genetics
CHEM0615	Preliminary Chemistry I
CHEM0625	Preliminary Chemistry II
CHEM1010	Fundamentals of Chemistry
CHEM1020	Introductory Chemistry
COMP1105	Computer Programming I
COMP1115	Computer Programming II
COMP2105	Discrete Mathematics
COMP2115	Information Structures
COMP3100	Operating Systems
COMP3140	Software Engineering II
COMP3160	Database Management Systems
COMP3910	Computer Research Project
ELET1100	Circuit Analysis
ELET1110	Digital Electronics
ELET1120	Basic Electronics
MATH0101	Preliminary Mathematics I
MATH0102	Preliminary Mathematics II
MATH1100	Basic Introductory Mathematics
MATH1110	Applied Statistics

MATH1120	Calculus I
MATH1130	Calculus II
MATH2100	Abstract Algebra
MATH2110	Linear Algebra
MATH2120	Analysis and Methods
MATH2130	Ordinary Differential Equations
MATH2140	Introduction to Probability
MATH2150	Mathematics Statistics
PHYS0070	Preliminary Physics
PHYS0071	Preliminary Physics II
PHYS1100	Mechanics
PHYS1101	Electricity and Magnetism
PHYS1102	Optics, Thermodynamics & Modern Physics
PHYS2101	Quantum Theory & Special Relativity

**FACULTY OF SOCIAL SCIENCES**

ECON1001	Introduction to Microeconomics
ECON1002	Introduction to Macroeconomics
ECON1003	Maths for Social Sciences I
ECON1004	Maths for Social Sciences II
ECON1005	Introductory Statistics
ECON2000	Intermediate Microeconomics
ECON2001	Intermediate Microeconomics I
ECON2002	Intermediate Macroeconomics II
ECON2003	Intermediate Macroeconomics III
ECON2008	Statistical Methods I
ECON2020	The Caribbean Economy
ECON3007	International Finance
ECON3011	Economics of Financial Institutions
ECON3049	Econometrics I
ACCT1002	Introduction to Financial Accounting
ACCT1003	Introduction to Cost and Management Accounting
ACCT2014	Financial Accounting I
ACCT2015	Financial Accounting II
ACCT2017	Management Accounting
ACCT3039	Cost and Management Accounting
ACCT3040	Accounting Theory

ACCT3043	Principles of Auditing
MGMT1001	Principles of Management
MKTG2001	Principles of Marketing
MGMT2005	Microcomputer Applications for Business
MGMT2006	Management Information Systems
MGMT2008	Organisational Behaviour
MGMT2020	Managerial Economics
MGMT2021	Business Law I
MGMT2026	Production and Operations Management
MGMT3011	Management Information Systems II
MGMT3017	Human Resources Management
MGMT3018	Industrial Relations
MGMT3031	Business, Strategy and Policy
MGMT3033	Business, Government and Society

## BIOLOGICAL SCIENCES

The Department of Biological & Chemical Sciences offers Single Majors in Biochemistry, Biology, Ecology and Microbiology as well as a Double Major in Biology. The Level II/III courses used for a Biology, Biochemistry, Ecology and/or Microbiology major cannot be used to simultaneously satisfy the requirements for a second biological major or a Biochemistry, Biology, Ecology or Microbiology minor.

### MAJOR IN BIOCHEMISTRY:

#### LEVEL I

BIOC1351	Introductory Biochemistry
BIOL1051	Biodiversity I
BIOL1151	Introductory Genetics
CHEM1010	Fundamentals of Chemistry
CHEM1020	Introductory Chemistry

#### LEVEL II

BIOC2351	Biochemistry I
BIOC2352	Biochemistry II
BIOL2151	Genetics I
BIOL2152	General Molecular Biology

#### LEVEL III

BIOC3251	Microbial Biochemistry
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#### AND Twelve (12) Credits from:

BIOC3053	Cell Signalling
BIOC3254	Biochemical Plant Pathology
BIOC3352	Biochemistry III
BIOC3354	Biochemistry of Human Disease
BIOC3950	Biochemistry Research Project
CHEM3210	Bioorganic & Medicinal Chemistry

A Student Majoring in Biochemistry cannot also Major in Microbiology.

**MINOR IN BIOCHEMISTRY [Sixteen (16) Credits]:**

BIOC2352      Biochemistry II

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

BIOC2351      Biochemistry I\*  
 BIOC3053      Cell Signalling  
 BIOC3251      Microbial Biochemistry\*  
 BIOC3254      Biochemical Plant Pathology  
 BIOC3352      Biochemistry III  
 BIOC3354      Biochemistry of Human Disease  
 BIOC3950      Biochemistry Research Project

\*A student taking a major in Microbiology cannot use BIOC2351 or BIOC3251 to satisfy the requirements for a Biochemistry minor.

**MAJOR IN BIOLOGY:****LEVEL I**

BIOC1351      Introductory Biochemistry  
 BIOL1051      Biodiversity I  
 BIOL1052      Biodiversity II  
 BIOL1151      Introductory Genetics

**LEVELS II & III**

BIOL2053      Physiology of Plants & Animals  
 BIOL3053      Developmental Physiology

**AND**

BIOL2151      Genetics I  
 MICR2251      General Microbiology

**OR**

BIOC2351      Biochemistry I  
 BIOC2352      Biochemistry II

**OR**

ECOL2451      Population Ecology  
 ECOL2452      Community Ecology

**OR**

BIOC2351      Biochemistry I

BIOL2152      General Molecular Biology

**OR**

MICR2251      General Microbiology  
 MICR2252      Eukaryotic Micro-organisms

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

BIOC3053      Cell Signaling  
 BIOC3251      Microbial Biochemistry  
 BIOC3254      Biochemical Plant Pathology  
 BIOC3352      Biochemistry III  
 BIOC3354      Biochemistry of Human Disease  
 BIOC3950      Biochemistry Research Project  
 BIOL3023      Coral Reef Biology  
 BIOL3152      Bioinformatics  
 BIOL3950      Biology Research Project  
 ECOL3451      Human Ecology and Conservation  
 ECOL3452      Behavioural Ecology  
 ECOL3453      Crop Ecology  
 ECOL3454      Fisheries Biology  
 ECOL3950      Ecology Research Project  
 MICR3059      Immunobiology  
 MICR3251      Food Microbiology  
 MICR3252      Microbial Ecology  
 MICR3253      Biology of Viruses  
 MICR3258      Pathogenic Micro-organisms  
 MICR3950      Microbiology Research Project

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

BIOC2351      Biochemistry I  
 BIOC2352      Biochemistry II  
 BIOL2151      Genetics I  
 BIOL2152      General Molecular Biology  
 BIOL2950      Biology Elective  
 ECOL2055      Horticulture  
 ECOL2451      Population Ecology  
 ECOL2452      Community Ecology  
 ECOL2453      Caribbean Island Biogeography  
 ECOL2454      Marine Biology  
 MICR2251      General Microbiology  
 MICR2252      Eukaryotic Micro-organisms

BIOC3053	Cell Signaling
BIOC3251	Microbial Biochemistry
BIOC3254	Biochemical Plant Pathology
BIOC3352	Biochemistry III
BIOC3354	Biochemistry of Human Disease
BIOL3023	Coral Reef Biology
BIOL3053	Developmental Physiology
BIOL3152	Bioinformatics
ECOL3451	Human Ecology and Conservation
ECOL3452	Behavioural Ecology
ECOL3453	Crop Ecology
ECOL3454	Fisheries Biology
MICR3059	Immunobiology
MICR3251	Food Microbiology
MICR3252	Microbial Ecology
MICR3253	Biology of Viruses
MICR3258	Pathogenic Micro-organisms

## DOUBLE MAJOR IN BIOLOGY

### LEVEL I

BIOC1351	Introductory Biochemistry
BIOL1051	Biodiversity I
BIOL1052	Biodiversity II
BIOL1151	Introductory Genetics

### LEVELS II & III

BIOL2053	Physiology of Plants & Animals
BIOL3053	Developmental Physiology

**AND**

BIOL2151	Genetics I
MICR2251	General Microbiology

**OR**

BIOC2351	Biochemistry I
BIOC2352	Biochemistry II

**OR**

ECOL2451	Population Ecology
ECOL2452	Community Ecology

**OR**

BIOC2351	Biochemistry I
BIOL2152	General Molecular Biology

**OR**

MICR2251	General Microbiology
MICR2252	Eukaryotic Micro-organisms

### AND Eight (8) Credits from:

BIOL3950	Biochemistry Research Project
BIOL3950	Biology Research Project
ECOL3950	Ecology Research Project
MICR3950	Microbiology Research Project

### AND Forty (40) Credits from:

BIOC2351	Biochemistry I
BIOC2352	Biochemistry II
BIOL2151	Genetics I
BIOL2152	General Molecular Biology
BIOL2950	Biology Elective
ECOL2055	Horticulture
ECOL2451	Population Ecology
ECOL2452	Community Ecology
ECOL2453	Caribbean Island Biogeography
ECOL2454	Marine Biology
MICR2251	General Microbiology
MICR2252	Eukaryotic Micro-organisms
BIOC3053	Cell Signalling
BIOC3251	Microbial Biochemistry
BIOC3254	Biochemical Plant Pathology
BIOC3352	Biochemistry III
BIOC3354	Biochemistry of Human Disease
BIOL3023	Coral Reef Biology
BIOL3152	Bioinformatics
ECOL3451	Human Ecology and Conservation
ECOL3452	Behavioural Ecology
ECOL3453	Crop Ecology
ECOL3454	Fisheries Biology
MICR3059	Immunobiology
MICR3251	Food Microbiology
MICR3252	Microbial Ecology
MICR3253	Biology of Viruses
MICR3258	Pathogenic Micro-organisms

**MINOR IN BIOLOGY [Sixteen (16) Credits]:**

BIOL2053      Physiology of Plants & Animals  
BIOL3053      Developmental Physiology

**AND Eight (8) Credits from:**

BIOC2351      Biochemistry I  
BIOC2352      Biochemistry II  
BIOL2151      Genetics I  
BIOL2152      General Molecular Biology  
BIOL2950      Biology Elective  
ECOL2055      Horticulture  
ECOL2451      Population Ecology  
ECOL2452      Community Ecology  
ECOL2453      Caribbean Island Biogeography  
ECOL2454      Marine Biology  
MICR2251      General Microbiology  
MICR2252      Eukaryotic Micro-organisms  
BIOC3053      Cell Signalling  
BIOC3251      Microbial Biochemistry  
BIOC3254      Biochemical Plant Pathology  
BIOC3352      Biochemistry III  
BIOC3354      Biochemistry of Human Disease  
BIOL3023      Coral Reef Biology  
BIOL3053      Developmental Physiology  
BIOL3152      Bioinformatics  
ECOL3451      Human Ecology and Conservation  
ECOL3452      Behavioural Ecology  
ECOL3453      Crop Ecology  
ECOL3454      Fisheries Biology  
MICR3059      Immunobiology  
MICR3251      Food Microbiology  
MICR3252      Microbial Ecology  
MICR3253      Biology of Viruses  
MICR3258      Pathogenic Micro-organisms

**MAJOR IN ECOLOGY:****LEVEL I**

BIOC1351      Introductory Biochemistry

BIOL1051      Biodiversity I  
BIOL1052      Biodiversity II  
BIOL1151      Introductory Genetics

**LEVEL II**

ECOL2451      Population Ecology  
ECOL2452      Community Ecology  
ECOL2453      Caribbean Island Biogeography

**AND**

ECOL2055      Horticulture

**OR**

ECOL2454      Marine Biology

**LEVEL III**

ECOL3451      Human Ecology and Conservation

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

BIOL3023      Coral Reef Biology  
ECOL3452      Behavioural Ecology  
ECOL3453      Crop Ecology  
ECOL3454      Fisheries Biology  
ECOL3950      Ecology Research Project  
MICR3252      Microbial Ecology

**MINOR IN ECOLOGY [Sixteen (16) Credits]:**

ECOL2451      Population Ecology  
ECOL2452      Community Ecology  
ECOL2453      Caribbean Island Biogeography

**AND**

ECOL2055      Horticulture

**OR**

ECOL2454      Marine Biology

**MAJOR IN MICROBIOLOGY:****LEVEL I**

BIOC1351      Introductory Biochemistry

BIOL1051 Biodiversity I  
BIOL1052 Biodiversity II  
BIOL1151 Introductory Genetics

**LEVEL II**

BIOC2351 Biochemistry I  
BIOL2151 Genetics I  
MICR2251 General Microbiology  
MICR2252 Eukaryotic Micro-organisms

**LEVEL III**

BIOC3251 Microbial Biochemistry  
MICR3252 Microbial Ecology

**AND Eight (8) Credits from:**

BIOC3254 Biochemical Plant Pathology  
MICR3059 Immunobiology  
MICR3251 Food Microbiology  
MICR3253 Biology of Viruses  
MICR3258 Pathogenic Micro-organisms  
MICR3950 Microbiology Research Project

A student taking a Major in Microbiology cannot also Major in Biochemistry.

**MINOR IN MICROBIOLOGY [Sixteen (16) Credits]:**

MICR2251 General Microbiology  
MICR2252 Eukaryotic Micro-organisms

**AND Eight (8) Credits from:**

BIOC3251 Microbial Biochemistry  
BIOC3254 Biochemical Plant Pathology  
MICR3059 Immunobiology  
MICR3251 Food Microbiology  
MICR3252 Microbial Ecology  
MICR3253 Biology of Viruses  
MICR3258 Pathogenic Micro-organisms  
MICR3950 Microbiology Research Project

## PRELIMINARY BIOLOGICAL COURSES

### BIOL0051 - BIOLOGY I (6-P 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:** Final Theory Examination (3 hours) 60%  
Two in-course Tests 20%  
Laboratory reports 20%

### BIOL0052 - BIOLOGY II (6-P 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:** Final Theory Examination (3 hours) 60%  
Two in-course tests 20%  
Laboratory reports 20%

## LEVEL I BIOLOGICAL COURSES

### BIOC1351 - INTRODUCTORY BIOCHEMISTRY (4 credits)

**Prerequisite:** **Either** CAPE Chemistry Unit 1 or CHEM0615 or an approved equivalent.

**Syllabus:** Cell fractionation and basic analytical techniques. Elementary thermodynamics ATP synthesis by substrate level, oxidative and photophosphorylation. Properties of H<sub>2</sub>O and aqueous solutions; pH; buffers. Structure and properties of nucleotides and nucleic acids.

Structure and properties of amino acids.  
 Protein structure and function.  
 Enzymes. Elementary enzyme kinetics;  
 reversible enzyme inhibition.  
 Structure and properties of lipids.  
 Monosaccharide structure and conformation.  
 Disaccharides and polysaccharides.  
 Glycolysis and the TCA cycle.

Teaching: Two lectures, one tutorial and (the equivalent of) three hours of practical per week.

Method of Examination:	Final Theory Examination (3 hours)	50%
	Mid-semester test	10%
	Tutorial Assignments	15%
	Practical reports	25%

### BIOL1051 - BIODIVERSITY I (4 credits)

Pre-requisite: CAPE Biology Unit 1 or 2 or BIOL0051 or BIOL0052 or CAPE Environmental Science and CSEC Biology.

Syllabus: Evolution: “Theories” of Evolution: Genesis; Linnaeus; Lamarck; Darwin-Wallace; Neo-Darwinism. Mechanisms: selection, mutation, migration, genetic drift, isolation mechanisms, hybridisation. Fossilisation and the fossil record, speciation and the time continuum.  
**Ecology:** Populations and communities. Habitat and niche. The Ecosystem Concept: energy flow; nutrient cycles; food chains and webs. Relationships: competition; predator-prey; types of symbioses.  
**Diversity and Classification:** Fundamental principles of Taxonomy; Units of Classification; The species as the basic unit of classification; Scientific names of species;

The Species Concept. Classical, numerical and molecular taxonomy; Biosystematics and Cladistics. Microorganisms: Introduction to structure and classification of viruses, bacteria and fungi.

**Plants:** A systematic review of the plant kingdom.

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

Method of Examination:	Final Theory Examination (2 hours)	50%
	In-course test(s)	15%
	Tutorial Assignments	10%
	Practical reports	25%

### BIOL1052 - BIODIVERSITY II (4 credits)

Pre-requisite: CAPE Biology Unit 1 or 2 or BIOL0051 or BIOL0052 or CAPE Environmental Science and CSEC Biology.

Syllabus: A systematic review of the animal kingdom, with emphasis on the major groups.  
 Animal body plans: germ layers, levels of organisation, symmetry, metamerism, cephalisation. Characteristics of major groups; adaptive radiation; vertebrate evolution.

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

Method of Examination:	Final Theory Examination (3 hours)	50%
	Tutorial essays	10%
	Practical Test(s)	15%
	Practical reports	25%

## BIOL1151 - INTRODUCTORY GENETICS (4 credits)

Prerequisite: **Either** CAPE Biology Unit I or BIOL0051 or CAPE Environmental Science and CSEC Biology.

