THE UNIVERSITY OF THE WEST INDIES
CAVE HILL CAMPUS, BARBADOS

THE FACULTY OF

SCIENCE &
TECHNOLOGY

PROGRAMMES & COURSES

2012-2013
MISSION
To advance education and create knowledge through excellence in teaching, research, innovation, public service, intellectual leadership and outreach in order to support the inclusive (social, economic, political, cultural, environmental) development of the Caribbean region and beyond.

VISION
By 2017, the University will be globally recognised as an innovative, internationally competitive university, deeply rooted in all aspects of Caribbean development and committed to serving the diverse people of the region and beyond.

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

This Guide is intended for students entering the Faculty of Science and Technology from academic year 2012 – 2013. Continuing students must refer to Faculty Regulations that govern their year of entry – available on the Faculty website.

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

Disclaimer:

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

The University of the West Indies is a regional and international institution primarily serving the needs of the Commonwealth Caribbean. Established in 1948 at Mona, Jamaica, as a college in special relationship with the University of London, it received full university status in 1962, as an independent degree-granting institution. In 1960, a second campus was established at St Augustine, Trinidad, and in 1963 teaching started in Barbados, first at a temporary site at the Bridgetown Port and then at the Cave Hill Campus.

Sciences have been taught at the Cave Hill Campus of the University of the West Indies from its inception. The Faculty was formerly known as the Faculty of Natural Sciences and later the Faculty of Science & Technology then the Faculty of Pure & Applied Sciences before settling on the current name of the Faculty of Science and Technology. Our full-time Academic Staff are mainly Caribbean nationals but we are also very much an international Faculty with about one third of our lecturers drawn from countries far and wide. Our degree programmes are well-respected regionally and internationally with many of our graduates working or pursuing further studies overseas. The Faculty comprises three sections:-

- Department of Biological & Chemical Sciences – undergraduate & graduate programmes

- Department of Computer Science, Mathematics & Physics – undergraduate & graduate programmes

- Centre for Resource Management and Environmental Studies (CERMES) – graduate programmes

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

Science graduates may register for the research degrees of M.Phil. and Ph.D. under the supervision of a member of the Academic Staff. The Faculty also offers MSc. programmes in various fields. CERMES offers an MSc. in Natural Resource and Environmental. While an MSc in Electronic Commerce was offered by the Department of Computer Science, Mathematics and Physics, providing graduates with the skills required for implementing, maintaining and developing Electronic Commerce services in the region however, this will soon be replaced with a series of new taught Masters programmes in Cyber-Security, Telecommunications, Robotics, Gaming, Networking, and Computer Science to keep our science and technology offerings exciting. A new programme in Renewable Energy Management will also begin this academic year and an online M.Sc. in Telecommunications is soon to be launched.

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: 2012-2013

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td><strong>Annual Business Meeting of Council</strong></td>
<td>April 26, 2013</td>
</tr>
<tr>
<td><strong>Graduation Dates</strong></td>
<td></td>
</tr>
<tr>
<td>Open Campus</td>
<td>Saturday, October 13, 2012</td>
</tr>
<tr>
<td>Cave Hill Saturday,</td>
<td>October 20, 2012</td>
</tr>
<tr>
<td>St Augustine</td>
<td>Thur. October 25 – Sat. October 27, 2012</td>
</tr>
<tr>
<td><strong>Semester I Dates 2012/2013</strong></td>
<td></td>
</tr>
<tr>
<td>Semester I Begins</td>
<td>August 26, 2012</td>
</tr>
<tr>
<td>Teaching Begins</td>
<td>September 03, 2012</td>
</tr>
<tr>
<td>Teaching Ends</td>
<td>November 30, 2012</td>
</tr>
<tr>
<td>Examinations Begin</td>
<td>December 05, 2012</td>
</tr>
<tr>
<td>Examinations End</td>
<td>December 21, 2012</td>
</tr>
<tr>
<td>Semester I Ends</td>
<td>December 21, 2012</td>
</tr>
<tr>
<td><strong>Semester II Dates 2012/2013</strong></td>
<td></td>
</tr>
<tr>
<td>Semester II Begins</td>
<td>January 20, 2013</td>
</tr>
<tr>
<td>Teaching Begins</td>
<td>January 21, 2013</td>
</tr>
<tr>
<td>Teaching Ends</td>
<td>April 19, 2013</td>
</tr>
<tr>
<td>Semester Break</td>
<td>April 22 – 26, 2013</td>
</tr>
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<td>Examinations Begin</td>
<td>April 29, 2013</td>
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<tr>
<td>Examinations End</td>
<td>May 17, 2013</td>
</tr>
<tr>
<td>Semester II Ends</td>
<td>May 17, 2013</td>
</tr>
<tr>
<td><strong>CROSS CAMPUS MEETINGS</strong></td>
<td></td>
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<tr>
<td>Cross Campus Meetings at St. Augustine</td>
<td>October 01 - 05, 2012</td>
</tr>
<tr>
<td>Cross Campus Meetings at the Regional Headquarters, Mona</td>
<td>January 20 - 24, 2013</td>
</tr>
<tr>
<td>Cross Campus Meetings at Cave Hill</td>
<td>May 27 - 31, 2013</td>
</tr>
</tbody>
</table>
APPENDIX I

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

- Applied Mathematics *
- Biology
- Botany
- Chemistry
- Computer Science
- Environmental Science
- Further Mathematics *
- Geography
- Geology
- Physics
- Pure & Applied Mathematics
- Pure Mathematics*
- Zoology

* The following cannot be counted together:

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

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

(b) List of Approved Science CSEC General Proficiency/GCE O-Level subjects:

- Additional Mathematics
- Biology
- Chemistry
- Computer Science
- Geography
- Information Technology (General)
- Integrated Science
- Physics

APPENDIX II

List of Majors in the UWI Science Faculties:

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

* Offered at Cave Hill
APPENDIX III

FOUNDATION COURSES

FOUN 0100 – Fundamentals of Written English
FOUN 1001 – English for Academic Purposes
FOUN 1008 – Rhetoric II: Writing for Special Purposes
FOUN 1101 – Caribbean Civilization
FOUN 1210 – Science, Medicine & Technology in Society
FOUN 1301 – Law, Governance, Economy & Society

1 Both courses cannot be taken - students must choose one or the other
2 Not normally available to Science Faculty Students

FOUN 0100  FUNDAMENTALS OF WRITTEN ENGLISH
(0 Credits)
This course is required for all students entering the University who are not exempted from the Proficiency Test and have not taken it or failed it.

FOUN 1001 ENGLISH FOR ACADEMIC PURPOSES
(3 Credits)
This course is designed to: equip students with the study and research skills they will need in order to get the maximum benefit from all their courses at the University; to familiarize them with the linguistic situation in the Caribbean and break down certain misconceptions they usually have about it and to introduce students to the rhetorical modes of discourse.

FOUN 1008 RHETORIC II; WRITING FOR SPECIAL PURPOSES (3 Credits)
This course is designed to equip students across the disciplines (particularly the Social Sciences, Law, Science and Technology) with skills in business, technical and scientific writing.

FOUN 1101 CARIBBEAN CIVILIZATION (3 Credits)
This course is designed to develop an awareness of the main process of cultural development in Caribbean societies, highlighting the factors, the problematics and the creative output that have fed the emergence of Caribbean identities; to develop a perception of the Caribbean as wider than island nations or linguistic blocs; to stimulate students’ interest in, and commitment to Caribbean civilization and to further their self-determination.

FOUN 1210 SCIENCE, MEDICINE AND TECHNOLOGY IN SOCIETY (3 Credits)
The overall aim of the course is to develop the ability of the student to engage in an informed manner in public discourse on matters pertaining to the impact of science, medicine and technology on society. The course will help students to appreciate the essential characteristics of the scientific method as a mode of enquiry into nature and to understand why it provides the foundations of the technological world.

FOUN 1301 LAW, GOVERNANCE, ECONOMY AND SOCIETY (3 Credits)
This is a multi-disciplinary course of the Faculty of Social Sciences which is designed mainly for non-Social Sciences students. The course will introduce students to some of the major institutions in Caribbean society. It will expose them to both historical and contemporary aspects of Caribbean society, including Caribbean legal, political and economic systems. In addition, Caribbean culture and Caribbean social problems are discussed.
APPENDIX IV

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).

<table>
<thead>
<tr>
<th>PART</th>
<th>LABORATORY COURSES (WEEKLY HOURS)</th>
<th>NON-LABORATORY COURSES (WEEKLY HOURS)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>LECTURE</td>
<td>TUTORIAL</td>
</tr>
<tr>
<td>PART I</td>
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<td></td>
</tr>
<tr>
<td>PRELIM</td>
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<td>LEVEL 1</td>
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<tr>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PART II</td>
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<td></td>
</tr>
<tr>
<td>LEVELS 2 &amp; 3</td>
<td>2</td>
<td>1</td>
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<tr>
<td></td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

APPENDIX V

GRADING SYSTEM

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

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

Table 2: GPA to Honours Conversion

<table>
<thead>
<tr>
<th>Class of Honours</th>
<th>Cumulative GPA</th>
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</thead>
<tbody>
<tr>
<td>First</td>
<td>3.60 and above</td>
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<tr>
<td>Upper Second</td>
<td>3.00 – 3.59</td>
</tr>
<tr>
<td>Lower Second</td>
<td>2.00 – 2.99</td>
</tr>
<tr>
<td>Pass</td>
<td>1.00 – 1.99</td>
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</table>
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 & Economics
- Computer Science with Economics
- Computer Science with Management
- Computer Science with Management
- Information Technology & Accounting
- Information Technology with Accounting
- Information Technology & Economics
- Information Technology with Economics
- Information Technology with 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
MATH1101  Basic Mathematics I
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
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 One Level III COMP course
And One Level II/III COMP course

AND Either
ACCT3040 Accounting Theory
OR
ACCT3041 Advanced Financial Accounting

AND Six (6) Credits From Accounting Electives:
ACCT3015 Accounting Information Systems
ACCT3039 Cost & Management Accounting II
ACCT3040 Advanced Accounting Theory
ACCT3041 Advanced Financial Accounting
ACCT3044 Advanced Auditing
MGMT3023 Independent Study
MGMT3024 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
MATH1101 Basic Mathematics I
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 1 Credits from any 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

AND
ACCT3040 Accounting Theory
OR
ACCT3041 Advanced Financial Accounting

LEVEL III
COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis
ACCT3043 Auditing

AND
ACCT3040 Accounting Theory
OR
ACCT3041 Advanced Financial Accounting

And One Level III COMP Course
### And One Level II/III COMP Course

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>FOUN 1008</td>
<td>Rhetoric II: Special Purposes</td>
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<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>FOUN 1001</td>
<td>English for Academic Purposes</td>
</tr>
<tr>
<td>AND</td>
<td></td>
</tr>
<tr>
<td>FOUN 1101</td>
<td>Caribbean Civilization</td>
</tr>
<tr>
<td>FOUN 1301</td>
<td>Law, Governance and Society</td>
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### COMPUTER SCIENCE AND ECONOMICS

#### LEVEL I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>COMP 1105</td>
<td>Computer Programming I</td>
</tr>
<tr>
<td>COMP 1115</td>
<td>Computer Programming II</td>
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<tr>
<td>MATH 1101</td>
<td>Basic Mathematics I</td>
</tr>
<tr>
<td>MATH 1110</td>
<td>Applied Statistics</td>
</tr>
<tr>
<td>ECON 1001</td>
<td>Introduction to Microeconomics</td>
</tr>
<tr>
<td>ECON 1002</td>
<td>Introduction to Macroeconomics</td>
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</table>

**AND Eight (8) Level I Credits**

#### LEVEL II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>COMP 2105</td>
<td>Discrete Mathematics</td>
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<tr>
<td>COMP 2115</td>
<td>Information Structures</td>
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<tr>
<td>COMP 2125</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP 2145</td>
<td>Software Engineering I</td>
</tr>
<tr>
<td>ECON 2000</td>
<td>Intermed. Microeconomics I</td>
</tr>
<tr>
<td>ECON 2001</td>
<td>Intermed. Microeconomics II</td>
</tr>
<tr>
<td>ECON 2002</td>
<td>Intermed. Macroeconomics I</td>
</tr>
<tr>
<td>ECON 2003</td>
<td>Intermed. Macroeconomics II</td>
</tr>
<tr>
<td>ECON 2008</td>
<td>Statistical Methods I</td>
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#### LEVEL III

<table>
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<tbody>
<tr>
<td>COMP 3100</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>COMP 3180</td>
<td>Algorithm Design and Analysis</td>
</tr>
<tr>
<td>ECON 3049</td>
<td>Econometrics I</td>
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</tbody>
</table>