Syllabus: **The Nature of the Genetic Material:** Experimental evidence implicating the nucleic acids. DNA structure - experimental evidence & theory. DNA conformation. **DNA Replication and Assortment:** Semi-conservative. Modes of replication. The replication fork in *Escherichia coli*. DNA polymerases. The cell cycle. Organisation of eukaryotic chromatin. Mitosis and meiosis. Mendelism. Linkage and Recombination. **The Genetic Material as an Information Carrier:** The Central Dogma. Colinearity. Transcription and translation in prokaryotes & eukaryotes. Gene expression/regulation - lac and/or trp operons in *E. coli*. **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.

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

Method of Examination:	Final Theory Examination (2 hours)	50%
	Mid-semester test	15%
	Tutorial Assignments	10%
	Practical reports	25%

## LEVEL II BIOLOGICAL COURSES

### BIOC2351 - BIOCHEMISTRY I (4 credits)

Pre-Requisites: BIOC1351 Introductory Biochemistry & CHEM0625 Preliminary Chemistry II

Syllabus: **Enzymes:** Enzyme kinetics. Catalytic mechanisms. Use of kinetics to elucidate catalytic mechanisms. Models of allosteric enzymes. Regulation of enzyme activity. **Vitamins:** Structure and activity of water-soluble and lipid-soluble vitamins. **Carbohydrate Metabolism:** Metabolic pathways and their regulation including glycolysis, tricarboxylic acid cycle, gluconeogenesis, biosynthesis of polysaccharides, glyoxylate pathway and pentose phosphate pathway. Dark reactions of photosynthesis. **Lipid Metabolism:** Metabolic pathways and their regulation -  $\beta$ -oxidation, fatty acid biosynthesis. Biological membranes and transport. **Nitrogen Metabolism:** Overview of amino acid catabolism and biosynthesis. Urea cycle. Nitrogen fixation. Amino acids as biosynthetic precursors. Nucleic Acids: DNA replication. Protein synthesis. Regulation of prokaryotic gene expression.

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

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

## **BIOC2352 - BIOCHEMISTRY II (4 Credits)**

Pre-requisite: BIOC2351 Biochemistry I

Syllabus: **Metabolic regulation:** Regulatory enzymes, control of enzyme activity. Hormonal regulation of mammalian metabolism. Chemical classes of hormones. Molecular aspects of hormonal signal transduction. Integration of metabolic regulation. Regulation of fuel metabolism.

**Biochemical Methods:** Molecular spectroscopic methods. Infrared, Raman, NMR, fluorescence UV-vis, circular dichroism. Mass Spectroscopic methods. Review of electrophoresis Chromatographic methods. Radiotracer methods. Electrochemistry and sensors. Enzymatic methods.

**Toxicology:** Overview of toxicology. Environmental toxicology. Biological fate of pesticides and other potential environmental pollutants. Regulatory concerns. Metabolism and toxicology of xenobiotics, including pharmacologicals and food additives.

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

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

## **BIOL2053 - PHYSIOLOGY OF PLANTS & ANIMALS (4 credits)**

Prerequisites: BIOL1052 Biodiversity II and BIOC1351 Introductory Biochemistry

Syllabus: **Plants:** Functional anatomy of flowering plants. Water relations, mineral nutrition, transpiration, gas exchange. Photosynthesis and translocation.

**Animals:** Physiological processes in animals. Circulation, gas exchange, osmotic regulation, acquisition of energy, thermoregulation.

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

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

## **BIOL2057 - BIOLOGY FIELD COURSE (2 credits)**

Pre-requisites: BIOL1051 Biodiversity I & BIOL1052 Biodiversity II

Syllabus: A practical introduction to Caribbean flora and fauna, including the use of ecological methods.

Teaching: A five day residential course on a Caribbean island.

Method of Examination: An assessment of the student's field note book 100%

## BIOL2151 - GENETICS I (4 credits)

Pre-requisites: BIOC1351 Introductory Biochemistry & BIOL1151 Introductory Genetics

Syllabus: **Gene structure and expression:** The modern concept of the gene in prokaryotes and eukaryotes. Transcription and processing of RNA.

**Genome organisation:** In prokaryotes and eukaryotes. Extranuclear genomes.

**Genetic mutation:** Isolation and analysis of mutants. Mutagens. DNA repair.

**Transmission genetics:** Mendelian principles. Linkage and recombination. Lysis, lysogeny and crossing in bacteriophages. Conjugation, transduction and transformation in bacteria. Sexual and parasexual analyses in fungi. Genetic analysis in higher eukaryotes. Maternal effects and extranuclear genetics.

**Genetic recombination:** Breakage and reunion. Models for generalised recombination and gene conversion. Site-specific recombination. Transposons.

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

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

## BIOL2152 - GENERAL MOLECULAR BIOLOGY (4 credits)

Pre-requisite: BIOL2151 Genetics I

Syllabus: **Isolation and analysis of nucleic acids and proteins:** Isolation methods. Detection and quantification of DNA, RNA and proteins. Electrophoretic techniques. Restriction and modification systems. Restriction endonucleases. Physical mapping. Hybridisation techniques. Sequencing.

**Genetic manipulation:** Plasmid and bacteriophage cloning vectors. Cloning strategies. Gene libraries. Gene transfer systems. *In vitro mutagenesis*.

**Gene Expression:** Promoter-probe plasmids. Expression vectors. *In situ* Hybridization and Immunofluorescent detection methods. In vitro translation.

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

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

**BIOL2950 BIOLOGY ELECTIVE (4 credits)**

Pre-requisites: None

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

**ECOL2055 - HORTICULTURE (4 credits)**

Pre-requisites: BIOL1051 Biodiversity I &amp; BIOL1052 Biodiversity II

Syllabus: Horticulture is reviewed from a scientific base, exploring the environmental, genetic and cultural manipulation of plants for food (fruits and vegetables), pleasure (ornamentals) and recreation (turf). Sessions begin with a brief survey of horticulture and its significance locally and worldwide. These progress to study representative plant groups through stages in plant production, from propagation to growth through development both of the whole plant and of the population. In lectures, tutorials and practicals, plant responses to variations in soil / substrate type, water, minerals, light temperature, genotype and the presence of other organisms (pest, diseases and weeds) as well as spacing, pruning and imposed stress will be considered. Methods for analysing plant productivity in terms of quality and quantity are introduced and discussed.

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

Method of Examination:	Final Theory Examination (2 hours)	50%
	Practical reports	20%
	Tutorial essays, case studies & presentations	30%

**ECOL2451 - POPULATION ECOLOGY (4 credits)**

Pre-requisites: BIOL1051 Biodiversity I &amp; BIOL1052 Biodiversity II

Syllabus: Life tables. Exponential and logistic population growth. Population regulation. Deterministic and stochastic theories of life history evolution. Evolution and consequences of dispersal. Habitat selection. Quantitative ecological methods. Population dynamics and resource exploitation.

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

Method of Examination:	Final Theory Examination (3 hours)	70%
	Project Report/Essay	30%

**ECOL2452 - COMMUNITY ECOLOGY (4 credits)**

Pre-requisite: ECOL2451 Population Ecology

Syllabus: Neutralism, commensalism, proto-cooperation, mutualism. Interference and exploitation competition. Competition equations. Niche characteristics. Competitive exclusion. Character displacement. Predator/prey interactions. Optimal foraging. Food web structure. Community stability. Plant-animal interactions – frugivory and pollination. Population models and parasitoid-host systems. Community changes. Quantitative ecological methods. Palaeoecology.

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

Method of Final Theory Examination (3 hours) 70%  
Examination: Project report/Essay 30%

### **ECOL2453 - CARIBBEAN ISLAND BIOGEOGRAPHY** (4 Credits)

Pre-requisites: BIOL1051 Biodiversity I & BIOL1052  
Biodiversity II

Syllabus: Plate tectonics, island formation and Caribbean geology. Climate patterns (past and present). Equilibrium theory of island biogeography. Species turnover. Taxon cycle. The major habitat types found in the Caribbean - location, structure, anthropogenic influences and typical species. Reviews of distribution, evolution and ecology of selected taxonomic groups. Field survey methods.

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

Method of Final Theory Examination (3 hours) 50%  
Examination: Mid-term Test 10%  
Field Notebook 40%

### **ECOL2454 - MARINE BIOLOGY** (4 credits)

Pre-requisite: ECOL2451 Population Ecology

Syllabus: Basic oceanography - tidal cycles, waves, ocean circulation and seawater chemistry. Global distributions, zonation and adaptations of sublittoral, intertidal planktonic, nektonic and deep sea organisms. Sampling techniques.

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

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

### **MICR2251 - GENERAL MICROBIOLOGY** (4 credits)

Pre-requisites: BIOL1051 Biodiversity I & BIOC1351  
Introductory Biochemistry

Syllabus: Sterilisation and disinfection. Cultivation of microorganisms. Enumeration of microorganisms. Biology of selected groups of bacteria, fungi and viruses. Aspects of applied microbiology.

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

Method of Final Theory Examination (3 hours) 60%  
Examination: Practical Reports 30%  
In-course Test(s)/Assignment(s) 10%

### **MICR2252 – EUKARYOTIC MICROORGANISMS** (4 credits)

Pre-requisite: MICR2251 General Microbiology

Syllabus: An introduction to the biology of the eukaryotic microorganisms: algae, fungi, and protista. Structure and function, reproduction, physiology, behaviour, and ecology.

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

Method of Final Theory Examination (3 hours) 60%  
Examination: Practical Reports 30%  
In-course test(s)/Assignment(s) 10%

### LEVEL III BIOLOGICAL COURSES

#### BIOC3053 - CELL SIGNALLING (4 credits)

Pre-requisite: BIOL2152 General Molecular Biology.

Syllabus: **Intracellular signalling:** ion fluxes and electrical fields, establishment of cell polarity. **Intercellular signalling:** Chemical messengers in “lower” organisms. The evolution of hormones. General aspects of hormone action. **Animal systems:** signal transduction by G proteins. Steroid hormone action. **Plant systems:** the molecular basis of plant hormone action.

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

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

#### BIOC3251 - MICROBIAL BIOCHEMISTRY (4 credits)

Pre-requisite: BIOC2351 Biochemistry I.

Syllabus: Alternatives to the glycolytic pathway for sugar metabolism in micro-organisms. Fermentation; diversity of products in bacteria. Bacterial phosphoenolpyruvate: sugar phosphotransferase system. Glyoxylate cycle. Anaplerotic pathways unique to micro-organisms. Anoxygenic photosynthesis. Lithotrophy. Anaerobic respiration. Nitrogen fixation. Regulation of activities and cellular levels of microbial enzymes.

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

Method of Examination: Final Theory Examination (3 hours) 60%  
Practical report(s) 30%  
In-course test(s)/Assignment(s) 10%

#### BIOC3254 - BIOCHEMICAL PLANT PATHOLOGY (4 credits)

Pre-requisites: MICR2251 General Microbiology and BIOL2151 Genetics I.

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

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

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

#### BIOC3352 - BIOCHEMISTRY III (4 Credits)

Pre-requisites: BIOC2351 Biochemistry I & BIOC2352 Biochemistry II

Syllabus: The areas of study may vary from year to year but will usually include;-Clinical biochemistry and techniques, biological

membranes and transport, food biochemistry, protein structure and function, molecular chaperones.

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

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

### **BIOC3354 - BIOCHEMISTRY OF HUMAN DISEASE** (4 credits)

Prerequisite: BIOC2351 Biochemistry I

Syllabus: The areas of study will focus on a variety of human diseases such as: HIV/AIDS, cardiovascular disease, diabetes, obesity, various cancers, liver disease, kidney disease, various syndromes and deficiencies including in-born errors of metabolism. Various aspects of the biochemistry will be studied for the diseases, with a highlight of the latest ground-breaking research in the area. The areas studied will include specific biochemical pathways, key proteins and enzymes that play a role in the disease, and linkage of these pathways with the presentation of the symptoms of the disease.

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

Method of Examination: Final Theory Examination (3 hours) 60%  
In-course test(s)/assignment(s) 20%  
Practical reports 20%

### **BIOC3950 - BIOCHEMISTRY RESEARCH PROJECT** (8 credits)

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

Restrictions: Cannot be taken with BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project or ECOL3950 Ecology Research Project

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

Method of Examination: Supervisor's Assessment 15%  
Seminar 15%  
Project Report 70%

### **BIOL3023 – CORAL REEF BIOLOGY** (4credits)

Pre-requisite: ECOL2454 Marine Biology

Syllabus: Biology of scleractinian corals: Anatomy, skeletal morphology, calcification and skeletogenesis, endosymbiosis with zooxanthellae, modes of feeding, reproduction and recruitment, environmental factors that influence growth and distribution. Ecology of coral communities: Theory of coral reef formation, types of reef. Reef community structure and zonation. Dynamics of coral communities including

diversity/stability relationships, keystone species, algal-herbivore and predator prey interactions, inter-specific competition, succession, and disturbance. A survey of the major groups of reef-associated organisms including other coelenterates, porifera, molluscs, echinoderms, fishes, and algae. Emphasis will be on Caribbean coral reefs, but comparisons will be made among reefs from other regions.

**Practical Work:** Laboratory exercises on taxonomy and physiology of corals and other reef-associated organisms. Field exercises, with extensive in-water work, on coral reef community structure and dynamics.

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

Method of Examination:	One 2-hour theory paper	60%
	Laboratory reports	30%
	In-course practical tests	10%

### **BIOL3053 - DEVELOPMENTAL PHYSIOLOGY** (4 credits)

Prerequisite: BIOL 2053 Physiology of Plants & Animals

Restrictions: Cannot be taken by those who have passed BL 22A Animal Physiology or BL 22B Plant Physiology

Syllabus: **Plants:** Internal and external regulation of flowering plant growth and development including phytohormones.  
**Animals:** Human growth and development. Reproduction. Overview of prenatal and postnatal development. Integrative systems. In depth analysis of selected processes in plant and animal development.

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

Method of Examination:	Final Theory Examination (3 hours)	70%
	In-course tests/assignments	10%
	Project reports	20%

### **BIOL 3152 - BIOINFORMATICS (4 Credits)**

Pre-requisite: BIOL2152 General Molecular Biology

Syllabus: Common types of genomic and proteomic data including DNA and protein sequences, motifs, domains, patterns, secondary structure and folding classes, tertiary structure. DNA and protein sequence analysis including analysis of homology, identification of motifs and domains, pairwise and multiple alignments including global and local alignments. Dynamic programming algorithms for sequence alignment, prediction of secondary structure, prediction of gene structure. Methods of phylogenetic analysis. The distribution of data through public databases, data formats, and end-user applications for manipulation and analysis including use of PAM250 scoring matrix, BLOSUM 62, scoring matrix, FASTA, BLAST, PSI-BLAST, PHI-BLAST, PSSM, Smith-Waterman dynamic Programming.

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

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

**BIOL3950 - BIOLOGY RESEARCH PROJECT** (8 credits)

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

Restrictions: Cannot be taken with BIOC3950 Biochemistry Research Project, MICR3950 Microbiology Research Project or ECOL3950 Ecology Research Project

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

Method of Examination:	Supervisor's Assessment	15%
	Seminar	15%
	Project Report	70%

**ECOL3451 - HUMAN ECOLOGY AND CONSERVATION** (4 credits)

Pre-requisites: ECOL2451 Population Ecology and ECOL2452 Community Ecology.

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

deterioration. Conservation as maintenance of biological diversity - endangered habitats, endangered species.

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

Method of Examination:	Final Theory Examination (3 hours)	70%
	Project Report/Essay	30%

**ECOL3452 - BEHAVIOURAL ECOLOGY** (4 credits)

Pre-requisites: ECOL2451 Population Ecology & ECOL2452 Community Ecology.

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

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

Method of Examination:	Final Theory Examination (3 hours)	70%
	Project Report/Essay	30%

**ECOL3453 - CROPECOLOGY** (4 credits)

Pre-requisites: ECOL2452 Community Ecology & BIOL1151 Introductory Genetics

Syllabus: Autecology of selected crop species and their evolution, propagation and breeding. Interactions of crop species with weed, pest, disease and beneficial organisms in the

agroecosystem. Control of weeds, diseases and pests by cultural, chemical and biological means. Integrated pest management.

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

Method of Examination: Final Theory Examination (3 hours) 60%  
Project Report 20%  
Essay 20%

### **ECOL3454 - FISHERIES BIOLOGY (4 credits)**

Pre-requisites: ECOL2451 Population Ecology, ECOL2452 Community Ecology & ECOL2454 Marine Biology

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

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

Method of Examination: Final Theory Examination (3 hours) 70%  
Practical Reports 20%  
In-course test(s)/Assignment(s) 10%

### **ECOL3950 - ECOLOGY RESEARCH PROJECT (8 credits)**

Pre-requisites: ECOL2451 Population Ecology, ECOL2452 Community Ecology & ECOL2453 Caribbean Island Biogeography

Restrictions: Cannot be taken with BIOL3950 Biology Research Project, MICR3950 Microbiology Research Project or BIOC3950 Biochemistry Research Project

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

Method of Examination: Supervisor's assessment 15%  
Seminar 15%  
Project Report 70%

### **MICR3059 - IMMUNOBIOLOGY (4 credits)**

Pre-requisites: BIOC1351 Introductory Biochemistry & BIOL2151 Genetics I

Syllabus: The mammalian immune system. Cells and organs involved in the immune response. Cell biology of phagocytosis. Structure and functions of the immunoglobulins. Phylogeny of the immune system. Immunoprophylaxis.