**One Level III COMP course**

**One Level II/III COMP course**

**Four Level II/III ECON courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>FOUN 1008</td>
<td>Rhetoric II: Special Purposes</td>
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<td>OR</td>
<td></td>
</tr>
<tr>
<td>FOUN 1001</td>
<td>English for Acad. Purposes</td>
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<tr>
<td>AND</td>
<td></td>
</tr>
<tr>
<td>FOUN 1101</td>
<td>Caribbean Civilisation</td>
</tr>
<tr>
<td>FOUN 1301</td>
<td>Law, Governance and Society</td>
</tr>
</tbody>
</table>
COMPUTER SCIENCE WITH ECONOMICS

LEVEL I
COMP1105 Computer Programming I
COMP1115 Computer Programming II
MATH1101 Basic Mathematics I
MATH1110 Applied Statistics
ECON1001 Intro. to Microeconomics
ECON1002 Intro. to Macroeconomics

AND Eight (8) Level I Credits

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

AND One Level II/III ECON course

LEVEL III
COMP3100 Operating Systems
COMP3180 Algorithm Design and Analysis

One Level III COMP course
One Level II/III COMP course
And Fifteen Level II/III credits

AND

FOUN
FOUN1008 Rhetoric II: Special Purposes
OR
FOUN1001 English for Acad. Purposes
AND
FOUN1101 Caribbean Civilisation
FOUN1301 Law, Governance and Society

COMPUTER SCIENCE AND MANAGEMENT

LEVEL I
COMP1105 Computer Programming I
COMP1115 Computer Programming II
MATH1101 Basic Mathematics I
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

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

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

FOUN
FOUN1101 Caribbean Civilisation
**LEVEL III**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>COMP3100</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>COMP3180</td>
<td>Algorithm Design and Analysis</td>
</tr>
<tr>
<td>MGMT3017</td>
<td>Human Resources Management</td>
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</table>

**AND**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN1301</td>
<td>Law, Governance and Society</td>
</tr>
</tbody>
</table>

**One Level III COMP course**

**One Level II/III COMP course**

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ACCT3015</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td>ACCT3039</td>
<td>Advanced Management &amp; Cost Accounting</td>
</tr>
<tr>
<td>MGMT3011</td>
<td>Management Information Systems II</td>
</tr>
<tr>
<td>MGMT3018</td>
<td>Industrial Relations</td>
</tr>
<tr>
<td>MGMT3022</td>
<td>Organisational Development</td>
</tr>
<tr>
<td>MGMT3033</td>
<td>Business, Government and Society</td>
</tr>
<tr>
<td>MGMT3037</td>
<td>International Business</td>
</tr>
<tr>
<td>MGMT3038</td>
<td>Cross-National Management</td>
</tr>
<tr>
<td>MGMT3045</td>
<td>Business Law II</td>
</tr>
<tr>
<td>MGMT3048</td>
<td>Financial Management II</td>
</tr>
<tr>
<td>MGMT3049</td>
<td>Financial Institutions and Markets</td>
</tr>
<tr>
<td>MGMT3052</td>
<td>Taxation and Tax Management</td>
</tr>
<tr>
<td>MGMT3053</td>
<td>International Financial Management</td>
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<td>MGMT3056</td>
<td>Project Management</td>
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<td>MGMT3058</td>
<td>New Venture Management</td>
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<td>MGMT3075</td>
<td>Public Enterprise Management</td>
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**COMPUTER SCIENCE WITH MANAGEMENT**

**LEVEL I**

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<td>Introduction to Financial Accounting</td>
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<tr>
<td>ACCT1003</td>
<td>Cost &amp; Management Accounting I</td>
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<tr>
<td>ECON1001</td>
<td>Introduction to Microeconomics</td>
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<td>ECON1002</td>
<td>Introduction to Macroeconomics</td>
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<td>MGMT1001</td>
<td>Principles of Management</td>
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**OR**

**FOUR (4) Level I Credits from any Faculty**

**AND**

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**LEVEL II**

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<td>Information Structures</td>
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<td>COMP2125</td>
<td>Computer Architecture</td>
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<td>Management Information Systems I</td>
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<td>Organizational Behaviour</td>
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<td>FOUN1301</td>
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**AND**

- **One Level III COMP course**
- **One Level II/III COMP course**

**AND**

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### INFORMATION TECHNOLOGY AND ACCOUNTING

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<td>Cost and Management Accounting I</td>
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<td>Introduction to Microeconomics</td>
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**AND**

- ELET1110 Digital Electronics

**OR**

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**OR**

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#### LEVEL II
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<td>Financial Management</td>
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**AND Six (6) Credits From Accounting Electives:**

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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

AND
ACCT3040  Accounting Theory
OR
ACCT3041  Advanced Financial Accounting

AND
One Level III COMP course
One Level II/III COMP course

AND Six (6) Credits From Accounting Electives:
ACCT3015  Accounting Information Systems
ACCT3039  Cost & Management Accounting II
ACCT3040  Advanced Accounting Theory
ACCT3041  Advanced Financial Accounting
ACCT3044  Advanced Auditing
MGMT3023  Independent Study
MGMT3024  Managerial Communications
MGMT3048  Financial Management II
MGMT3049  Financial Institutions and Markets
MGMT3052  Taxation and Tax Management
MGMT3072  Services Sector Accounting

INFORMATION TECHNOLOGY WITH ACCOUNTING

LEVEL I
COMP1105  Computer Programming I
COMP1115  Computer Programming II
MATH1101  Basic Mathematics I
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 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
ACCT2017  Management Accounting
FOUN1101  Caribbean Civilization

LEVEL III
COMP3160  Database Management Studies
COMP3170  Web-Based Applications
ACCT3043  Auditing
FOUN1301  Law, Governance and Society
AND

*One Level III COMP course*

*One Level II/III COMP course*

AND

ACCT3040 Accounting Theory

OR

ACCT3041 Advanced Financial Accounting

AND

Fourteen (14) Level II/III Credits

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**INFORMATION TECHNOLOGY AND ECONOMICS**

**LEVEL I**

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AND Eight (8) Level I Credits

**LEVEL II**

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<td>Intermed. Microeconomics II</td>
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<td>ECON2002</td>
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**LEVEL III**

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*One Level III COMP course*

*One Level II/III COMP course*

*Four Level II/III ECON courses*

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OR

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1008 Rhetoric II: Special Purposes

1001 English for Acad. Purposes

1101 Caribbean Civilisation

1301 Law, Governance and Society
LEVEL III
COMP3160  Database Management Systems
COMP3170  Web-Based Applications
MGMT3017  Human Resources Management

AND
FOUN1301  Law, Governance and Society

AND
One Level III COMP course
One Level II/III COMP course

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
MATH1101  Basic Mathematics I
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

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
One Level III COMP course
One Level II/III COMP course
AND
Fourteen (14) Level II/III credits

FOUN
FOUN 1008 Rhetoric II: Special Purposes
OR
FOUN 1001 English for Academic Purposes

AND
FOUN 1101 Caribbean Civilization
FOUN 1301 Law, Governance and Society

MATHEMATICS AND ACCOUNTING

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AND Six (6) Credits From:

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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
- MGMT3024  Managerial Communications
- MGMT3048  Financial Management II
- MGMT3049  Fin. Institutions and Markets
- MGMT3052  Taxation and Tax Mangt.
- MGMT3072  Services Sector Accounting

**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
- MATH1101  Basic Mathematics I
- MATH1102  Basic Mathematics II
- MATH1110  Applied Statistics
- MATH1120  Calculus I
- MATH1130  Calculus II

**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**
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 AND ECONOMICS

LEVEL I
MATH1101  Basic Mathematics I
MATH1102  Basic Mathematics II
MATH1120  Calculus I
MATH1130  Calculus II
MATH1110  Applied Statistics
COMP1105  Computer Programming I
ECON1001  Introd. to Microeconomics
ECON1002  Introd. to Macroeconomics

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

FOUN
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
- **MATH1101** Basic Mathematics I
- **MATH1102** Basic Mathematics II
- **MATH1120** Calculus I
- **MATH1130** Calculus II
- **MATH1110** Applied Statistics
- **COMP1105** Computer Programming I
- **ECON1001** Introd. to Microeconomics
- **ECON1002** Introd. to Macroeconomics

#### Level II
- **MATH2100** Abstract Algebra
- **MATH2110** Linear Algebra
- **MATH2120** Analysis & Methods I
- **MATH2130** Ord. Differential Equations
- **ECON2000** Interm. Microeconomics I
- **ECON2001** Interm. Microeconomics II
- **ECON2002** Interm. Macroeconomics I
- **ECON2003** Interm. 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**

#### Science and Management

#### Level I
- **Required Level 1 Courses for Science Major plus**
  - **MATH1101** Basic Mathematics I
  - **MATH1110** Applied Statistics
  - **ACCT1002** Introd. to Financial Accounting
  - **ACCT1003** 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
  - **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
- **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

**FOUN**
- **FOUN 1008** Rhetoric II: Special Purposes
- **OR**
  - **FOUN 1001** English for Acad. Purposes
- **AND**
  - **FOUN 1101** Caribbean Civilisation
  - **FOUN1301** Law, Governance and Society
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

FOUN
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

MATH1101 Basic Mathematics I
MATH1110 Applied Statistics
ACCT1002 Introd. to Financial Accounting
ACCT1003 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

FOUN
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 93 credits.

SCIENCE AND PSYCHOLOGY

LEVEL 1
Sixteen (16) credits from Level 1 Science Courses plus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC1003</td>
<td>Introduction to Psychology</td>
</tr>
<tr>
<td>PSYC1004</td>
<td>Introduction to Social Psychology</td>
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<tr>
<td>PSYC1012</td>
<td>Introduction to Developmental Psychology</td>
</tr>
<tr>
<td>PSYC1013</td>
<td>Introduction to Research Methods</td>
</tr>
<tr>
<td>PSYC1015</td>
<td>Historical Issues in Psychology</td>
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LEVELS II & III
Thirty-two (32) credits of required Level II/III Courses for Science Major plus

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PSYC2002</td>
<td>Abnormal Psychology</td>
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<tr>
<td>PSYC2003</td>
<td>Physiological Psychology</td>
</tr>
<tr>
<td>PSYC2004</td>
<td>Personality Theory I</td>
</tr>
<tr>
<td>PSYC2014</td>
<td>Statistics And Research Design II</td>
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<tr>
<td>PSYC2013</td>
<td>Developmental Psychology</td>
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<tr>
<td>PSYC3017</td>
<td>Personality Theory II</td>
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<tr>
<td>PSYC3030</td>
<td>Introduction to Clinical Psychology</td>
</tr>
<tr>
<td>PSYC3011</td>
<td>Research Paper In Psychology*</td>
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</table>

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

FOUN

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<td>Rhetoric II: Special Purposes</td>
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<tr>
<td>OR</td>
<td>English for Acad. Purposes</td>
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<td>FOUN1101</td>
<td>Caribbean Civilization</td>
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<tr>
<td>FOUN1301</td>
<td>Law, Governance and Society</td>
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SCIENCE WITH PSYCHOLOGY

LEVEL I
Sixteen (16) credits from Level I Science Courses plus

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<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>PSYC1003</td>
<td>Introduction to Psychology</td>
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<tr>
<td>PSYC1004</td>
<td>Introduction to Social Psychology</td>
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<tr>
<td>PSYC1013</td>
<td>Introduction to Research Methods</td>
</tr>
<tr>
<td>PSYC1015</td>
<td>Historical Issues in Psychology</td>
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</tbody>
</table>

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

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<td>PSYC2003</td>
<td>Physiological Psychology</td>
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<td>PSYC2004</td>
<td>Personality Theory I</td>
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<tr>
<td>PSYC2013</td>
<td>Developmental Psychology</td>
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<tr>
<td>PSYC2014</td>
<td>Statistics And Research Design II</td>
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<tr>
<td>PSYC3016</td>
<td>Research Project in Psychology (Minor)</td>
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</tbody>
</table>
AND Fifteen (15) Level II/III credits

FOUN
- FOUN1008 Rhetoric II: Special Purposes
OR
- FOUN1001 English for Acad. Purposes
- 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

FOUN
- 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
- EDPS1001 Introduction to Human Development

LEVELS II & III
Thirty-two (32) credits of required Level II/III Courses for the Science Major plus
- EDCU2101 Introduction to Curriculum, Theory, Planning & Practice
- EDRS2201 Introduction to Research Methods
- EDSO3102 Social Context of Education

And ONE of the following:-
- 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 Fifteen (15) Level II/III credits and Four (4) Level I/II/III Credits

FOUN
- 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
BIOL1052  Biodiversity II
CHEM1010  Fundamentals of Chemistry