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

Method of Examination: Final Theory Examination (3 hours) 80%  
In-course Test(s)/Assignments 20%

### **MICR3251 - FOOD MICROBIOLOGY (4 credits)**

Pre-requisites: MICR2251 General Microbiology & MICR2252 Eukaryotic Microorganisms

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

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

Method of Examination: Final Theory Examination (3 hours) 60%  
Practical report(s) 30%  
In-course test(s)/Assignment(s) 10%

#### **MICR3252 - MICROBIAL ECOLOGY (4 credits)**

Pre-requisites: Either MICR2251 General Microbiology & MICR2252 Eukaryotic Microorganisms or ECOL2451 Population Ecology, ECOL2452 Community Ecology & ECOL2453 Caribbean Island Biogeography

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

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

Method of Examination: Final Theory Examination (3 hours) 60%  
Practical Report(s) 30%  
In-course test(s)/Assignment(s) 10%

#### **MICR3253 - BIOLOGY OF VIRUSES (4 credits)**

Pre-requisites: MICR2251 General Microbiology & BIOL2151 Genetics I

Syllabus: The nature of viruses. Structure of viruses. Viroids. Prions. Medical virology – viral diseases of humans, mode of transmission, symptoms, pathogenesis, control measures, vaccination, antiviral drugs, interferon Plant viruses – disease symptoms, control measures. Molecular virology: entry and exit of viruses from host cells; RNA virus replication; DNA virus replication viral oncogenesis

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

Method of Examination: Final Theory Examination (3 hours) 60%  
Practical reports 30%  
In-course test(s)/Assignment(s) 10%

#### **MICR3258 - PATHOGENIC MICRO-ORGANISMS (4 credits)**

Pre-requisites: MICR2251 General Microbiology & BIOL2151 Genetics I.

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

## CHEMISTRY

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

### MAJOR IN CHEMISTRY:

#### LEVEL I

CHEM1010 Fundamentals of Chemistry  
CHEM1020 Introductory Chemistry

#### LEVEL II

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

#### LEVEL III

CHEM3500 Chemistry Project (4 credits)

#### AND Eight (8) credits from:

CHEM3100 Inorganic Chemistry II  
CHEM3200 Organic Chemistry II  
CHEM3210 Bioorganic & Medicinal Chemistry  
CHEM3300 Physical Chemistry II

### MINOR IN CHEMISTRY (Sixteen (16) Credits):

CHEM2010 Practical Chemistry I (2 credits)  
CHEM2020 Practical Chemistry II (2 credits)

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

CHEM2100 Inorganic Chemistry I  
CHEM2200 Organic Chemistry I  
CHEM2300 Physical Chemistry I  
CHEM2400 Analytical Chemistry I

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

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

### MICR3950 - MICROBIOLOGY RESEARCH PROJECT (8 credits)

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

Restrictions: Cannot not be taken with BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project or ECOL3950 Ecology Research Project

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

Method of Examination: Supervisor's assessment 15%  
Seminar 15%  
Project Report 70%

**DOUBLE MAJOR IN CHEMISTRY:****LEVEL I**

- CHEM1010 Fundamentals of Chemistry  
CHEM1020 Introductory Chemistry

**LEVEL II**

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

**LEVEL III**

- CHEM3505 Chemistry Research Project (8 credits)  
CHEM3100 Inorganic Chemistry II  
CHEM3200 Organic Chemistry II  
CHEM3300 Physical Chemistry II

**AND Twenty-Four (24) Credits From:**

- BIOC2351 Biochemistry I  
BIOC2352 Biochemistry II  
CHEM2950 Chemistry Elective  
CHEM3135 Bioinorganic Chemistry  
CHEM3145 Bonding in Inorganic Chemistry  
CHEM3210 Bioorganic & Medicinal Chemistry  
CHEM3225 Natural Products Chemistry  
CHEM3235 Bioorganic Chemistry  
CHEM3415 Analytical Chemistry III

## PRELIMINARY CHEMISTRY COURSES

### CHEM0615 - PRELIMINARY CHEMISTRY I

(6 P-credits)

Prerequisite: None

Corequisite: CHEM0625 Preliminary Chemistry II or equivalent.

Syllabus: A course of about 39 lectures, associated tutorials and a maximum of 39 hours of laboratory work on the fundamentals of Chemistry and elementary Organic Chemistry.

**Fundamentals of Chemistry:** Atomic theory of matter. The mole concept, chemical equations and stoichiometry. Electron configurations of the elements: the Periodic Table. Properties of isolated atoms. Chemical bonding and energy changes. Classification of bonds. Molecular structures. Interactions between molecules.

**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.

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

Examination:	Final examination (three hours)	60 %
	In-course test(s) / assignment(s)	20 %
	Practicals	20 %

### CHEM0625 - PRELIMINARY CHEMISTRY 2

(6 P-credits)

Prerequisite: None

Corequisite: CHEM0615 (Preliminary Chemistry I) or its equivalent.

Syllabus: A course of about 39 lectures, associated tutorials and a maximum of 39 hours of laboratory work on elementary Physical Chemistry and Inorganic Chemistry.

**Physical Chemistry:** Properties of solids, liquids, gases and solutions. Laws of thermochemistry. Energetics of reactions: Hess' Law, thermodynamic cycles. Kinetics: rates and mechanisms of reactions. Equilibria in gas phase and solution reactions including acid-base, redox and precipitation. Principles of electrochemistry.

**Inorganic Chemistry:** Periodicity of chemical behaviour: dependence on electron configuration. Properties and reactions of the main group elements and their compounds, with emphasis on hydrogen, Groups 1, 2 and 17, and Periods (n=2) and (n=3). First row transition metals and coordination complexes. Industrial processes and environmental considerations

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

Examination:	Final examination (three hours)	60 %
	In-course test(s) / assignment(s)	20 %
	Practicals	20 %

## LEVEL I CHEMISTRY COURSES

### CHEM1010 - FUNDAMENTALS OF CHEMISTRY

(6 Credits)

Prerequisite: CHEM0615 Preliminary Chemistry & CHEM0625 Preliminary Chemistry II, or CAPE Chemistry Units 1 & 2, or equivalent.

Syllabus: A course of 39 lectures, associated tutorials and 52 hours of practical work, on the fundamental aspects of Chemistry.

**Basic Principles:** Molecular energetics; An introduction to spectroscopy.

**Atoms and Diatomic Molecules:** Atomic structure and properties; Bonding in diatomic molecules.

**Polyatomic Molecules:** Molecular structures; Reactions.

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

Method of	Final examination (three hours)	60 %
Examination:	In-course test(s) / assignment(s)	20 %
	Practicals	20 %

### CHEM1020 - INTRODUCTORY CHEMISTRY

(6 Credits)

Prerequisite: CHEM0615 Preliminary Chemistry I and CHEM0625 Preliminary Chemistry II, or CAPE Chemistry Units 1 & 2, or equivalent.

Syllabus: An introductory course of 39 lectures, associated tutorials and 52 hours of practical work, on Inorganic, Organic and Physical Chemistry.

**Inorganic Chemistry:** Matter in bulk; Coordination complexes; Periodicity in main group chemistry.

**Organic Chemistry:** Hydrocarbons; Halides, alcohols, ethers and amines; Carbonyl compounds, carboxylic acids and their derivatives.

**Physical Chemistry:** Thermochemistry; Kinetics; Electrochemistry.

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

Method of	Final examination (three hours)	60 %
Examination:	In-course test(s) / assignment(s)	20 %
	Practicals	20 %

## LEVEL II CHEMISTRY COURSES

### CHEM2010 - PRACTICAL CHEMISTRY I (2 Credits)

Prerequisite: CHEM1010 Fundamentals of Chemistry & CHEM1020 Introductory Chemistry

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

Teaching: Five hours of practical classes per week.

Method of	Practical work	60%
Examination:	In-course tests and assignments	40%

### CHEM2020 - PRACTICAL CHEMISTRY II (2 Credits)

Prerequisite: CHEM1010 Fundamentals of Chemistry & CHEM1020 Introductory Chemistry

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

Teaching: Five hours of practical classes per week.

Method of Practical work 60%

Examination: In-course tests and assignments 40%

### CHEM2100 - INORGANIC CHEMISTRY I (4 Credits)

Prerequisite: CHEM1010 Fundamentals of Chemistry & CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials, surveying the chemistry of the main group and d-block transition elements.

**Main Group Chemistry:** A survey of the structures, properties and reactions of the s- and p-block elements, and their compounds, including hydrides, oxides, halides, polymers and technologically important materials.

**Transition Metals:** A survey of the properties and reactions of the first row transition metals and their compounds, with emphasis on the effects of the non-degeneracy of the d-orbitals in complexes and on technologically important materials.

Teaching: Three lectures and one tutorial per week.

Method of Final examination (2 hours) 60%

Examination: In-course tests and assignments 40%

### CHEM2200 - ORGANIC CHEMISTRY I (4 Credits)

Prerequisite: CHEM1010 Fundamentals of Chemistry

& CHEM1020 Introductory Chemistry

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

**Reaction mechanisms:** Energetics, kinetics and the investigation of mechanisms. Substitution, elimination and addition reactions. Linear free energy relationships  
**Stereochemistry:** Stereoisomerism and chirality. Fischer convention. Conformation and stereochemistry of ring compounds. Dynamic stereochemistry.

**Spectroscopy:** The application of spectroscopic techniques in elucidating the structures of organic molecules.

**Aromatics:** Aromatic and heteroaromatic chemistry. Electrophilic and nucleophilic substitution. Polynuclear aromatic hydrocarbons (PAH's). Radical halogenation and oxidation of alkyl benzenes.

**Synthesis:** Principles of organic synthesis: carbanions and their use in carbon-carbon bond formation. Organometallic reagents in organic synthesis.

Teaching: Three lectures and one tutorial per week.

Method of Final examination (2 hours): 60%

Examination: In-course tests and assignments: 40%

### CHEM2300 - PHYSICAL CHEMISTRY I (4 Credits)

Prerequisite: CHEM1010 Fundamentals of Chemistry & CHEM1020 Introductory Chemistry

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

Teaching: Three lectures and one tutorial per week

Method of Final examination (2 hours) 60%

Examination: In-course tests and assignments 40%

### **CHEM2400 - ANALYTICAL CHEMISTRY I (4 Credits)**

Prerequisite: CHEM1010 Fundamentals of Chemistry & CHEM1020 Introductory Chemistry

Syllabus: A course of 36 lectures and associated tutorials, surveying the essential areas of analytical chemistry: methodology and sampling; statistical methods; the use of spectroscopic, electrochemical, and chromatographic techniques.

Teaching: Three lectures and one tutorial per week

Method of Final examination (2 hours) 60%

Examination: In-course tests and assignments 40%

### **CHEM2950 - CHEMISTRY ELECTIVE (4 Credits)**

Pre-requisites: None

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

## **LEVEL III CHEMISTRY COURSES**

### **CHEM3100 - INORGANIC CHEMISTRY (4 credits)**

Prerequisites: CHEM2100 Inorganic Chemistry I

Syllabus: This final year inorganic chemistry course covers topics in the applications

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

Teaching: Three lectures and one tutorial per week.

Method of Final examination (2 hours) 60%

Examination: In-course tests and assignments 40%

### **CHEM3135 - BIOINORGANIC CHEMISTRY (4 credits)**

Prerequisites: CHEM2100 Inorganic Chemistry I

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

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

Method of Final Theory Examination (2 hours) 60%  
Examination: In-course test(s)/Assignment(s) 20%  
Practicals 20%

### **CHEM3145 - BONDING IN INORGANIC CHEMISTRY (4 credits)**

Prerequisites: CHEM2100 Inorganic Chemistry I

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

Teaching: Three lecturers and one two-hour tutorial per week.

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

### **CHEM3200 – ORGANIC CHEMISTRY II (4 credits)**

Pre-requisites: CHEM2200 Organic Chemistry I

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

Teaching: The teaching approaches used will include lectures, tutorials and student presentations

Method of Final Theory Examination (2 hours) 60%  
Examination: In-course test(s)/Assignment(s) 20%  
Weekly assignments 10%  
Presentations 10%

### **CHEM3210: BIOORGANIC & MEDICINAL CHEMISTRY (4 credits)**

Pre-requisite: CHEM2200 Organic Chemistry I

Restrictions: Not available to persons who have passed CHEM3225 Natural Products Chemistry or CHEM3235 Bioorganic Chemistry

Syllabus: The aim of this course is to give students an understanding of the basic principles used in the synthesis of compounds of biological

importance, an overview of the major classes of secondary metabolites found in nature, and an introduction to medicinal chemistry. The advantages and disadvantages of different approaches to the synthesis of the biologically important compounds will be discussed, while modern methods for the study of natural products and medicinal chemistry will be emphasized.

Teaching: Three lectures and one tutorial per week.

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

### **CHEM3300 – PHYSICAL CHEMISTRY II (4 credits)**

Pre-requisite: CHEM2300 Physical Chemistry I

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

Teaching: Three lectures and one tutorial per week.

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

### **CHEM3415 - ANALYTICAL CHEMISTRY III (4 credits)**

Prerequisites: CHEM2415 Analytical Chemistry II  
OR CHEM2400 Analytical Chemistry I  
AND CHEM 2020 Practical Chemistry II

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

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

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

### **CHEM3500 - CHEMISTRY PROJECT (4 credits)**

Pre-requisites: CHEM2100 Inorganic Chemistry I,  
CHEM2200 Organic Chemistry I,

CHEM2300 Physical Chemistry I,  
CHEM2400 Analytical Chemistry I,  
CHEM2010 Practical Chemistry I  
and CHEM2020 Practical Chemistry II

bound copies of a written report. Enrolment will be limited to those students who have demonstrated good practical skills and an aptitude for research.

Syllabus: A pass in this 4-credit research project is required for a major in Chemistry. The course consists of a research project carried out under the supervision of a member of staff. Students will be directed to an initial survey of relevant literature and will present brief outlines of their planned research. Duration of the project is one semester, and students are expected to spend at least 72 hours on laboratory and/or computational work. Each student will be required to give a seminar on completion of the project and submit two copies of a typed report.

Method of	Supervisor's Assessment	15%
Examination:	Seminar	15%
	Project Report	70%

Method of	Supervisor's Assessment	15%
Examination:	Seminar	15%
	Project Report	70%

### **CHEM3505 - CHEMISTRY RESEARCH PROJECT** (8 credits)

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

Description: A practical project carried out under the supervision of a member of staff. The project will run throughout the academic year and students are expected to spend at least 144 hours on laboratory work. Each student will be required to give a seminar on completion of the project as well as submit two typed and

## COMPUTER SCIENCE & 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, p 39 ).

### MAJOR IN COMPUTER SCIENCE:

#### LEVEL I

- COMP1105 Computer Programming I
  - COMP1115 Computer Programming II
  - MATH1100 Basic Introductory Mathematics
- AND**
- ELET1110 Digital Electronics (Not required but strongly recommended)

#### OR

Four (4) Level I credits from this Faculty

#### LEVEL II

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

#### LEVEL III

- COMP3100 Operating Systems
- COMP3180 Algorithm Design and Analysis

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

- COMP2135 Systems Software
- COMP2150 Computer Networks I
- COMP2160 Object-Oriented Programming
- COMP2950 Computer Science Elective
- COMP3115 Information Systems
- COMP3125 Artificial Intelligence

- COMP3135 Programming Languages
- COMP3140 Software Engineering II
- COMP3155 Computer Networks II
- COMP3160 Data Base Management Systems
- COMP3170 Web-Based Applications
- COMP3190 Special Topics in Computer Science
- COMP3200 Compiler Theory
- COMP3210 Electronic Commerce
- COMP3910 Computer Science Research Project

### MINOR IN COMPUTER SCIENCE

[Sixteen (16) Credits]

#### At Least Eight (8) Credits From:

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

#### AND At Most Eight (8) Credits from:

- COMP2135 Systems Software
- COMP2150 Computer Networks I
- COMP2160 Object-Oriented Programming
- COMP2950 Computer Science Elective
- COMP3115 Information Systems
- COMP3125 Artificial Intelligence
- COMP3135 Programming Languages
- COMP3140 Software Engineering II
- COMP3155 Computer Networks II
- COMP3160 Data Base Management Systems
- COMP3170 Web-Based Applications
- COMP3190 Special Topics in Computer Science
- COMP3200 Compiler Theory
- COMP3210 Electronic Commerce
- COMP3910 Research Project

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

## **MAJOR IN INFORMATION TECHNOLOGY:**

### **LEVEL I**

COMP1105 Computer Programming I  
COMP1115 Computer Programming II  
MATH1100 Basic Introductory Mathematics

### **AND**

ELET1110 Digital Electronics (Not required but strongly recommend)