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  Analytical Chemistry I
CHEM2100  Inorganic Chemistry I
CHEM2200  Organic Chemistry I
ERSC2001  Earth & Life
ERSC2002  Climatology

YEAR III
BIOC3251  Microbial Biochemistry
BIOC3354  Biochemistry of Human Disease
BIOL3152  Bioinformatics
ECOL3452  Behavioural Ecology
ECOL3453  Crop Ecology
MICR3253  Biology of Viruses
CHEM3100  Inorganic Chemistry II
CHEM3300  Physical Chemistry II
CHEM3415  Analytical Chemistry III
CHEM3500  Chemistry Project
CHEM3515  Environmental Chemistry
ERSC3001  Natural Hazards

SEMESTER II

PRELIMINARY
CHEM0625  Preliminary Chemistry II
BIOL0052  Biology II

YEAR I
BIOL1151  Introductory Genetics
BIOC1351  Introductory Biochemistry
CHEM1020  Introductory Chemistry
ERSC1001  Dynamic Earth
ERSC1003  Astronomy: Planets, Stars and Space

YEAR II
BIOC2352  Biochemistry II
BIOL2058  Tropical Ornamental Plants
BIOL2152  General Molecular Biology
ECOL2454  Marine Biology
ECOL2452  Community Ecology
MICR2252  Eukaryotic micro-organisms
CHEM2020  Practical Chemistry II
CHEM2300  Physical Chemistry I
CHEM2400  Analytical Chemistry I
ERSC2003  Oceanography

YEAR III
BIOC3053  Cell Signalling
BIOC3254  Biochemical Plant Pathology
BIOL3053  Developmental Physiology
ECOL3423  Coral Reef Ecology
ECOL3451  Human Ecology and Conservation
MICR3251  Food Microbiology
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<tr>
<th>Course Code</th>
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<td>MICR3252</td>
<td>Microbial Ecology</td>
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<tr>
<td>MICR3258</td>
<td>Pathogenic Micro-organisms</td>
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<tr>
<td>CHEM3135</td>
<td>Bioinorganic Chemistry</td>
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<tr>
<td>CHEM3145</td>
<td>Bonding in Inorganic Chemistry</td>
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<td>CHEM3200</td>
<td>Organic Chemistry II</td>
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<td>CHEM3210</td>
<td>Bioorganic &amp; Medicinal Chemistry</td>
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<td>CHEM3500</td>
<td>Chemistry Project</td>
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<td>ERSC3002</td>
<td>Climate Variability &amp; Predictability</td>
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**YEAR-LONG COURSES**

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<td>Chemistry Research Project</td>
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<td>BIOC3950</td>
<td>Biochemistry Research Project</td>
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<td>BIOL3950</td>
<td>Biology Research Project</td>
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<tr>
<td>ECOL3950</td>
<td>Ecology Research Project</td>
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<tr>
<td>MICR3950</td>
<td>Microbiology Research Project</td>
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**DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS AND PHYSICS**

**SEMESTER I**

**PRELIMINARY**

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>COMP0001</td>
<td>Preliminary Computer Science I</td>
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<tr>
<td>MATH0101</td>
<td>Preliminary Mathematics I</td>
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<tr>
<td>PHYS0070</td>
<td>Preliminary Physics I</td>
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**YEAR I**

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<td>COMP1105</td>
<td>Computer Programming I</td>
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<tr>
<td>COMP1115</td>
<td>Computer Programming II</td>
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<td>COMP1125</td>
<td>Introduction to UNIX</td>
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<td>ELET1110</td>
<td>Digital Electronics</td>
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<tr>
<td>ELET1120</td>
<td>Basic Electronics</td>
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<td>MATH1101</td>
<td>Basic Mathematics I</td>
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<td>MATH1110</td>
<td>Applied Statistics</td>
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<td>Calculus I</td>
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<td>PHYS1100</td>
<td>Mechanics</td>
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**YEAR II**

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<td>COMP2105</td>
<td>Discrete Mathematics</td>
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<td>COMP2115</td>
<td>Information Structures</td>
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<tr>
<td>COMP2125</td>
<td>Computer Architecture</td>
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<tr>
<td>COMP2145</td>
<td>Software Engineering I</td>
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<tr>
<td>COMP2150</td>
<td>Computer Networks I</td>
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<tr>
<td>COMP2155</td>
<td>Building Web Applications</td>
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<tr>
<td>COMP2160</td>
<td>Object-Oriented Programming</td>
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<td>ELET2100</td>
<td>Microprocessors I</td>
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<tr>
<td>ELET2130</td>
<td>Digital Communications I</td>
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<tr>
<td>MATH2100</td>
<td>Abstract Algebra</td>
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<tr>
<td>MATH2120</td>
<td>Analysis and Methods</td>
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</table>
MATH2140 Probability Theory
PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics and Special Relativity
PHYS2102 Solid State Physics
PHYS2106 Advanced Physics/Technology Lab. I
ERSC2004 Renewable Energy Sources

YEAR III
COMP3100 Operating Systems
COMP3135 Programming Languages
COMP3140 Software Engineering II
COMP3180 Algorithm Design and Analysis
COMP3210 Electronic Commerce
COMP3220 Human-Computer Interaction
COMP3260 Computer Graphics I
COMP3910 Computer Science Research Project
COMP3920 Computer Science Major Research Project
COMP3930 Computer Science Group Research Project
ELET3110 Control and Instrumentation
ELET3130 Introduction to DSP
ELET3160 Electronics Research Project
MATH3160 Number Theory
MATH3120 Matrix Analysis
MATH3220 Sampling Theory
MATH3375 Discrete & Computation Geometry
MATH3450 Statistical Theory I
PHYS3100 Quantum Mechanics
PHYS3102 Optics and Lasers
PHYS3106 Physics Research Project

YEAR I
COMP1105 Computer Programming I
COMP1115 Computer Programming II
COMP1130 Web Technology Fundamentals
ELET1100 Circuit Analysis
ELET1110 Digital Electronics
MATH1100 Basic Mathematics
MATH1102 Basic Mathematics II
MATH1110 Applied Statistics
MATH1130 Calculus II
PHYS1101 Electricity and Magnetism
PHYS1102 Optics, Thermodynamics & Modern Physics

YEAR II
COMP2105 Discrete Mathematics
COMP2115 Information Structures
COMP2125 Computer Architecture
COMP2145 Software Engineering I
COMP2150 Computer Networks I
COMP2160 Object-Oriented Programming
ELET2110 Circuit Simulation
ELET2120 Discrete Device Electronics
ELET2140 Medical Instrumentation
MATH2110 Linear Algebra
MATH2130 Ordinary Differential Equations
MATH2150 Mathematical Statistics
PHYS2103 Classical Mechanics
PHYS2105 Computational Physics I
PHYS2107 Advanced Physics / Technology Laboratory II

SEMESTER II
PRELIMINARY
COMP0002 Preliminary Computer Science II
MATH0102 Preliminary Mathematics II
PHYS0071 Preliminary Physics II
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<tr>
<th>YEAR III</th>
<th>METEOROLOGY</th>
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<tr>
<td>COMP3115 Information Systems</td>
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<td>COMP3125 Artificial Intelligence</td>
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<tr>
<td>COMP3155 Computer Networks II</td>
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<tr>
<td>COMP3160 Database Management Systems</td>
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<td>COMP3165 Software Quality Assurance</td>
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<td>COMP3170 Web-based Applications</td>
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<tr>
<td>COMP3240 Introduction to Distributed Systems</td>
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<tr>
<td>COMP3230 Network &amp; Computer Security</td>
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<td>COMP3910 Computer Science Research Project</td>
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<td>COMP3930 Computer Science Group Research Project</td>
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<td>ELET3041 Microcontrollers &amp; Applications</td>
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<tr>
<td>ELET3120 Communication Circuits</td>
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<td>ELET3151 Digital Communications II</td>
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<td>ELET3210 Sensors &amp; Actuator Technology</td>
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<tr>
<td>MATH3100 Multivariate Analysis</td>
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<td>PHYS3105 Statistical Mechanics</td>
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<tr>
<td>PHYS3106 Physics Research Project</td>
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<tr>
<td>PHYS3107 Fundamental of Photovoltaic Physics</td>
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<td></td>
<td>SEMESTER I</td>
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<tr>
<td>METE1000 Introduction to Physical Meteorology &amp; Weather Observations</td>
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<tr>
<td>METE1200 Oceans &amp; Climate</td>
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<tr>
<td>METE2000 Physical Meteorology I</td>
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<td>METE2100 Dynamic Meteorology I</td>
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<tr>
<td>METE2300 Hydrometeorology</td>
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<tr>
<td>METE3100 Dynamic Meteorology II</td>
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<td>METE3200 Synoptic Meteorology II</td>
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<td></td>
<td>SEMESTER II</td>
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<tr>
<td>METE1100 Introduction to Dynamic Meteorology and Weather Systems</td>
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<td>METE1300 Climate Change, Education and Awareness</td>
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<tr>
<td>METE2001 Physical Meteorology II</td>
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<tr>
<td>METE2200 Synoptic Meteorology I</td>
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<tr>
<td>METE3300 Tropical Meteorology</td>
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<tr>
<td>METE3400 Weather Radars and Satellites</td>
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<tr>
<td>METE3500 Bioclimatology</td>
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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

AND Twelve (12) Credits from:
BIOC3053 Cell Signalling
BIOC3254 Biochemical Plant Pathology
BIOC3352 Biochemistry III
BIOC3354 Biochemistry of Human Disease
BIOC3950 Biochemistry Research Project
BIOL3152 Bioinformatics
CHEM3135 Bioinorganic Chemistry

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
BIOL3152 Bioinformatics
CHEM3135 Bioinorganic Chemistry

* 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
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

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

A Student Majoring in Biochemistry cannot also Major in Microbiology.
### 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
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<tr>
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<td>MICR2251</td>
<td>General Microbiology</td>
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<td>BIOC2351</td>
<td>Biochemistry I</td>
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<td>BIOC2352</td>
<td>Biochemistry II</td>
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<td>BIOC2351</td>
<td>Biochemistry I</td>
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<tr>
<td>BIOL2152</td>
<td>General Molecular Biology</td>
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<td>MICR2251</td>
<td>General Microbiology</td>
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<tr>
<td>MICR2252</td>
<td>Eukaryotic Micro-organisms</td>
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**AND Eight (8) Credits from:**
- BIOC3950  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
- BIOL2050  Sustainability and Land Use
- BIOL2055  Bio Processing and Tropical Energy
- BIOL2058  Tropical Ornamental Plants
- 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
- BIOL3152  Bioinformatics
- BIOL3900  Interdisciplinary Project
- ECOL3423  Coral Reef Ecology
- 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
- BIOL2058  Tropical Ornamental Plants
- BIOL2151  Genetics I
- BIOL2152  General Molecular Biology
- BIOL2950  Biology Elective
- ECOL2055  Horticulture
- ECOL2451  Population Ecology
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:
ECOL3423 Coral Reef Ecology
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

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

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

PRELIMINARY BIOLOGICAL COURSES

BIOL0051 - BIOLOGY I (6 Credits)
Pre-requisite:  None


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

Method of Final Examination:  Theory Examination (3 hours)  60%
Examination:  Two in-course Tests  20%
Laboratory reports  20%

BIOL0052 - BIOLOGY II (6 Credits)
Pre-requisite:  None

Syllabus  The organism and the environment: Acquisition of energy - autotrophic, holozoic, saprophytic and parasitic nutrition. Cellular respiration - glycolysis, the Krebs cycle, anaerobic respiration. Ecosystems - structure, function, population interactions. Environmental change & evolution - variation in populations, evolution and natural selection. Humanecology - 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.
LEVEL I BIOLOGICAL COURSES

BIOC1351 - INTRODUCTORY BIOCHEMISTRY (4 credits)

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


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

Method of Examination: Final Theory Examination (3 hours) 60%
Examination: Two in-course tests 20%
Laboratory reports 20%


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.

BIOL1051 - BIODIVERSITY I (4 credits)

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

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

Teaching: Two lectures, one tutorial and three hours of practical per week.
**BIOL1052 - BIODIVERSITY II (4 credits)**

Pre-requisite: (CAPE Biology Unit 1 and CAPE Biology Unit 2) or (BIOL0051 Biology 1 and BIOL0052 Biology 2) or (CAPE Environmental Science Units 1 & 2 & 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: CAPE Biology Unit I or BIOL0051 or CAPE Environmental Science & CSEC Biology.