### **OR**

Four (4) Level I credits from this Faculty

### **LEVEL II**

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

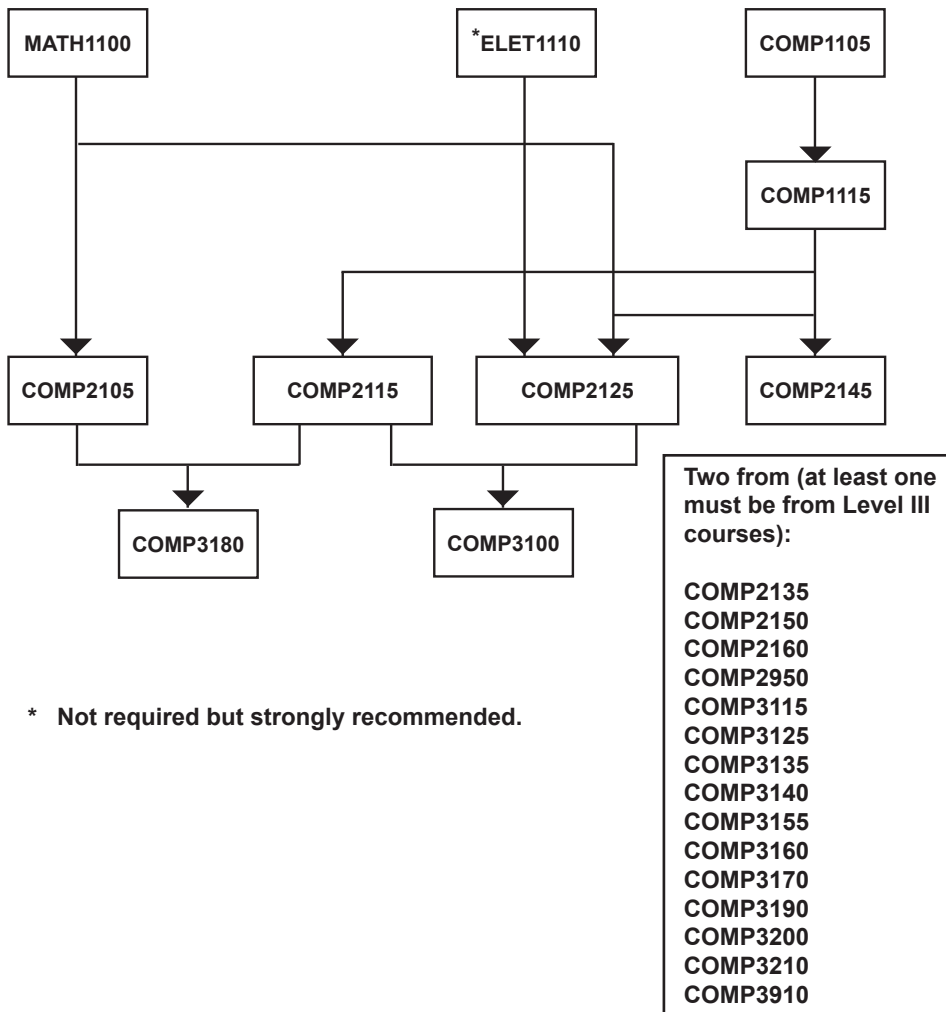
### **LEVEL III**

COMP3160 Database Management Systems  
COMP3170 Web-Based Applications

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

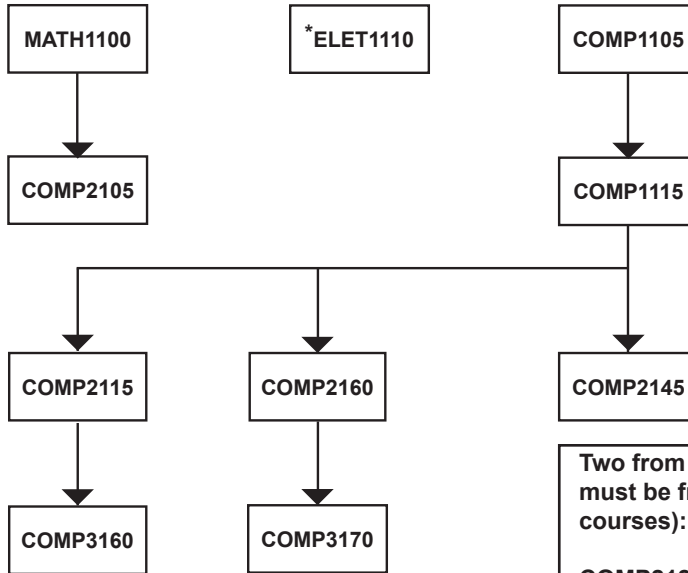
COMP2125 Computer Architecture  
COMP2135 Systems Software  
COMP2150 Computer Networks I  
COMP2950 Computer Science Elective  
COMP3100 Operating Systems  
COMP3115 Information Systems  
COMP3125 Artificial Intelligence  
COMP3135 Programming Languages  
COMP3140 Software Engineering II  
COMP3155 Computer Networks II  
COMP3160 Database Management Systems  
COMP3180 Algorithm Design and Analysis  
COMP3190 Special Topics in Computer Science  
COMP3200 Compiler Theory  
COMP3210 Introduction to Electronic Commerce  
COMP3910 Computer Science Research Project

**MINIMUM COURSE REQUIREMENTS FOR B.SC. (MAJOR IN  
COMPUTER SCIENCE) OR THE COMPUTER SCIENCE COMPONENT  
OF A DOUBLE MAJOR**



\* Not required but strongly recommended.

**MINIMUM COURSE REQUIREMENTS FOR B.SC. (MAJOR IN IT)  
OR THE IT COMPONENT OF A DOUBLE MAJOR**



\* Not required but strongly recommended.

Two from (at least one must be from Level III courses):

- COMP2125
- COMP2135
- COMP2150
- COMP2950
- COMP3100
- COMP3115
- COMP3160
- COMP3125
- COMP3135
- COMP3140
- COMP3155
- COMP3180
- COMP3190
- COMP3200
- COMP3210
- COMP3910

**MINOR IN INFORMATION TECHNOLOGY**  
**[Sixteen (16) Credits]:**

**At Least Eight (8) Credits From:**

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

**AND At Most Eight (8) Credits From:**

COMP2125 Computer Architecture  
COMP2135 Systems Software  
COMP2150 Computer Networks I  
COMP2950 Computer Science Elective  
COMP3100 Operating Systems  
COMP3115 Information Systems  
COMP3125 Artificial Intelligence  
COMP3135 Programming Languages  
COMP3140 Software Engineering II  
COMP3155 Computer Networks II  
COMP3180 Algorithm Design and Analysis  
COMP3190 Special Topics in Computer Science  
COMP3200 Compiler Theory  
COMP3210 Introduction to Electronic Commerce  
COMP3910 Research Project

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

**DOUBLE MAJOR IN COMPUTER SCIENCE:**

**LEVEL I**

COMP1105 Computer Programming I  
COMP1115 Computer Programming II  
MATH1100 Basic Introductory Mathematics

**AND**

ELET1110 Digital Electronics (Not required but strongly recommended)

**OR**

Four (4) Level I credits from this Faculty

**LEVEL II**

COMP2105 Discrete Mathematics  
COMP2115 Information Structures  
COMP2125 Computer Architecture  
COMP2145 Software Engineering I  
COMP2150 Computer Networks I  
COMP2160 Object-Oriented Programming

**AND at most Eight (8) Credits From:**

COMP2135 Systems Software  
COMP2950 Computer Science Elective  
ELET2100 Microprocessors I  
ELET2130 Digital Communications I  
PHYS2104 Neural Networks

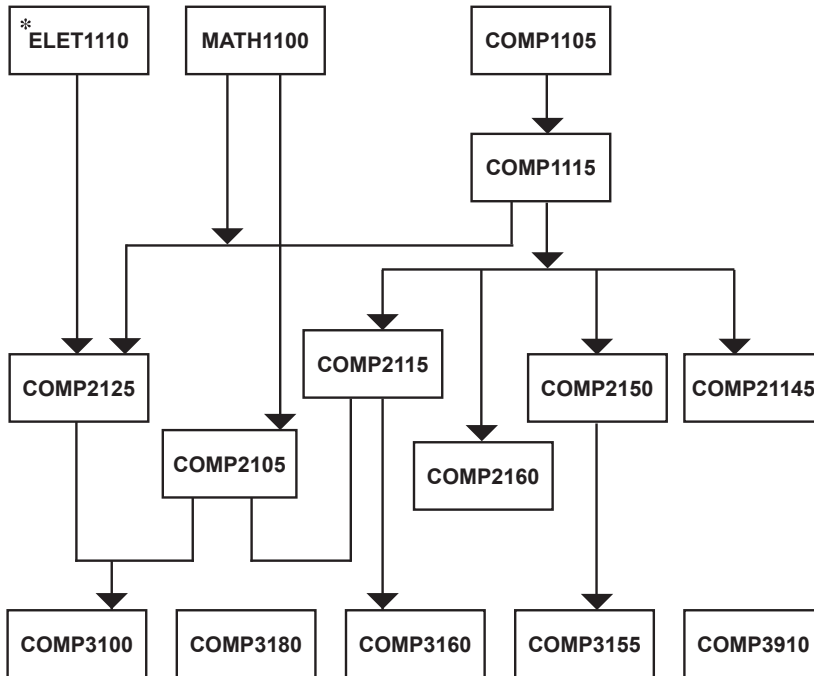
**LEVEL III**

COMP3100 Operating Systems  
COMP3155 Computer Networks II  
COMP3160 Database Management Systems  
COMP3180 Algorithm Design and Analysis  
COMP3910 Computer Science Research Project

**AND at least Twelve (12) Credits From:**

COMP3115 Information Systems  
COMP3125 Artificial Intelligence  
COMP3135 Programming Languages  
COMP3140 Software Engineering II  
COMP3170 Web-Based Applications  
COMP3190 Special Topics in Computer Science  
COMP3200 Compiler Theory  
COMP3210 Introduction to Electronic Commerce  
ELET3100 Microprocessors II  
ELET3151 Digital Communications II

MINIMUM COURSE REQUIREMENTS FOR B.S.C. (DOUBLE MAJOR IN COMPUTER SCIENCE)



At most two from:

COMP2135  
 COMP2950  
 PHYS2104  
 ELET2100  
 ELET2130

At least three from:

COMP3115  
 COMP3125  
 COMP3135  
 COMP3140  
 COMP3170  
 COMP3190  
 COMP3200  
 COMP3210  
 ELET3100  
 ELET3151

\* Not required but strongly recommended.

## LEVEL I COMPUTER SCIENCE COURSES

### COMP1005 - COMPUTER APPLICATIONS (4 Credits)

Pre-requisite: None (but registration restricted to non-majors in Computer Science)

Overview: An introduction to the fundamental concepts of computing and computers with a particular emphasis on providing a broad overview of the field of Computer Science.

Syllabus: Problem Solving and Programming (Algorithmic development, coding using a high-level language) Application Programming (Databases, spreadsheets, report generation) Fundamental Topics (Computer Architecture, operating systems, database Systems and information retrieval, human-computer communication, software engineering, networks, artificial intelligence, current trends and research).

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

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

### COMP1105 - COMPUTER PROGRAMMING I (4 Credits)

Pre-requisite: None

Overview: An introductory treatment of computer programming with an emphasis on problem analysis, algorithmic development and the fundamental principles of programming.

Syllabus: Basic Computer Architecture (Central processor, main and secondary memory, Input/output devices)  
Integrated Development Environments (Editors, Compilers, debuggers, libraries)

Problem Solving (top-down design, stepwise refinement, sorting and searching)  
Files (Standard input/output, sequential text files)  
Data Types (integers, reals, characters, strings)  
Operators (Assignment, arithmetic, relational, Boolean, precedence rules)  
Control Structures (Sequencing, iteration, selection)

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

Method of Examination: Final Theory Examination (3 hours) 60%  
In-course Tests/Assignments 40%

### COMP1115 - COMPUTER PROGRAMMING II (4 Credits)

Pre-requisite: COMP1105 Computer Programming I

Overview: An intermediate treatment of computer programming with an emphasis on modular design and basic data structures.

Syllabus: Problem Solving (Recursion, randomness)  
Files (Direct and indexed files)  
Data Types (Enumerated types, type definitions)  
Data Structures (Structures, multidimensional arrays, systems, pointers)  
Basic Abstract Data Types (Lists, stacks, queues)

Pointers (Dynamic memory allocation)  
Classes and Data Abstraction

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

Method of Final Theory Examination (3 hours) 60%  
Examination: In-course Tests/Assignments 40%

### **COMP1130 - WEB TECHNOLOGY FUNDAMENTALS** (4 Credits)

Pre-requisite: None

Overview: An introduction to the major Internet components, protocols, and technologies utilized for the development and support of e-commerce applications.

Syllabus: The Internet  
Overview of Web Application Architectures  
Hypertext Markup Language (HTML)  
Web Server Applications  
Java in the Enterprise  
e-Business  
Security

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

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

## **LEVEL II COMPUTER SCIENCE COURSES**

### **COMP2105 - DISCRETE MATHEMATICS (4 Credits)**

Pre-requisite: MATH1100 Basic Mathematics

Overview: A continued introduction to the mathematical foundations of Computer Science.

Syllabus: Predicate Calculus (Universal and existential quantifiers, proofs, logical equivalences and inferences) Asymptotic Analysis and Notation ( $O$ ,  $\theta$  and  $\Omega$ )  
Recurrence Relations (Homogeneous, non-homogeneous, change of variable)  
Mathematical induction Elementary Combinatorics (permutations and combinations, Binomial Theorem, Pigeonhole principle)

Elementary Graph Theory (Paths, cycles and connectivity, classes of graphs, trees, minimum spanning trees, depth-first and breath-first traversals, adjacency and incident matrices) Finite State Machines (State graphs/tables, regular sets, recognizers, Kleene's theorem, machine minimization)

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

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

### **COMP2115 – INFORMATION STRUCTURES (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II

Overview: An advanced treatment of computer programming with an emphasis on the design and implementation of abstract data types.

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

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

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

### **COMP2125- COMPUTER ARCHITECTURE (4 Credits)**

Pre-requisite: (COMP1115 Computer Programming II & MATH1100 Basic Mathematics) or ELET1110 Digital Electronics

Overview: An example of the salient features of modern computer architectures.

Syllabus: Instruction Sets and Execution  
Pipelining,  
Addressing Modes

Memory Hierarchies  
Caching  
RISC vs CISC Architecture  
Interrupt Processing  
I/O Processing

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

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

### **COMP2135 - SYSTEMS SOFTWARE (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II

Overview: An introduction to the fundamental concepts of modern operating Systems from the perspective of the systems programmer and with a Particular emphasis on the use of operating systems calls.

Syllabus: Programming Tools (Structure and use of: Compilers, linkers, Debuggers, profilers and preprocessors)  
Process Management (Overview of processes and threads, creating and using child processes, creating and using pipes)  
File Management (Overview of file management, manipulating file attributes, binary I/O, streamed I/O, redirection of standard I/O, use of shell redirection operators, filters, atomic operations, directory manipulation)  
Memory Management (Memory layout of a program, advanced memory, Array

and pointer manipulations, command line arguments and Environment variables), Device Management (Accessing and managing I/O devices)

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

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

### **COMP2145 - SOFTWARE ENGINEERING I (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II

Overview: An introduction to the principal concepts of software engineering with a particular emphasis on the software development process.

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

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

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

### **COMP2150 - COMPUTER NETWORKS I (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II

Overview: An introduction to digital communication systems and local area networks, with a view to providing the foundation for the advanced computer network course(s).

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

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

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

### **COMP2160 - OBJECT-ORIENTED PROGRAMMING (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II

Overview: A comprehensive introduction to the object-oriented paradigm with a particular emphasis on the class design and design patterns.

Syllabus: Fundamental Concepts (Encapsulation, information hiding, classes and objects, inheritance, polymorphism, dynamic binding)

Fundamentals of Class Design (Inheritance vs composition relationships, constructors and destructors, copy constructors, selectors, modifiers)

Design by Contract (Exception handling, assertions)

Advanced Concepts (Abstract and concrete classes, frame-works and design patterns)

Applications using Class Libraries

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

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

### **COMP2950 - COMPUTER SCIENCE ELECTIVE** (4 Credits)

Pre-requisites: None

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

## **LEVEL III COMPUTER SCIENCE COURSES**

### **COMP3100 - OPERATING SYSTEMS (4 Credits)**

Pre-requisite: COMP2115 Information Structures & COMP2125 Computer Architecture

Overview: An introduction to the fundamental concepts of modern operating systems.

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

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

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

### **COMP3115 - INFORMATION SYSTEMS (4 Credits)**

Pre-requisite: COMP2145 Software Engineering I

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

<p>Overview: An introduction to information systems and systems development with a particular emphasis on the role of information systems/ information technology for development.</p>	<p>(e.g. prototyping, agile development) Testing Strategies (black box, white box, usability)</p>
<p>Syllabus: Evolution of Information Technology, Impact of Information Technology on Business Information and Information Systems Systems Planning, Development and Implementation Delivery of Information Services</p>	<p>Teaching: Three (3) lectures and one tutorial per week.</p>
<p>Teaching: Three (3) lectures and one tutorial per week.</p>	<p>Method of Examination: Final Theory Examination (2 hours) 60% In-course Tests/Assignments 40%</p>
<b>COMP3125 - ARTIFICIAL INTELLIGENCE (4 Credits)</b>	
<p>Pre-requisite: COMP2105 Discrete Mathematics &amp; COMP2115 Information Structures</p>	<p>Pre-requisite: COMP2115 Information Structures</p>
<p>Overview: An introduction to the fundamental concepts of artificial intelligence with a particular emphasis on knowledge representation and searching.</p>	<p>Overview: An introduction to the major concepts of programming language Design with a particular emphasis on the imperative, functional, Logic, object-oriented and concurrent paradigms of programming.</p>
<p>Syllabus: Problems and Search (Problem spaces, heuristic search), Knowledge Representation (Predicate logic, rule-based systems, Reasoning, slot-and-filler) Advanced Topics (Game playing, natural language, planning, learning) Applications (Expert systems, software agents, programming-by-example) Software Development Approaches</p>	<p>Syllabus: Imperative Programming (Basic Semantics, data types control structures) Object-Oriented Programming (Objects, classes and methods, Inheritance, polymorphism) Functional Programming (Referential transparency, recursion, types and Polymorphism, lambda calculus) Logic Programming (Predicate calculus and logical deduction, unification and resolution, non-determinism and back-tracking) Scripting Languages (Regular expressions) Concurrent Programming (Communication and synchronization)</p>
<p>Teaching: Three (3) lectures and one tutorial per week.</p>	<p>Teaching: Three (3) lectures and one tutorial per week.</p>
<p>Method of Examination: Final Theory Examination (2 hours) 60% In-course Tests/Assignments 40%</p>	<p>Method of Examination: Final Theory Examination (2 hours) 60% In-course Tests/Assignments 40%</p>

**COMP3140 - SOFTWARE ENGINEERING II (4 Credits)**

Pre-requisite: COMP2145 Software Engineering I

Overview: A further examination of software engineering with a particular emphasis on project management, including the issues and techniques involved, as well as the management of on-going projects.

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

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

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

**COMP3155 - COMPUTER NETWORKS II (4 Credits)**

Pre-requisite: COMP2150 Computer Networks I

Overview: A further exploration of general networking concepts, focusing on the higher layers of the ISO protocol stack. In particular, routing, internetworking with TCP/IP and network security. Network design issues as well as management issues are also explored.

Syllabus: The ISO Reference Model – layer 3 and above  
Internetworking with TCP/IP  
WAN Technologies e.g. ATM, Frame Relay

Quality of Service in Communications Networks  
Network Security  
Network Design  
Network Performance  
Network Management

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

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

**COMP3160 - DATABASE MANAGEMENT SYSTEMS (4 Credits)**

Pre-requisite: COMP2115 Information Structures

Overview: An introduction to database management systems with a particular emphasis on the relational database model.

Syllabus: Principles of Database Design (Logical and Physical schemas, Data independence, entity-relationship model)  
Relational Database Systems (Data normalization, data description Languages, query languages)  
Advanced Database Concepts (Distributed databases, object-oriented Databases, data warehousing)

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

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

**COMP3170 - WEB-BASED APPLICATIONS (4 Credits)**

Pre-requisite: COMP2160 Object-Oriented Programming

Overview: An introduction to the fundamentals of web applications development with a particular emphasis on client-server applications, database connectivity, networking considerations and security.

Syllabus: Overall Client-Server Model Client Side Programming (Development of browser software, Client side scripting)  
Networking (TCP/IP, HTTP, sockets, datagrams, routing issues)  
Server Side Programming (GFI, server side scripting, web services)  
Database Connectivity (Server to database connectivity issues)  
Security (Policy development, physical security, securing web applications)  
Design Issues (User interface factors, hardware issues)

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

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

**COMP3180 - ALGORITHM DESIGN AND ANALYSIS (4 Credits)**

Pre-requisite: COMP2105 Discrete Mathematics & COMP2115 Information Structures

Overview: An introduction to the design and analysis of sequential algorithms with a particular

emphasis on the paradigms of algorithmic design and their application to diverse problem areas.

Syllabus: Analysis of Algorithms: computational models, time and space Complexities, worst-case and expected complexities, lower and Upper bounds; Techniques for designing efficient algorithms: recursion, divide-and-conquer, balancing, dynamic programming, and branch-and-bound; Problems on sets and sequences including sorting and selection; string matching; Matrix and Boolean matrix multiplication; Graph algorithms; The classes of P, NP and NP-Complete problems.

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

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

**COMP3190 - SPECIAL TOPICS IN COMPUTER SCIENCE (4 Credits)**

Pre-requisite: Restricted to finalists majoring in Computer Science .

Overview: An advanced treatment of an applied or theoretical area of Computer Science that reflects the current concerns and/or research interest of the Department.

Syllabus: Topics will be drawn from the principles of programming languages, operating systems, information systems, graphics, artificial intelligence, software engineering, networks, logic, computability and complexity theory, algorithms, program verification, discrete mathematics and any other area of current interest.

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

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

### **COMP3200 - COMPILER THEORY (4 Credits)**

Pre-requisite: COMP2115 Information Structures

Overview: An introduction to compiler theory with a particular emphasis on the Phases of compiler construction.

Syllabus: Interpreters vs Compilers.  
Lexical Analysis (Recognition and specification of tokens finite, Automata, regular expressions, symbol tables)  
Syntax Analysis (Intermediate and final code generation, Intermediate representations, code generators)  
Code Optimization (Flow graphs, data flow analysis, transformations)

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

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

### **COMP3210 - ELECTRONIC COMMERCE (4 Credits)**

Pre-requisite: COMP2160 Object-Oriented Programming

Overview: Provides a comprehensive introduction to electronic commerce.

Syllabus: Internet concepts and technology  
Economic foundation of electronic commerce Storefronts, shopping carts and Landing pages

Order processing  
Pricing and payment processing  
Security issues  
Shipping and handling  
Products, Internet marketing and legal issues

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

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

### **COMP3910 - COMPUTER SCIENCE RESEARCH PROJECT (4 Credits)**

Pre-requisite: Restricted to finalists majoring in Computer Science .

Overview: An opportunity for final year students in Computer Science, to apply and develop their classroom knowledge in a real-world or research environment.

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Computer Science The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and research effort. The project should contain some originality in material and evidence of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of Semester II and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in Semester II.

N.B. Enrolment will be limited to those students who have demonstrated a sound academic background and an aptitude for research.

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

Method of Written Report 60%

Examination: Oral Presentation 20%

Proposal and Literature Review 20%

## EARTH SCIENCES

These courses currently do not lead to a Minor or Major in Earth Sciences.

### ERSC1001 - DYNAMIC EARTH (4 credits)

Pre-requisites: None

Syllabus: An introduction to geology and geomorphology with specific reference to the Caribbean. Origin, composition and structure of the Earth and its oceans; basic geological processes that shape the Earth's surface – weathering, erosion, transport and deposition; geomorphological structures and features that result from dynamic and large-scale processes. Rocks and Minerals. Introductory plate tectonics. Geological mapping and field techniques.

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

Method of Theory Examination (2 hours) 60%

Examination: Laboratory 20%

In-course assignments/tests 20%

### ERSC1002 - OCEANS AND CLIMATE (4 credits)

Pre-requisites: None

Syllabus: **The climate system:** Radiation, the atmosphere, greenhouse effect, climate variability.

**The oceans:** Chemical composition of the oceans, ocean circulation, cryosphere, biosphere, geosphere, timescales and feedbacks.

**Physical interaction between the ocean and atmosphere:** Long-wave radiation, heat and moisture exchange, oceanic heat balance, temperature, salinity, density, basic forces within the atmosphere and ocean, hydrostatic balance, Coriolis force, geostrophy, tidal forces and their influence, wave formation and characteristics, wind-driven circulations, the ocean gyres, coastal upwelling, monsoonal circulation, oceanic eddies, the thermohaline circulation, oceanic impacts, tropical cyclones and mesocyclones

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

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

## **ELECTRONICS**

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

### **MAJOR IN ELECTRONICS:**

#### **LEVEL I**

ELET1100 Circuit Analysis  
ELET1110 Digital Electronics  
ELET1120 Basic Electronics  
MATH1120 Calculus I

**And 32 Credits from Level II & III Electronics courses as indicated below.**

#### **LEVEL II**

**At Least Twelve (12) Credits From:**

ELET2100 Microprocessors I  
ELET2110 Circuit Simulation  
ELET2120 Discrete Device Electronics  
ELET2130 Digital Communications I

#### **LEVEL III**

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

ELET3100 Microprocessors II  
ELET3110 Control and Instrumentation  
ELET3120 Communication Circuits  
ELET3130 Introduction to Digital Signal Processing (DSP)  
ELET3140 Microcomputers and Control  
ELET3151 Digital Communications II  
ELET3160 Electronics Research Project

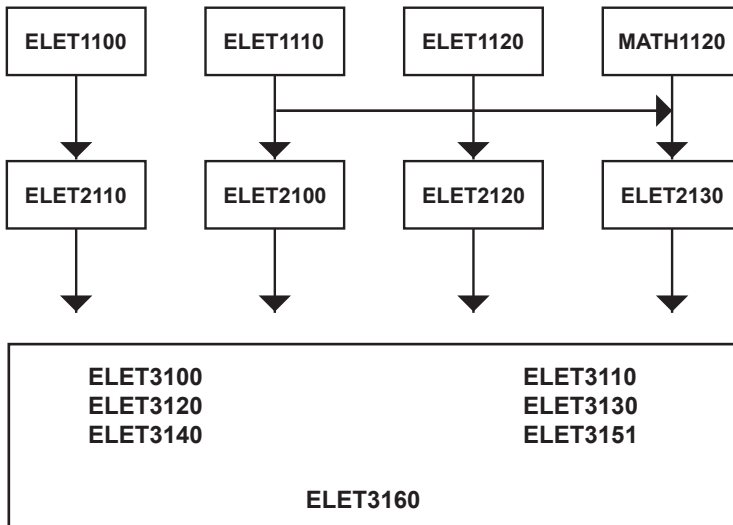
**MINOR IN ELECTRONICS** [Sixteen (16) Credits]:

**Sixteen (16) Credits (Four Courses) From:**

ELET2100 Microprocessors I  
ELET2110 Circuit Simulation

ELET2120 Discrete Device Electronics  
 ELET2130 Digital Communications I  
 ELET3100 Microprocessors II  
 ELET3110 Control and Instrumentation  
 ELET3120 Communication Circuits  
 ELET3130 Introduction to Digital Signal Processing  
 (DSP)  
 ELET3140 Microcomputers and Control  
 ELET3151 Digital Communications II  
 ELET3160 Electronics Research Project

### ELECTRONICS MAJOR



## PRELIMINARY ELECTRONICS COURSES

There are no Preliminary courses in Electronics.

## LEVEL I ELECTRONICS COURSES

### ELET1100 – CIRCUIT ANALYSIS (4 Credits)

Pre-requisite: CAPE Physics Units I & II or CAPE Pure Mathematics Units I & II

Objectives: An introduction to the theory of circuit analysis of DC & AC networks, and operational amplifiers.

Syllabus: Kirchhoff's laws. DC circuits, alternating voltages. Phasor and complex representation of sinusoids. Impedance and power in AC circuits. Series and parallel circuits. Admittance, impedance and resonance. Mesh current and node voltage analysis. Thevenin's and Norton's theorems, superposition and maximum power transfer theorem. Mutual inductance, circuit transients, bode plots. Operational amplifier circuits - amplifiers, integrators, differentiators, adders, subtractors, multivibrators, waveform generators, power op-amps.

Teaching: Two (2) lectures, one tutorial and three (3) laboratory hours every week.

Method of Examination: Final Theory Examination (2 hours) 70%  
In-course Tests/Assignments 20%  
Laboratory 10%

### ELET1110 – DIGITAL ELECTRONICS (4 Credits)

Pre-requisite: None

Objectives: An introduction to digital logic and its applications.

Syllabus: Binary systems. Logic gates, truth-tables. Combinational logic. Boolean algebra. Karnaugh mapping, minimization, NAND/NOR logic. Binary arithmetic, binary codes, encoders, decoders, code conversion, multiplexer, data selector, demultiplexer, clocks, one-shot Asynchronous & synchronous circuits (latches, flip-flops, asynchronous counters, synchronous counters, applications of counters, shift registers). Design and analysis of asynchronous & synchronous circuits. IC families. Bipolar, MOS, TTL, CMOS, Tri-state, Schmitt trigger. Recent advances of ICs, Analog-to-Digital and Digital-to-Analog conversion, sample & hold, D/A & A/D ICs, introduction to the microprocessor, number systems, floating point representation.

Teaching: Two (2) lectures, one tutorial and three (3) laboratory hours every week.

Method of Examination: Final Theory Examination (2 hours) 70%  
In-course Tests/Assignments 20%  
Laboratory 10%

### ELET1120 – BASIC ELECTRONICS (4 Credits)

Pre-requisite: None

Objectives: An introduction to analog electronic components and how they operate in simple circuits.

Syllabus: Resistors, capacitors, inductors & their applications in circuits. Characteristics and applications of diodes including photodevices. Other semiconductor devices and their applications (SCR, TRIACS, etc...). Transistors (BJT & FETS), how they work and their application in circuits. Simple amplifiers, their design and properties. Basic filters, power supplies and regulators. Analysis of some standard electronic circuits

Teaching: Two (2) lectures, one tutorial and three (3) laboratory hours every week.

Method of Examination:	Final Theory Examination (2 hours)	70%
	In-course Tests/Assignments	20%
	Laboratory	10%

## LEVEL II ELECTRONICS COURSES

### ELET2100 – MICROPROCESSORS I (4 Credits)

Pre-requisite: ELET1110 Digital Electronics

Objectives: An applied introduction to the microprocessor and computer architecture. Assembly Language and simple interfaces are studied.

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

Teaching: Two (2) lectures four (4) hours of laboratory per week.

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

### ELET2110 – CIRCUIT SIMULATION (4 Credits)

Pre-requisite: ELET1100 Circuit Analysis

Objectives: An introduction to circuit analysis & design using SPICE simulation software.

Syllabus: Introduction to SPICE, Language syntax, netlists, Source specification and passive

element models, Active device modeling, macro models, AC, DC, transient, frequency and Monte Carlo analysis, Issues of convergence and stability.

Teaching: Two (2) contact hours and four (4) laboratory hours per week

Method of Examination: Final Theory Examination (2 hour) 60%  
In-course Tests/Assignments 20%  
Laboratory 20%

### **ELET2120 – DISCRETE DEVICE ELECTRONICS** (4 Credits)

Pre-requisite: ELET1120 Basic Electronics

Objectives: A more detailed study of analog circuits and amplifiers.

Syllabus: Hybrid & hybrid-pi equivalent circuits. Difference & cascode amplifiers. Darlington configuration, complementary symmetry amplifiers. Types of feedback & their effects. High & low frequency response of RC coupled amplifiers. Tuned amplifiers, oscillators.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

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

### **ELET2130 - DIGITAL COMMUNICATIONS I** (4 credits)

Pre-requisite: MATH1120 Calculus I and ELET1110 Digital Electronics

Objective: An introduction to basic digital communication systems.

Syllabus: Fundamentals of digital communications, Fourier analysis, Energy and power spectral density, frequency response, Analog to Digital conversion, Information Theory, Baseband Transmission, Error Control Coding (Block).

Teaching: Two (2) 1-hour lectures and four (4) hours of laboratory per week.

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

### **ELET2950 ELECTRONICS ELECTIVE** (4 credits)

Pre-requisites: None

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

### **LEVEL III ELECTRONICS COURSES**

#### **ELET3100 – MICROPROCESSORS II** (4 Credits)

Pre-requisite: ELET2100 Microprocessors I

Objectives: Further studies of the microprocessor with emphasis on the PC and interfacing.

Syllabus: Interfacing - simple & power devices, A/D systems, memory, co-processor. Assembly language programming using 80XXX/Pentium Intel instructions. Microprocessors architecture - a detailed look at the 80XXX Intel family, instruction set, handling interrupts. Microcontrollers and applications.

Teaching: Two (2) contact hours and four (4) laboratory hours, per week

Method of Examination: Final Theory Examination (2 hours) 60%  
In-course Tests/Assignments 20%  
Laboratory or Project 20%

### **ELET3110 – CONTROL & INSTRUMENTATION** (4 Credits)

Pre-requisite: ELET2120 Discrete Device Electronics

Objectives: A detailed study of control and instrumentation with applications.

Syllabus: Block diagrams, signal flow graphs, frequency response, stability, steady state and transient response. Transducers, controllers and control systems for level, temperature, speed and position control. Sampled systems. Introduction to computer control and robotics.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination: Final Theory Examination (2 hour) 60%  
In-course Tests/Assignments 20%  
Laboratory 20%

### **ELET3120 – COMMUNICATION CIRCUITS** (4 Credits)

Pre-requisite: ELET2120 Discrete Device Electronics

Objectives: The analysis of circuits and systems used in rf communications.

Syllabus: High frequency transistors, transformers and filters. HF construction techniques. RF amplifiers, oscillators and frequency synthesisers. Mixers, IF amplifiers. Circuits for modulation and demodulation. Simulating communication circuits.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Examination: Final Theory Examination (2 hour) 60%  
In-course Tests/Assignments 20%  
Laboratory 20%

### **ELET3130 – INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)** (4 Credits)

Pre-requisite: ELET2110 Circuit Simulation

Objectives: To cover the fundamentals of digital signal processing.