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


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


**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%

**BIOC2950 BIOCHEMISTRY ELECTIVE (4 credits)**

Pre-requisites: None

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

**BIOL 2050 SUSTAINABILITY AND LAND USE (4 credits)**

Pre-requisite: Permission of Department

**Syllabus:**
Land resources and environmental constraints to sustainable forage production in the tropics; Presentation of the main tropical forage grass and legume species; Sustainable forage production systems in the tropics; Conservation of forages in the tropics; Plant-herbivore interactions; Measurement of forage biomass and determination of botanical composition.
of pastures; Assessment of grassland and pasture condition; Evaluation of forage species and cultivars; Measurement of chemical composition and nutritive value of tropical forages; Measurement of animal performance

**Teaching:**
The course will be taught over four weeks, with three 3-hour lectures and/or discussions and three laboratory/field trips per week. The theory and practical components of the course are integrated. Practical work will be conducted in the lab and/or in the field.

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<thead>
<tr>
<th>Method of Examination</th>
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<tbody>
<tr>
<td>Weekly quizzes</td>
<td>20%</td>
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<tr>
<td>Oral presentation</td>
<td>30%</td>
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<tr>
<td>Final Examination (2 hours)</td>
<td>50%</td>
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**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:**
The course will be taught over four weeks, with three 3-hour lectures and/or discussions and three laboratory/field trips per week. The theory and practical components of the course are integrated. Practical work will be conducted in the lab and/or in the field.

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

**BIOL2055 - BIOPROCESSING AND TROPICAL ENERGY**
(4 credits)

**Pre-requisite:**
Permission of Department

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

**Teaching:**
The course will be taught over four weeks, with three 3-hour lectures and/or discussions and three laboratory/field trips per week. The theory and practical components of the course are integrated. Practical work will be conducted in the lab and/or in the field.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Pre-requisites</th>
<th>Syllabus</th>
<th>Teaching</th>
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<tbody>
<tr>
<td>BIOL2057</td>
<td>BIOLOGY FIELD COURSE (2 credits)</td>
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<td>BIOL1051 Biodiversity I &amp; BIOL1052 Biodiversity II</td>
<td>A practical introduction to Caribbean flora and fauna, including the use of ecological methods.</td>
<td>Two lectures, one tutorial and three hours of practical per week.</td>
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<td>Method of An assessment of the student’s field note</td>
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<td>Examination: Oral presentation</td>
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<td>Method of Final Examination (2 hours)</td>
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<td>BIOL2058</td>
<td>TROPICAL ORNAMENTAL PLANTS (4 credits)</td>
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<td>BIOL 1051 Biodiversity I and BIOL 1052 Biodiversity II</td>
<td>This course is a survey of tropical ornamental plants and their families. Students will learn</td>
<td>Two lectures, three hour practical and one tutorial per week.</td>
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<td>the identification, horticultural classification, cultural requirements and best horticultural</td>
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<td>use of the cultivated garden flora. Cultivated, domesticated and wild plants will be compared.</td>
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<td>Morphological features necessary for plant identification will be taught.</td>
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<td>BIOL2151</td>
<td>GENETICS I (4 credits)</td>
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<td>BIOC1351 Introductory Biochemistry &amp; BIOL1151 Introductory Genetics</td>
<td>Gene structure and expression: The modern concept of the gene in prokaryotes and eukaryotes.</td>
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<td>Transcription and processing of RNA.</td>
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<td>Genome organisation: In prokaryotes and eukaryotes. Extranuclear genomes.</td>
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<td>Transmission genetics: Mendelian principles. Linkage and recombination. Lysis, lysogeny and</td>
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<td>crossing in bacteriophages. Conjugation, transduction and transformation in bacteria. Sexual and</td>
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<td>parasexual analyses in fungi. Genetic analysis in higher eukaryotes. Maternal effects and</td>
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<td>extranuclear genetics.</td>
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<td>Genetic recombination: Breakage and reunion. Models for generalised recombination and gene</td>
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<td>conversion. Site-specific recombination. Transposons.</td>
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</table>
BIOL2152 - GENERAL MOLECULAR BIOLOGY
(4 credits)

Pre-requisite: BIOL1151 Introductory Genetics


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 & 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 & BIOL1052 Biodiversity II

Syllabus: Evolution; Population demography and regulation; Life history strategies; Dispersal and migration; Habitat and habitat selection; Quantitative ecological methods.

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: Species interactions within communities; Community structure and function; Community patterns and processes; Quantitative ecological methods.

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%

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

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

Method of Examination: Final Theory Examination (3 hours) 70%
Mid-term Test 10%
Field Notebook 40%

ECOL2454 - MARINE BIOLOGY (4 credits)


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

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

ECOL2950 - ECOLOGY ELECTIVE (4 credits)

Pre-requisites: None

Syllabus: An advanced course in the Ecological Sciences taken as an exchange student at an approved institution and pre-approved by the Dean.
MICR2251 - GENERAL MICROBIOLOGY (4 credits)

Pre-requisites: BIOL1051 Biodiversity I & BIOC1351 Introductory Biochemistry

Syllabus: This course is an introduction to microorganisms: Bacteria, Archaea, Algae, Fungi, Protozoa and Viruses. Topics presented include: the structure and function of microorganisms, microbial reproduction, physiology, taxonomy, behaviour and ecology. Techniques for the isolation, cultivation, enumeration and control of microorganisms are introduced. Some aspects of applied microbiology are covered.

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

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

MICR2252 – EUKARYOTIC MICROORGANISMS (4 credits)

Pre-requisite: MICR2251 General Microbiology


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

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

MICR2250 MICROBIOLOGY ELECTIVE (4 credits)

Pre-requisites: None

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

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.


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.


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

Method of Examination: Final Theory Examination (3 hours) 60%
Practical reports 20%
In-course test(s)/Assignment(s) 10%

BIOC3254 - BIOCHEMICAL PLANT PATHOLOGY
(4 Credits)

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


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)

Pre-requisite: BIOC2351 Biochemistry I

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

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

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

BIOL3053 - DEVELOPMENTAL PHYSIOLOGY (4 credits)

Prerequisite: BIOL 2053 Physiology of Plants & Animals

Syllabus: Plants: Internal and external regulation of flowering plant growth and development including phytohormones.

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, pair-wise and multiple alignments including global and local alignments. Dynamic programming algorithms for sequence alignment, prediction of secondary structure, prediction of gene
structure. Methods of phylogenetic analysis.
The distribution of data through public
databases, data formats, and end-user
applications for manipulation and analysis
including use of PAM250 scoring matrix,
BLOSUM 62, scoring matrix, FASTA, BLAST,
PSI-BLAST, PHI-BLAST, PSSM, Smith-
Waterman dynamic Programming.