Syllabus: Sampling, Z-Transforms, discrete convolution, DFT, FFT, DCT and related transforms. IIR and FIR digital filters. Approximations to analog filters. Practical implementation of digital filters.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

Method of Final Theory Examination (2 hour) 60%  
 Examination: In-course Tests/Assignments 20%  
 Laboratory 20%

**ELET3140 – MICROCOMPUTERS & CONTROL**  
 (4 Credits)

Pre-requisite: ELET2100 Microprocessors I

Objectives: A look at the application of microcomputers for control.

Syllabus: Integrated circuits for serial communications and their properties.  
 Programming the serial ports in higher level languages and on different operating systems.  
 Analog input and output. Programming the parallel and game port.  
 Universal Serial Bus. Controller networks, types and properties.  
 Controlling PC's configured as controllers and Inter-net servers from internet clients.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

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

**ELET3151 - DIGITAL COMMUNICATIONS II**  
 (4 credits)

Pre-requisite: ELET2130 Digital Communications I

Objectives: A detailed study of more advanced Digital Communication systems

Syllabus: Signals and Spectra, Bandpass Transmission, Error Control Coding (Convolutional), Satellite Communications, Wireless Communications.

Teaching: Two (2) 1-hour lectures and four (4) hours of laboratory per week.

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

**ELET3160 - ELECTRONICS RESEARCH PROJECT**  
 (4 Credits)

Pre-requisite: Restricted to Finalists Majoring in Electronics

Objectives: For Final Year students in Electronics to apply and develop their classroom knowledge in a real-world or research environment.

Syllabus: Students will be given a problem for which they must develop a workable electronics solution which should preferably be of commercial interest. The developed solution should be of sufficient Breadth and depth to make it equivalent to a 4-credit advanced Course in electronics. Solution may include Mathematics and Computer Software but an electronic circuit component is required.

Method of Proposal and Literature Review 20%  
 Examination: Oral Presentation 20%  
 Final Written Project Report 60%

## MATHEMATICS

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

### MAJOR IN MATHEMATICS:

#### LEVEL I

MATH1100 Basic Introductory Mathematics  
MATH1120 Calculus I  
MATH1130 Calculus II

#### AND

COMP1105 Computer Programming I

#### OR

COMP1005 Computer Applications

#### LEVEL II

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

#### LEVEL III

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

MATH2140 Introduction to probability  
MATH2150 Mathematical Statistics  
MATH3100 Multivariate Analysis  
MATH3110 Design of Experiments  
MATH3120 Numerical Analysis  
MATH3130 Optimization Theory  
MATH3140 Fourier Analysis and PDE  
MATH3150 Complex Variables I  
MATH3160 Number Theory  
MATH3170 Advanced Algebra  
MATH3180 Introduction to Topology  
MATH3190 Matrix Analysis  
MATH3200 Lambda Calculus

MATH3210 Mathematical Logic  
MATH3220 Sampling Theory  
MATH3230 Lebesgue Measure  
MATH3300 Mathematics Research Project

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

MATH2100 Abstract Algebra  
MATH2120 Analysis & Methods I

#### AND Eight (8) Credits From:

MATH2110 Linear Algebra  
MATH2130 Ordinary Differential Equations  
MATH2140 Introduction to probability  
MATH2150 Mathematical Statistics  
MATH3100 Multivariate Analysis  
MATH3110 Design of Experiments  
MATH3120 Numerical Analysis  
MATH3130 Optimization Theory  
MATH3140 Fourier Analysis and PDE  
MATH3150 Complex Variables I  
MATH3160 Number Theory  
MATH3170 Advanced Algebra  
MATH3180 Introduction to Topology  
MATH3190 Matrix Analysis  
MATH3200 Lambda Calculus  
MATH3210 Mathematical Logic  
MATH3220 Sampling Theory  
MATH3230 Lebesgue Measure

### DOUBLE MAJOR IN MATHEMATICS:

#### LEVEL I

MATH1100 Basic Introductory Mathematics  
MATH1120 Calculus I  
MATH1130 Calculus II

#### AND

COMP1105 Computer Programming I

**OR**

COMP1005 Computer Applications

**LEVEL II**

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

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

MATH2140 Introduction to probability  
 MATH2150 Mathematical Statistics  
 MATH3100 Multivariate Analysis  
 MATH3110 Design of Experiments  
 MATH3120 Numerical Analysis  
 MATH3130 Optimization Theory  
 MATH3140 Fourier Analysis and PDE  
 MATH3150 Complex Variables I  
 MATH3160 Number Theory  
 MATH3170 Advanced Algebra  
 MATH3180 Introduction to Topology  
 MATH3190 Matrix Analysis  
 MATH3200 Lambda Calculus  
 MATH3210 Mathematical Logic  
 MATH3220 Sampling Theory  
 MATH3230 Lebesgue Measure  
 MATH3300 Mathematics Research Project

**PRELIMINARY MATHEMATICS COURSES****MATH0101 - PRELIMINARY MATHEMATICS I**

(6 P-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.

Examination: Final Theory Examination (3 hours) 80%  
 In-course Tests/Assignments 20%

**MATH0102 – PRELIMINARY MATHEMATICS II**

(6P-Credits)

Pre-requisite: CXC Mathematics or equivalent

Syllabus: **Sequences and Series:** Use of  $\sum$  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 modelling:** 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

### MATH1100 – BASIC MATHEMATICS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 or MATH0101 & MATH0102.

Objectives: The course provides an introduction to linear algebra, algebraic structures and number systems.

Syllabus: Logic, summation conventions, mathematical induction; sets, relations and functions; equivalence relations, graphs, trees, partial orders; binary operations; number systems, real numbers, complex numbers; counting

principles; systems of linear equations, Gaussian elimination; matrices, adjoint and inverse; linear independence.

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

Method of Examination: Final Theory Examination (3 hours) 75%  
In-class Test(s)/Assignment(s) 25%

### MATH1110 - APPLIED STATISTICS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 or MATH0101 & MATH0102.

Objective: To acquaint students with the fundamental ideas of modern applied statistics, and provide an opportunity for the students to use a computer in the study of this subject.

Syllabus: Data presentation types of dates, tables and graphs. Numerical summary measures, measure of central tendency, measure of dispersion and Chebychev's inequality. Probability, operations on events, conditional probability and Bayes' theorem. Probability distributions, binomial, Poisson and normal distributions. Point estimation and confidence interval. Hypotheses testing general concepts, types of errors, power, sample size, one-sided and two-sided tests. Comparisons of means, paired samples and independent samples. Analysis of variance, one-way analysis of variance and multiple comparisons procedures. Contingency tables, chi-square test and odds ratio. Correlation, two-way scatter plot and Pearson's correlation coefficient. Linear regression, concepts, the model and its evaluation. Nonparametric methods, sign tests, Wilcoxon rank sum test and applications. Sampling methods and sources of bias

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

Method of Final Theory Examination (2 hours) 75%  
Examination: In-course Tests/Assignments 25%

### **MATH1120 – CALCULUS I (4 Credits)**

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

Objective: To introduce students to the basic properties  
and applications of real-valued functions of  
one real variable.

Syllabus: Functions and graphs, limits, continuity,  
differentiability, the concept of an extremum,  
curve sketching, antiderivatives, the definite  
integral, fundamental theorem of calculus,  
improper integrals, sequences and series.

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

Method of Final Theory Examination (2 hours) 75%  
Examination: In-class Tests/Assignments 25%

### **MATH1130 – CALCULUS II (4 Credits)**

Pre-requisite: MATH1120 Calculus I

Objective: To introduce basic concepts of vector  
functions on subsets of Euclidean space.

Syllabus: Function of several variables, vector  
functions, limits, continuity, and sketching,  
differentiation, partial derivatives, extrema  
for functions of 2 and 3 variables, Lagrange  
multipliers, change of variable and Jacobian,  
polar, spherical and cylindrical coordinates,

double and triple integrals, line and surface  
integrals.

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

Method of Final Theory Examination (2 hours) 75%  
Examination: In-class Tests/Assignments 25%

## **LEVEL II MATHEMATICS COURSES**

### **MATH2100 – ABSTRACT ALGEBRA (4 Credits)**

Pre-requisite: MATH1100 Basic Mathematics

Objective: To expose students to fundamentals of  
mathematical structures.

Syllabus: Elements of logic. Elements of set theory.  
Relations and functions.  
Finite permutations. Isomorphisms.  
Elementary theory of groups, rings and  
fields.

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

Method of Final Theory Examination (2 hours) 70%  
Examination: In-class Tests/Assignments 30%

### **MATH2110 – LINEAR ALGEBRA (4 Credits)**

Pre-requisite MATH1100 Basic Mathematics, MATH1120  
Calculus I & MATH1130 Calculus II

Objective: To provide an introduction to fundamental  
concepts in linear algebra.

Syllabus: Elements of sets and functions.

Vector spaces, Linear forms. Linear transformations Matrices and determinants. Systems of linear equations. Quadratic forms.

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

Method of Final Theory Examination (2 hours) 70%  
Examination: In-class Tests/Assignments 30%

### **MATH2120 – ANALYSIS & METHODS I (4 Credits)**

Pre-requisite MATH1100 Basic Mathematics, MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: The real number system. Countability and topology of the real line; Continuity and differentiability.  
The Riemann integral. Infinite series and power series.

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

Method of Final Theory Examination (2 hours) 70%  
Examination: In-class Tests/Assignments 30%

### **MATH2130 – ORDINARY DIFFERENTIAL EQUATIONS (4 Credits)**

Pre-requisite MATH1100 Basic Mathematics, MATH1120 Calculus I & MATH1130 Calculus II

Objective: To introduce students to elementary techniques of solution and classification for ordinary differential equations.

Syllabus: Techniques of solution, applications, and theory of first-order differential

equations. Theory and methods of solution for higher-order linear equations. Applications of second-order linear equations from the sciences and engineering. Power series methods for solutions to linear equations. Laplace transform theory, techniques and applications.

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

Method of Final Theory Examination (2 hours) 70%  
Examination: In-class Tests/Assignments 30%

### **MATH2140 – INTRODUCTION TO PROBABILITY (4 Credits)**

Pre-requisite MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: Basic probability theory: Combinatorial Methods, Laws of probability, conditional probability, independence. Bayes formula; random variables, discrete and continuous distributions, expectations, moments, moment generating functions, functions of random variables, jointly distributed random variable. Special distributions: binomial, geometric, negative binomial, Poisson, hypergeometric, uniform, exponential, gamma, normal, bivariate normal. Law of large numbers, the central limit theorem.

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

Method of Final Theory Examination (2 hours) 70%  
Examination: In-class Tests/Assignments 30%

### **MATH2150 - MATHEMATICAL STATISTICS**

(4 Credits)

Pre-requisite: MATH2140 Introduction to Probability

Syllabus: Sampling distributions including chi-square,  $t$ , order statistics. Estimation of parameters, likelihood, sufficiency, significance tests. Simple linear regression and correlation. Analysis of Variance. Non-parametric procedures, Elementary principles of experimental design.

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

Method of Final Theory Examination (2 hours) 70%

Examination: In-class Tests/Assignments 30%

### **MATH2950 - MATHEMATICS ELECTIVE (4 Credits)**

Pre-requisites: None

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

### **LEVEL III MATHEMATICS COURSES**

#### **MATH3100 – MULTIVARIATE ANALYSIS (4 credits)**

Prerequisites: MATH2110 Linear Algebra and MATH2140 Analysis & Methods I

Syllabus: Notions of multivariate distributions, Bivariate normal distributions, conditional distribution and multiple correlation coefficients, moments.

Estimation of the mean vector and covariance matrix of the multivariate normal distributions; Inferences concerning the mean vector. Introduction to the  $T^2$  statistics and its uses. Discriminant analysis and its applications. Principal components analysis. Cluster analysis.

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

Examination: One 2-hour written paper 60%  
Coursework 40%

#### **MATH3110 - DESIGN OF EXPERIMENTS (4 Credits)**

Pre-requisites: MATH1110 Applied Statistics & MATH2150 Mathematical Statistics

Syllabus: Need for designing experiments, analysis of completely randomized completely block design, Latin squares. Factorial experiments, nested factorial experiments split, plot design, balanced incomplete block designs.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

#### **MATH3120 – NUMERICAL ANALYSIS (4 Credits)**

Pre-requisite MATH2110 Linear Algebra or MATH2120 Analysis & Methods I

Syllabus: Types of error, Finite Differences and Interpolation; Numerical Evaluation and Integrals; Numerical solution of Differential equations; Roots of Equations: Linear

Systems and Matrices,; Construction of Algorithms for Computation.

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

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

### **MATH3130 – OPTIMIZATION THEORY (4 Credits)**

Pre-requisite: MATH2110 Linear Algebra

Syllabus: Linear Programming and Duality – Mathematical Structure of the Primal; Equivalent Linear Programmes ;Simplex and revised Simplex Techniques; Dual Linear Programmes. Complimentary Slackness, Matrix Theoretic Overview, the Duality Theorem, Special Linear Programmes, - Transportation Problems; Modified Distribution techniques; Construction of Algorithms for Computation.

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

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

### **MATH3140 - FOURIER ANALYSIS AND PDE (4 Credits)**

Pre-requisite: MATH2130 Ordinary Differential Equations

Objective: An introduction to the methods of Fourier Analysis and its applications

Syllabus: Orthogonal systems (Fourier, Haar, Bessel, Sturm-Liouville etc.). Periodic functions,

Fourier expansion, Fourier coefficients, periodic extension. Fourier series for odd and even functions. Problem of convergence. Dirichlet theorem. Minimal property of partial sums. Bessel's inequality. Parseval's identity. Integration and differentiation of Fourier series. Fourier series in complex form. Multiple Fourier series. Fourier transform its properties. Convolution. Partial differential equations, their classification.

Basic differential equations of mathematical physics: wave equation; Laplace equation, heat equation. Application of the Fourier method to the solution of the PDE.

The Discrete Fourier transform. The Fast Fourier transform.

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

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

### **MATH3150 – COMPLEX VARIABLES I (4 credits)**

Pre-requisite: MATH2120 Analysis & Methods I

Description: This is a first course in the theory and methods of complex variables. Many concepts in complex variable are generalizations of topics in calculus and real analysis, while other results and methods are specific to the subject itself. The material in this course is a blend of mathematical theorems and computational techniques.

This course will be of interest to students majoring in mathematics or physics.

Complex numbers, their analysis and geometry. Functions of a complex variable,

Syllabus: limits, continuity. Analytic functions and harmonic functions. Complex integration, contour integrals, Cauchy theorems and consequences. Power series, Taylor series and Laurent series. Residue theory and applications.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

### **MATH3160 – NUMBER THEORY (4 Credits)**

Pre-requisite: MATH2100 Abstract Algebra

Objective: To offer a basic course in the fundamentals of the development of formal number systems with applications to Cryptography.

Syllabus: Number systems. Peano's axioms for  $\mathbb{N}$  and extensions. Mathematical Induction. Equivalence relations. Quotient systems. Euclidean Algorithm. Linear Diophantine Equations. Congruences. Wilson's theorem. Chinese remainder theorem. Euler totient function. Elements of Cryptography.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

### **MATH3170 – ADVANCED ALGEBRA (4 Credits)**

Pre-requisite: MATH2100 Abstract Algebra

Objective: To build on the foundation laid in MATH2100 by providing an in-depth study of selected topics in groups, rings and fields.

Syllabus: Normal subgroups. Factor groups. Isomorphism theorems. Cayley's theorem. Sylow's theorems. Rings and ideals. Fields.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

### **MATH3180 – INTRODUCTION TO TOPOLOGY (4 Credits)**

Pre-requisites: MATH2100 Abstract Algebra & MATH2120 Analysis & Methods I

Objective: This is a first course in point-set topology. The subject of topology grew out of the study of geometric and analytic properties of the real-line and Euclidean space. In particular, topology studies generalizations of the concepts of union, intersection, open intervals, closed intervals, limit points, and continuous functions. The material of topology is a combination of ideas from algebra, analysis and geometry. The emphasis in this course is on mathematical proofs and generalizations. Introduction to topology will be of interest primarily to mathematical students,

Syllabus: Definition of a topological space, examples, continuous functions. Connected spaces and compact spaces. Topology of the real line and Euclidean space. Countability of topological spaces and separation axioms.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

### **MATH3190 – MATRIX ANALYSIS (4 Credits)**

Pre-requisite: MATH2110 Linear Algebra

Objective: This course is designed to expose the student to a number of general results on matrices and to provide techniques for solving difference equations and differential equations and differential equations by formulating such equations as eigen value problems.

Syllabus: Complex matrices. The eigenvalue problem. Simultaneous reduction of quadratic forms. Cayley-Hamilton theorem. The Spectral Theorem, Jordan Canonical Forms. Applications to difference and differential equations.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

### **MATH3200 – LAMBDA CALCULUS (4 Credits)**

Pre-requisite: MATH2100 Abstract Algebra

Syllabus: Lambda calculus, combinatory logic, fixed-point combinators, normal forms, reductions, Church-Rosser theorem, Böhm's theorem, standardization theorem, Mitschke's theorem, recursive functions, undecidability, models, type assignment, logical extensions of the  $\lambda$ -calculus.

Operators,  $\lambda$ -notation, naïve interpretation,  $\lambda$ -terms, free and bound variables, substitution, congruence, reduction, redexes,  $\beta$ -equality, normal forms, Church-Rosser theorem, combinatory logic, fixed point combinators, Böhm's theorem, standardization theorem, and quasi-leftmost-reduction, Mitschke's theorem.

Recursive functions, Kleene normal form,  $\lambda$ -representation of recursive functions, undecidability of classical first-order logic. Formal theories of equality, extensionality, and reduction, correspondence between  $\lambda$ -calculus and combinatory logic; combinatory algebras, combinatorial completeness, models of  $\lambda$ -calculus, Scott's construction; typed  $\lambda$ -calculus, type assignment, logic based on the  $\lambda$ -calculus, Curry's paradox.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

**MATH3210 – MATHEMATICAL LOGIC** (4 Credits)

Pre-requisite: MATH2100 Abstract Algebra

Syllabus: Formal languages, derivations, theories, propositional logics, classical propositional logic, independence of axioms; quantification, interpretations, satisfiability and truth, first-order theories, metatheorems and derived rules; completeness, normal forms, formal number theory, number-theoretic functions and relations, primitive recursive and recursive functions. Gödel numbering, Gödel's incompleteness theorem.

Axiomatic set theory, relations and functions, equinumerosity, Schroeder-Bernstein theorem, Cantor's theorem, ordinals, recursion, cardinals, axiom of choice and well-ordering.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

**MATH3220 – SAMPLING THEORY** (4 Credits)

Pre-requisite: MATH1110 Applied Statistics &amp; MATH2150 Mathematical Statistics

Syllabus: Basic ideas concerning the design and uses of sample surveys. Sampling techniques: Simple random sampling (with derivations of basic results), Stratified sampling, Cluster sampling, (one and two stage). Systematic sampling. Non-response and missing data in sample surveys. Designing forms and collecting data. Interpretation of data and

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

**MATH3230 – LEBESGUE MEASURE** (4 Credits)

Pre-requisite: MATH2120 Analysis and Methods I

Syllabus Reimann integration. Lebesgue measure, integration and differentiation, spaces of p-integrable functions, models of convergence, product measures.

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

Method of Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

**MATH3300 – MATHEMATICS RESEARCH PROJECT** (4 Credits)

Pre-requisite: Restricted to Finalists Majoring in Mathematics

Overview: An opportunity for final year students in Mathematics to apply and develop their classroom knowledge in a real-world or research environment.

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Mathematics. The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and research effort. The project should contain some originality in material and evidence

of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of the Semester and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in the same Semester.

N.B. Enrolment will be limited to those students who have demonstrated a sound academic background and an aptitude for research.

Method of Examination:	Written Report	60%
	Oral Presentation	20%
	Proposal and Literature Review	20%

## **METEOROLOGY**

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

### **MAJOR IN METEOROLOGY:**

#### **LEVEL I**

METE1010	Introduction to Meteorology I
METE1011	Introduction to Meteorology II
MATH1120	Calculus I
MATH1130	Calculus II

#### **LEVEL II**

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

#### **LEVEL III**

METE3100	Dynamic Meteorology II
METE3200	Synoptic Meteorology II
METE3300	Tropical Meteorology

#### **AND either:**

METE3400	Weather Radar and Satellites
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#### **OR**

METE3410	Applications of Meteorology
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### **MINOR IN METEOROLOGY [Sixteen (16) Credits]:**

METE2100	Dynamic Meteorology I
METE2200	Synoptic Meteorology I

#### **AND Four (4) Credits from:**

METE2000	Physical Meteorology I
METE2001	Physical Meteorology II

#### **AND Four (4) Credits from:**

METE3100	Dynamic Meteorology II
METE3200	Synoptic Meteorology II
METE3300	Tropical Meteorology

## LEVEL I METEOROLOGY COURSES

### METE1010 - INTRODUCTION TO METEOROLOGY I (6 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).

Syllabus: **The Atmosphere:** Structure and composition of the atmosphere. Atmospheric statics and thermodynamics. Cloud and precipitation processes. Atmospheric radiation. The energy budget.

**The Ocean:** Composition and structure of the ocean. Classification of Oceans and Seas. Circulations of the Oceans. Ocean currents and upwelling. Characteristics of waves and tides.

**Laboratory:** Meteorological elements and their measurements. Weather symbols and plotting models. Thermodynamic diagrams.

Teaching: Three (3) lectures, one tutorial and four (4) hours of practical per week.

Method of Examination: Final Theory Examination (2 hours) 80%  
In-Class Tests/Assignments 20%

### METE1011 - INTRODUCTION TO METEOROLOGY II (6 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).

Syllabus: **Weather Systems**  
Elements of the general circulation. Air masses, fronts, cyclones, anticyclones,

jet streams. Local wind systems. Tropical weather systems. Elementary atmospheric dynamics.

### Climate and the Environment

The physical basis of climate. Regional climates. Local climates - topoclimates and man-made effects. Climatic change and climate variability. Climatic data analysis and processing.

### Laboratory

Introduction to scalar field analysis. Geostrophic wind and thermal wind computations. Introduction to surface and isobaric analysis.

Teaching: Three (3) lectures, one tutorial and four (4) hours of practical per week.

Method of Examination: Final Theory Examination (2 hours) 80%  
In-Class Tests/Assignments 20%

## LEVEL II METEOROLOGY COURSES

### METE2000 PHYSICAL METEOROLOGY I (4 Credits)

Pre requisites: METE1010 Introduction to Meteorology I, METE1011 Introduction to Meteorology II, MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Thermodynamics of dry air and moist air. Thermodynamic diagrams. Hydrostatics, instability and convection. Formation and growth of cloud droplets by diffusion and condensation. Droplet growth by collision and coalescence. The growth and structure

of ice crystals. The size and distribution of droplets and crystals. Widespread and convective precipitation, thunderstorms.

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

Method of Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

### **METE2001 PHYSICAL METEOROLOGY II (4 Credits)**

Pre requisites: METE1010 Introduction to Meteorology I, METE1011 Introduction to Meteorology II, MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Fundamental physics of radiation. Solar and terrestrial radiation. The heat balance of the earth and atmosphere. Fundamentals of atmospheric electricity. Elementary atmospheric optics. Introduction to the upper atmosphere. Ozone in the atmosphere.

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

Method of Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

### **METE2100 DYNAMIC METEOROLOGY I (4 Credits)**

Pre requisites: METE1010 Introduction to Meteorology I, METE1011 Introduction to Meteorology II, MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Elementary vector methods in meteorology.

Derivation of the equation of motion from Newton's law. The equation of motion in various co ordinate systems. Simplification of the equation of motion. The conservation of mass and the conservation of total energy. The basic equations with pressure as the vertical coordinate. Horizontal balanced motions; the geostrophic thermal wind. Concepts of circulation and vorticity; the circulation theorems and the vorticity equation and their applications. Structure and dynamics of the planetary boundary layer.

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

Method of Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

### **METE2200 SYNOPTIC METEOROLOGY I (4 Credits)**

Pre requisites: METE1010 Introduction to Meteorology I, METE1011 Introduction to Meteorology II, MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: The general circulation the mean fields of the atmosphere and their seasonal variation. The characteristics, structure and evolution of mid latitude frontal systems and cyclones in the lower troposphere. The kinematics of horizontal motion and the computation of kinematic parameters. Analysis of scalar and vector fields. Analysis of mid latitude synoptic systems. Methods of estimating vertical motion.

Teaching: Two (2) lectures and four (4) hours of practical per week.

Method of Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

### **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 tutorial per week.

Method of Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

#### **METE3200 SYNOPTIC METEOROLOGY II (4 Credits)**

Pre requisites: METE2100 Dynamic Meteorology I and METE2200 Synoptic Meteorology I

Syllabus: The three dimensional structure of mid-latitude cyclones. The Polar front jet stream structure and characteristics; the 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. 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 Final Theory Examination (2 hours) 80%  
Examination: In-Class Tests/Assignments 20%

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

Method of Final Theory Examination (2 hours) 80%

Examination: In-Class Tests/Assignments 20%

### **METE3400 – WEATHER RADARS AND SATELLITES** (4 Credits)

Pre requisites: METE2000 Physical Meteorology I, METE2001 Physical Meteorology II and METE2200 Synoptic Meteorology I

Syllabus: **Radar Meteorology:** Introduction to radar. Radar indicators. Electro-magnetic waves. Propagation of radar waves. Formulation of the radar equation. Precipitation measurements. Interpretation of echoes. Hurricanes as observed by radar. Applications and use of radar data.

**Satellite Meteorology:** Brief History and basic concepts. Instrumentation and receiving systems. Identification of cloud and weather systems including hurricanes. Applications and use of satellite information. Use of satellite data in combination with radar data.

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

Method of Final Theory Examination (2 hours) 80%

Examination: In-Class Tests/Assignments 20%

### **METE3410 APPLICATIONS OF METEOROLOGY** (4 Credits)

Pre requisites: METE1010 Introduction to Meteorology I, METE1011 Introduction to Meteorology II, MATH1120 Calculus I & MATH1130 Calculus II,

Syllabus:

**Methods and applications in Climatology:** Climatic applications. Climatic data analysis and processing frequency and probability distributions, standard error, significance tests, analysis of variance, simple regression and correlation. Introduction to extreme value analysis. Applications of statistical techniques to climate data using computers.

**Hydrometeorology:** The water cycle. Analysis of hydrometeorological data for design purposes. Meteorological and hydrological aspects of water management operations. The water balance.

**Agrometeorology:** Definition, scope and role of Agrometeorology. Dependency of agriculture on climate and soil. Factors which exert influence on climate and soil. Soil physics terminology. Photosynthesis. Phenology. Partitioning of solar radiation. Soil moisture content and soil moisture tension. Applications to local agrometeorological problems.

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

Method of Final Theory Examination (2 hours) 80%

Examination: In-Class Tests/Assignments 20%

## PHYSICS

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

### MAJOR IN PHYSICS:

#### LEVEL I

- PHYS1100 Mechanics
- PHYS1101 Electricity and Magnetism
- PHYS1102 Optics, Thermodynamics & Modern Physics

#### AND

- MATH1120 Calculus I

#### OR

- MATH1130 Calculus II

#### LEVEL II

- PHYS2100 Mathematical Methods in Physics
- PHYS2101 Quantum Mechanics & Special Relativity
- PHYS2103 Classical Mechanics
- PHYS2106 Advanced Physics/Technology Laboratory I
- PHYS2107 Advanced Physics/Technology Laboratory II

#### LEVEL III

- PHYS3100 Quantum Mechanics
- PHYS3101 Electrodynamics
- PHYS3105 Statistical Mechanics

#### AND Four (4) Credits From:

- ELET2100 Microprocessors I
- ELET2110 Circuit Simulation
- ELET2120 Discrete Device Electronics
- ELET2130 Digital Communications I
- PHYS2102 Solid State Physics
- PHYS2104 Neural Networks
- PHYS2105 Computational Physics I
- PHYS2950 Physics Elective
- ELET3100 Microprocessors II
- ELET3110 Control and Instrumentation
- ELET3120 Communication Circuits
- ELET3130 Introduction to Digital Signal Processing (DSP)
- ELET3140 Microcomputers and Control

- ELET3151 Digital Communications II
- ELET3160 Electronics Research Project
- PHYS3102 Optics and Lasers
- PHYS3103 Astrophysics
- PHYS3104 Computational Physics II
- PHYS3106 Physics Research Project

### MINOR IN PHYSICS (Sixteen (16) Credits):

#### At Least Eight (8) Credits From:

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

#### AND At Most Eight (8) Credits From:

- PHYS2100 Mathematical Methods in Physics
- PHYS2101 Quantum Mechanics & Special Relativity
- PHYS2102 Solid State Physics
- PHYS2103 Classical Mechanics
- PHYS2104 Neural Networks
- PHYS2105 Computational Physics I
- PHYS2106 Advanced Physics/Technology Laboratory I
- PHYS2107 Advanced Physics/Technology Laboratory II
- PHYS2950 Physics Elective
- PHYS3100 Quantum Mechanics
- PHYS3101 Electrodynamics
- PHYS3102 Optics and Lasers
- PHYS3103 Astrophysics
- PHYS3104 Computational Physics II
- PHYS3105 Statistical Mechanics
- PHYS3106 Physics Research Project

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

## PRELIMINARY PHYSICS COURSES

### PHYS0070 – PRELIMINARY PHYSICS I (6 P-Credits)

Pre-requisite: None

Objectives: An introduction to Mechanics, Heat and Sound.

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, periodic waves, wave speed, travelling 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 and three (3) hours of practical per week.

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

### PHYS0071– PRELIMINARY PHYSICS II (6 P-Credits)

Pre-requisite: None

Objectives: An introduction to Electricity, Magnetism, Optics, & Modern Physics.

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. Kirchoff'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 and three hours of practical per week.

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

## LEVEL I PHYSICS COURSES

### PHYS1100 – MECHANICS (4 Credits)

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

Objectives: Fundamentals of classical particles and wave mechanics.

Syllabus: Kinematics in 1-, 2- and 3-dimensions, full vector analysis. Projectiles. Circular motion, dynamics of circular motion. Polar co-ordinates. Newton's laws. Friction. Conical pendulum. Inertial frames of reference. Centripetal forces, velocity-dependent forces (terminal velocity). Gravitation. Kepler's laws. Kinetic and potential energy, work-energy theorem, conservation of energy, power. Linear momentum, elastic and inelastic collision in 1-, 2- and 3-dimensions. Impulse, variable-mass systems. Rotational kinematics, rotational kinetic energy. Torque, angular momentum, rigid bodies. Equilibrium conditions, physical systems as examples of simple harmonic motion. Transverse and longitudinal waves (1-D), intensity, standing waves, sound waves, vibrational resonance, beats. Doppler effect.

Teaching: Two (2) lectures, one tutorial and three (3) hours of practical per week.

Method of Examination:	Final Theory Examination (2 hours)	70%
	In-class Tests/Assignments	20%
	Practical Reports	10%

### PHYS1101 – ELECTRICITY & MAGNETISM (4 Credits)

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

Objectives: Fundamentals of electricity and magnetism.

Syllabus: Electric charge, Coulomb's law, electric field - E. Charge and dipole in an electric field. Motion of charged particles in uniform and non-uniform electric fields.

Calculation of E for point charges and charge distributions. Electric flux, Gauss' law. Calculation of E for symmetrical charge distributions using Gauss's law. Electric potential, potential difference, work, potential energy, calculation of potential for point charges and charge distributions. Capacitance, RC circuits. Magnetic fields, force on charges and currents in a magnetic field, Hall effect, motion of charged particles in uniform and non-uniform magnetic fields, Ampere's law, Calculation of magnetic field B for simple field configurations, Biot and Savart law, induced EMF. Lenz's law, time varying magnetic field and relative motion inductance, LR circuits. Displacement current and Maxwell's equations. EM waves, E & B fields, energy density and energy flow in EM radiation.

Teaching: Two (2) lectures, one tutorial and three (3) hours of practical per week.

Method of Examination:	Final Theory Examination (2 hours)	70%
	In-class Tests/Assignments	20%
	Practical Reports	10%

**PHYS1102 – OPTICS, THERMODYNAMICS & MODERN PHYSICS (4 Credits)**

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

Objectives: Fundamentals of optics, thermodynamics, and modern physics.

Syllabus: **Physical Optics:** Fermat's principle and the derivation of laws of reflection and refraction. Interference of light: Path

and phase difference, Young's double-slit experiment and interference in thin films. Diffraction of light: Single and double slit diffraction, Raleigh's criteria and the resolution of single-slit and circular aperture. Resolving power of optical instruments. Diffraction grating and missing orders. Polarization of light: Methods of generating polarized light. Double refraction and optical activity.

**Thermodynamics:** Zeroth law of thermodynamics. Heat, work and the first law of thermodynamics. Applications of the first law to ideal gases. Heat engines and the second law of thermodynamics. Entropy calculations for reversible and irreversible processes.

**Modern Physics:** Early quantum theory: Blackbody radiation and Planck's hypothesis. Experimental evidence to support the photon theory of light. Wave-particle duality of light. Wave nature of matter and de Broglie's hypothesis. Experimental evidence to support de Broglie's hypothesis. Uncertainty Principle. Early models of the atom and their limitations.

Teaching: Two (2) lectures and three (3) hours of practical every other week.

Method of Examination:	Final Theory Examination (2 hours)	70%
	In-class Tests/Assignments	20%
	Practical Reports	10%

## LEVEL II PHYSICS COURSES

### PHYS2100 - MATHEMATICAL METHODS IN PHYSICS

(4 credits)

Prerequisites: MATH 1120 Calculus I

Objectives: Development of Mathematical Techniques for Physics.

Syllabus: Taylor's Expansion, Partial Differentiation of Multivariate Functions, diagonalization of Matrices, Eigenvectors, Eigenvalues, Elementary functions of Complex Variables, Divergence Theorem, Stokes' Theorem, line Integrals, Surface and Volume Integrals, Fourier Series, Ordinary differential Equations, Laplace Transforms, Introduction to Special functions, Wave Equation, Diffusion Equation.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-course tests / assignments 20%

### PHYS2101 – QUANTUM MECHANICS & SPECIAL RELATIVITY (4 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1102 Optics, Thermodynamics & Modern Physics, and MATH1120 Calculus I

Objectives: Wave mechanical approach to quantum mechanics: introduction to relativity.

Syllabus: Superposition of states, Wave mechanics, Matrix mechanics, Uncertainty relations, Complementarity, Wave-particle duality, Wave equation, Wave packets. Group

velocity, Momentum and position operators, operators.

Measurement, expectation values, TISE, Free particle, I-D potentials – square well, Finite square well, Step potential, barrier penetration, Numerical solution of the S.E, Ether hypothesis, Einstein's relativity, Lorentz transformation, Time dilation, Fitzgerald contraction, combination of velocities, Relativistic energy and momentum.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

### PHYS2102 – SOLID STATE PHYSICS (4 Credits)

Pre-requisite: PHYS1101 Electricity & Magnetism

Objectives: The theory and properties of solid state physics.

Syllabus: Crystallography: Symmetry, unit cells, Miller indices, Brillouin zones  
X-ray diffraction: Solid-state bonding: electrons in periodic potential  
Kronig-Penney model.  
Fermi Level: Thermal properties of solids. Electrical conductivity, Intrinsic and extrinsic semiconductors, Insulators, Thermoelectric and galvanomagnetic effects, Factors affecting the properties of semiconductors, Basic semiconductor devices, Types of magnetism and magnetic materials.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

**PHYS2103 – CLASSICAL MECHANICS (4 Credits)**

Pre-requisite: PHYS1100 Mechanics & MATH1120 Calculus I

Objectives: Rigorous theory of classical mechanics with vector calculus.

Syllabus: Full treatment of classical harmonic oscillator: damped and forced oscillations, jerk, coupled oscillators - normal modes (secular equation, normal frequencies, normal coordinates), simulation of 1-D crystal as linear array of coupled oscillators. General wave equation, phase and group velocity. Mechanics of continuous media: waves on a string, surface waves, sound waves, boundary effects. Fluids: statics, kinematics and dynamics of steady flow. Lagrange and Hamiltonian equations of motion. Non inertial frames of reference: accelerated and rotating, Coriolis effect. Rotation of a rigid body: Euler equations of motion. Dynamics of a particle in a central field of force, scattering.

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

Method of Examination:	Final Theory Examination (2 hours)	80%
	In-class Tests/Assignments	20%

**PHYS2104 – NEURAL NETWORKS (4 Credits)**

Pre-requisite: COMP1115 Computer Programming II and MATH1120 Calculus I

Objectives: A first study of neural networks and their applications.

Syllabus: Introduction to Neural Networks - Artificial & biological neural networks, signal processing, control, pattern recognition, medicine, speech production, speech recognition, business Introduction to Neural Networks, typical architectures, training techniques, common activation functions.  
 Pattern Classifications - Architecture, biases & thresholds, linear separability, data representation, Hebb net, perceptron, adaline, madaline, applications.  
 Backpropagation Neural Networks - Architecture, algorithm, alternative weight update procedures, alternative activation functions, number of hidden layers, applications.  
 Pattern Association - Training algorithms, hetero-associative net, auto-associative net, iterative auto-associative net, BAM, applications.  
 Competition Based Neural Networks - Fixed weight competitive nets, Kohonen self-organizing maps, learning vector quantisation, counter-propagation, introduction to adaptive resonance theory, applications.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

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

**PHYS2105 – COMPUTATIONAL PHYSICS I (4 Credits)**

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and MATH1120 Calculus I

Objectives: Practical introduction to numerical analysis and computer simulation.

Syllabus: Algorithms, flowcharts and pseudocode, organisation, control structures and standards for scientific programming, FORTRAN, C/C++, MATLAB and MAPLE, Introduction to UNIX, error, accuracy and stability, Introduction to numerical methods, practical implementation, Roots of equations, interpolation and extrapolation, numerical differentiation and integration, numerical solution of differential equations, Fourier methods, Introduction to computer modelling in Science.

Teaching: Two (2) lectures and four (4) hours of laboratory per week.

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

### **PHYS2106 – ADVANCED PHYSICS / TECHNOLOGY LABORATORY I (2 credits)**

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and PHYS1102 Optics, Thermodynamics & Modern Physics

Objectives: Upon successful completion of the course the student should have gained working experience in the essentials of experimental work, including:

- Collection of Data
- Troubleshooting Apparatus
- Application of Theory to Practical Problems
- Error Analysis
- Researching Background for

Experiments

- Writing Proper Laboratory Report

Syllabus: A minimum of five (5) experiments will be performed, researched and written up in a report format specified by the lecturer. Students will not be allowed to repeat experiments carried out in PHYS2107. At least two (2) experiments will be chosen from each of the following two (2) categories:

- (i) Classical Physics Experiments
- (ii) Experiments in New Technology

Teaching: Four hours of laboratory per week.

Method of Examination: Written Laboratory Reports (5) 80%  
Oral Examination 20%

### **PHYS2107 – ADVANCED PHYSICS / TECHNOLOGY LABORATORY II (2 credits)**

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and PHYS1102 Optics, Thermodynamics & Modern Physics

Objectives: Upon successful completion of the course the student should have gained working experience in the essentials of experimental work, including:

- Collection of Data
- Troubleshooting Apparatus
- Application of Theory to Practical Problems
- Error Analysis
- Researching Background for Experiments
- Writing Proper Laboratory Reports

Syllabus: A minimum of five (5) experiments will be performed, researched and written up in a report format specified by the lecturer. Students will not be allowed to repeat experiments carried out in PHYS2106. At least two (2) experiments will be chosen from each of the following two (2) categories:

- (i) Classical Physics Experiments
- (ii) Experiments in New Technology.

Teaching: Four hours of laboratory per week.

Method of Examination: Written Laboratory Reports (5) 80%  
Oral Examination 20%

### **PHYS2950 - PHYSICS ELECTIVE (4 credits)**

Pre-requisites: None

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

### **LEVEL III PHYSICS COURSES**

#### **PHYS3100 – QUANTUM MECHANICS (4 Credits)**

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Objectives: An advanced study of quantum mechanics and applications.

Syllabus: Operators and eigenvectors, eigenvalue equations, vector spaces, Dirac bra-ket formulation, axioms of quantum mechanics, compatible observables, uncertainty relations. Evolution of states in time. Hamiltonian operator, Ehrenfest's equations, representations and transformations of state vectors. Factorisation method. Harmonic oscillator, general Hamiltonian, normalisation. Free particle in 3-D, angular momentum, parity. Central potentials, isotropic harmonic oscillator, hydrogen atom. Fermions and bosons, the Exclusion Principle. Electron spin, magnetic moment, Perturbation theory. Time-dependent perturbations, transitions to the continuum, density of states. Elastic scattering in 1-D, scattering by a square well, resonances. Interpretation of Q. M. Copenhagen interpretation, alternative interpretations of wave-function collapse, EPR paradox, Bell's theorem.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

**rPHYS3101 – ELECTRODYNAMICS (4 Credits)**

Pre-requisite: PHYS1102 Optics, Thermodynamics & Modern Physics and PHYS2101 Quantum Mechanics & Special Relativity

Objectives: The theory of electromagnetism and applications.

Syllabus: Development of Maxwell's equations. Potentials. E-m waves in free space, conducting medium, plasmas. Reflection of e-m waves from dielectric and metallic boundaries, waveguides, special relativity and electrodynamics. Transformation of electric and magnetic fields.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

**PHYS3102 – OPTICS & LASERS (4 Credits)**

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Objectives: An advanced study of optics and modern applications.

Syllabus: Spatial and temporal coherence. Fraunhofer and Fresnel diffraction. Image formation and processing. Basic principles of lasers, population inversion, stimulated emission, A & B coefficients, etc. Gas, solid-state, liquid & dye lasers. Production of tunable, high-power, high-stability and short-pulse lasers. Applications.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

**PHYS3103 – ASTROPHYSICS (4 Credits)**

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Objectives: A study of astrophysics - our solar system and cosmology.

Syllabus: Structure of the sun and planets. Introduction to general relativity. Stellar Evolution Types and evolution of galaxies. Cosmological models.

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

Method of Examination: Final Theory Examination (2 hours) 80%  
In-class Tests/Assignments 20%

**PHYS3104 – COMPUTATIONAL PHYSICS II (4 Credits)**

Pre-requisite: PHYS2105 Computational Physics I

Objectives: A computational physics 'project' course with more advanced simulation techniques.

Syllabus: Elements of parallel processing. Numerical methods, practical implementation. Systems of linear equations, matrices, diagonalisation, decomposition, inversion, eigenvectors, sparse matrices. Numerical solution of partial differential equations. Non linear equations Simulation and modelling, random number generation, Monte Carlo methods. Elements of Chaos

theory, simple chaotic systems, exponents, attractors. Fractals, fractal dimension. Ising model, cellular automata.

Teaching: One lecture and Six (6) hours of practical per week.

Method of Project Report and Oral Presentation 70%

Examination: Practical Reports 30%

### **PHYS3105 – STATISTICAL MECHANICS (4 Credits)**

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Objectives: An advanced study of statistical physics and applications.

Syllabus: Models of thermal systems. Probability. Entropy. Internal energy. Temperature Contact with thermodynamics. Chemical potential. Free energy. Heat capacities. Microcanonical Canonical and grand canonical distributions (Boltzmann and Gibbs sums). Quantum statistics. F-D, B-E and Planck distributions. Blackbody radiation. Ideal gas. Fermi gas Density of states. Superfluidity. Bose-Einstein condensation. Phase transitions. Thermodynamics of the superconducting transition.

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

Method of Final Theory Examination (2 hours) 80%

Examination: In-class Tests/Assignments 20%

### **PHYS3106 - PHYSICS RESEARCH PROJECT (4 Credit)**

Pre-requisite: Restricted to Final Year students, Majoring in Physics.

Objective: Application of classroom knowledge in a real world or research environment.

Syllabus: In consultation with and under the supervision of a Faculty member, students are expected to define, investigate and report on an applied or theoretical research topic in Physics. The project itself is equivalent to a single Faculty course and must therefore reach that standard in terms of content and research effort. The project should contain some originality in material and evidence of extensive reading and comprehension of the subject area. A proposal and literature review must be submitted no later than the fourth week of Semester II and a final written report must be submitted and presented orally to a panel of at least three Faculty members no later than the last week of classes in Semester II.

**N.B.** Enrolment will be limited to those students who have demonstrated a sound academic background and an aptitude for research.

Method of Final Written Project Report 80%

Examination: Oral Presentation 20%

## MAIN LIBRARY, CAVE HILL RULES FOR READERS

### MEMBERSHIP

1. The Library opening hours are

Term and Mid-Year Vacation: Weekdays 9.00 a.m. to  
11.00 p.m.

Saturdays & Sundays  
9.00 a.m. to 11.00 p.m.

Break: Weekdays 9.00 a.m. to  
5.00 p.m.  
Saturdays CLOSED

Summer Vacation: Weekdays 9.00 a.m. to  
9.00 p.m.  
Saturdays 9:00 – 4:00

The Library is closed on Public and University holidays throughout the year.

2. The Library is open to all registered graduate and undergraduate students at the University and to all the academic, research, senior administrative and permanent and non-academic staff of the University.

3. Other persons over 17 years of age requesting use of the Library for reading or reference purposes may be admitted at the discretion of the Librarian. Such persons may be permitted to borrow books only in exceptional circumstances at the discretion of the Librarian, and will then be required to make a cautionary deposit of \$50.00 which shall be refunded on satisfactory termination of the membership.

### LOANS

#### General

4. Borrowers will be required to identify themselves. No book, periodical or other Library material may be removed from the Library unless the procedure has been completed at the Circulation Desk. The possession of a library book which has not been properly issued will be treated as a de-

liberate and serious offence. A reader is responsible to the Library for the items for which he or she has signed. No book, periodical, etc., will be accepted for issue or renewal after the second bell has been rung 15 minutes before closing time. All transactions must be completed fifteen minutes before the published closing time.

### **Undergraduate**

5. Undergraduate students at the University may have on loan a maximum of 10 items, including no more than two items from the overnight collection. For items from the open access shelves the period of loan is normally 21 days but all books are subject to recall at any time during this period. The period of loan may be extended in vacations at the discretion of the Librarian. Undergraduates may not borrow periodicals.

### **Postgraduates**

6. Postgraduate students of the University may have on loan up to 10 items at a time. This quota includes not more than two (2) bound periodicals and not more than two (2) items from the overnight collection. The period of loan is normally 10 weeks. All loans are subject to recall by the Librarian at any time.

### **Academic and Senior Administrative Staff**

9. Academic and senior administrative staff may have on loan up to 15 items at a time. This includes not more than two (2) bound volumes of periodicals and two (2) overnight loans. The period of loan is normally 10 weeks. All books are subject to recall by the Librarian at any time.

### **Non-Academic Staff**

8. Permanent non-academic staff may have on loan up to four (4) books at a time for up to 21 days. They may not borrow overnight books or periodicals.

### **Other Persons**

9. Other persons permitted to borrow books under Rule 3 may have on loan up to four (4) books at a time for up to 21 days.

### **Departments**

10. The Librarian, at his discretion, may lend books to departments/units of the University for such periods as he may decide. Heads of departments/units are responsible for such loans.

### **Renewals and Requests**

11. A book loaned to an undergraduate student may be renewed once only for a further period if it has not already been requested by another reader.

12. A book requested by another reader will be recalled only after it has been on loan for 10 days.

### **Non-Circulating Items**

13. Certain publications may on no account be removed from the Library. These include all reference books, current issues of periodicals and other works of special value. All non-circulating items are clearly marked.

### **Reserved Books**

14. Reserved books may only be borrowed overnight or on weekends. Only two (2) such items may be borrowed at any one time, the loan begins after 5.00 p.m. on weekdays, 11.00 a.m. on Saturdays, and 3.00 p.m. in the summer vacation, and must be returned by 10.00 a.m. or 5.00 p.m. as indicated by the date due stamp.

### **Reading Room Loans**

15. Only two (2) items may be borrowed for use in the Reading Room at any one time.

## **Periodicals**

16. Periodicals will normally be restricted to Reading Room use, but Graduate Students and members of the Academic and Senior Administrative Staff may borrow bound volumes only – to a maximum of two (2) such items – for a period of 14 days. These loans are not normally renewable.

## **FINES**

17. (a) The Librarian is empowered to levy a fine upon all readers who fail to return Library material within the prescribed period.

(b) The fine for late return of library material borrowed from the general collection by academic staff will be 50 cents for each day the loan is overdue.

(c) The fine for late return of library material borrowed from the general collection by postgraduate students will be 50 cents for each day the loan is overdue.

(d) The fine for the late return of library material from the general collection by other borrowers will be 25 cents for each day the loan is overdue.

(e) In determining the number of days by which a loan is overdue in relation to clauses (b), (c) and (d) above, only days in which the Library was closed owing to unforeseen circumstances will be excluded.

(f) The fine for late return of an item from the overnight collection will be charged at 10 cents per hour.

## **Maximum Fine**

18. The maximum fine for the late return of Library material shall not exceed Bds. \$50.00 in the case of academic staff borrowers, Bds \$50.00 in the case of postgraduate student borrowers, and Bds \$30.00 in the case of other borrowers.

19. Loss of or damage to any library material on loan to

a reader must be reported by him/her immediately. The reader must pay the cost of replacement (or the estimated market price of the book if irreplaceable) of lost or seriously damaged books or other items in addition to any fine which he/she may have incurred before the loss or damage was reported.

20. The names of all those who are not in good standing with the Library – that is, those who, after due notice, have failed to return overdue items or who fail to pay fines or costs of items lost or damaged – will be submitted to the Principal for further action.

## **THEFT AND MUTILATION**

21. The willful mutilation or defacement of library material, the attempt at, or illegal removal of library material, the attempt to obtain library materials or to gain access to library facilities by false pretences or forgery, will be considered a major offence against the University, and any person who commits such an offence may be reported to the appropriate University authority for disciplinary action which may include a maximum penalty fine of Bds \$300.00, suspension or expulsion.

## **CONDUCT**

22. The Reading Rooms are for the purpose of study and not for discussions or social gatherings. Any conduct inconsistent with this purpose or detrimental to its pursuit by others shall constitute a breach of the Rules.

23. The Librarian shall at all times have authority to maintain good order in the Library and may exclude from it or suspend from its use any reader who breaks these Rules. He/she may report to the Principal any person responsible for serious or persistent breach of these Rules; such conduct by any student shall be considered a breach of University discipline.

24. Readers must not mark, deface or damage any book or other library material or furnishings in any way.

8. All members of staff are empowered to require readers to comply with these Rules.
9. Silence shall be observed in the Reading Rooms.
10. All bags, briefcases, handbags, etc., must be deposited in the racks provided at the Library entrance. The University accepts no responsibility for loss or damage of any article so left.
11. Eating or drinking is strictly forbidden in the Library.
12. Smoking is strictly forbidden except in those parts of the Library where it is expressly permitted.
13. Except as provided for in Rule 20 above, any breach of these Rules or of the Regulations by a reader may render him/her liable to a fine not exceeding Bds \$20.00 at the discretion of the Librarian.