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

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

BIOL3900 - INTERDISCIPLINARY PROJECT (8 credits)

Pre-requisite: Permission of Department

Syllabus: Topics that address real-world problems
related to food, nutrition or energy at
the local, regional or international level.
Suggestions for specific topics may be
considered from students and others, subject
to the Department being able to provide
appropriate supervision in the chosen field of
research.

Teaching: The course will be taught over 14 weeks:
2 hours/day for 13 weeks and 5 days/week
for one week. The final report and oral
presentation is due in the final week (week
14) of the course.

Method of Examination: Supervisor’s Assessment 15%

BIOL3950 - BIOLOGY RESEARCH PROJECT (8 credits)

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

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

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

Method of Examination: Seminar 15%
Project Report 70%
ECOL3423 - CORAL REEF ECOLOGY (4 credits)

Pre-requisites: ECOL2452 Community Ecology & ECOL2454 Marine Biology

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

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

Method of Examination: Final Theory Examination (3 hours) 60%
Project Report/Essay 40%

ECOL3451- HUMAN ECOLOGY AND CONSERVATION (4 credits)


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.

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

Method of Examination: Final Theory Examination (3 hours) 70%

Examination: Project Report/Essay 30%

**ECOL3453 - CROP ECOLOGY (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%

Examination: Project Report 20%

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


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

Method of Examination: Final Theory Examination (3 hours) 70%

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

Syllabus: A practical project in Ecology carried out under the supervision of a staff member(s). Students will be allocated one of the available research topics and are expected to spend not less than 144 hours in field/laboratory studies. The project will be presented both orally in the form of a short seminar and in a written report. Three typed, and bound copies of the written report must be presented.
### FACULTY OF SCIENCE AND TECHNOLOGY
### UNDERGRADUATE PROGRAMMES & COURSES HANDBOOK 2012-2013

<table>
<thead>
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<th>Supervisor’s assessment</th>
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<td>Seminar</td>
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<td>Project Report</td>
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#### MICR3059 - IMMUNOBIOLOGY (4 credits)

**Pre-requisites:**
- BIOC1351 Introductory Biochemistry &
- BIOL2151 Genetics I

**Syllabus:**

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

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<td>In-course Test(s)/Assignments</td>
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#### 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.

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<td>In-course test(s)/Assignment(s)</td>
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#### 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:**

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

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<th>Method of Examination:</th>
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<td>In-course test(s)/Assignment(s)</td>
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#### MICR3253 - MICROBIOLOGY OF VIRUSES (4 credits)

**Pre-requisites:**
- MICR2251 General Microbiology &
- BIOL1151 Introductory Genetics

**Syllabus:**
The nature of viruses. Structure of viruses. Viroids. Prions. Medical virology – viral diseases of humans, mode of transmission, symptoms, pathogenesis, control measures, vaccination, antiviral drugs, interferon, Plant viruses – disease symptoms, control measures. Molecular virology: entry and exit of viruses from host cells; RNA virus replication; DNA virus replication, viral oncogenesis. Medical virology; viral diseases of humans; modes of transmission, symptoms: pathogenesis, control measures. Laboratory techniques used in the study,
MICR3258 - PATHOGENIC MICRO-ORGANISMS

(4 credits)

Pre-requisites: MICR2251 General Microbiology & BIOL1151 Introductory Genetics


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) 50%
- Practical Report(s) 30%
- 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: Not to be taken with BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, ECOL3950 Ecology or CHEM3505 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%
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)
or
CHEM3505  Chemistry Research Project (8 credits) (with special permission)

And Eight (8) credits from:
CHEM3100  Inorganic Chemistry II
CHEM3200  Organic Chemistry II
CHEM3300  Physical Chemistry II

MINOR IN CHEMISTRY (Sixteen (16) Credits):

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

DOUBLE MAJOR IN CHEMISTRY

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)

AND Thirty-two (32) credits from:
CHEM2950  Chemistry Elective
CHEM3100  Inorganic Chemistry II
CHEM3135  Bioinorganic Chemistry
CHEM3145  Bonding in Inorganic Chemistry
CHEM3200  Organic Chemistry II
CHEM3210  Bioorganic & Medicinal Chemistry
CHEM3300  Physical Chemistry II
CHEM3415  Analytical Chemistry III
CHEM3515  Environmental Chemistry

AND Four (4) Credits From:
BIOC2351  Biochemistry I
ERSC2004  Renewable Energy Sources
All incoming students registered to take courses in the Department of Biological and Chemical Sciences must attend a safety seminar usually held during registration week. Students taking laboratory courses in this Department will only be allowed to perform experiments if dressed in an appropriate lab coat, lab goggles and enclosed shoes. Some exceptions may be made in the wearing of safety goggles for lab procedures where there is no risk of eye injury (eg. microscope use).

PRELIMINARY CHEMISTRY COURSES

CHEM0615 - PRELIMINARY CHEMISTRY I (6 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 Physical Chemistry.
Teaching: Three lectures, one tutorial and three hours of practical work per week.
Method of Final examination (three hours) 60%
Examination: In-course test(s) / assignment(s) 20%
Practicals 20%

CHEM0625 - PRELIMINARY CHEMISTRY II (6 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 Organic Chemistry and Inorganic Chemistry.
Organic Chemistry: Structures, formulae and nomenclature of organic compounds. Introduction to reaction mechanisms. Functional groups and their reactions: hydrocarbons, halides, alcohols, amines, carbonyl compounds, carboxylic acids and their derivatives, including aliphatic and aromatic systems. Polymers.
Inorganic Chemistry: Periodicity. Properties and reaction of main group elements and their compounds: hydrogen, Group 1 and 2, Al, C and Si, N and P, O and S and the halogens. First row transition metals and coordination
complexes. Rusting. Industrial processes and environmental considerations.

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

Method of Examination:
- 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 I & CHEM0625 Preliminary Chemistry II, or CAPE Chemistry Units 1 & 2, or equivalent.

Syllabus: This course seeks to provide the student with knowledge of the fundamental principles of chemistry with an emphasis on atomic and molecular structures and properties. Introduction to the chemical kinetics, electrochemistry, fundamentals of spectroscopy and organic chemistry will also be explored. The student will also be introduced to fundamental laboratory techniques required in the Organic, Inorganic and Analytical sub-disciplines.

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

Method of Examination:
- Final examination (three hours) 60%
- 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: The second half of this course covers three disciplines of chemistry - Inorganic, Organic and Physical and presents introductory information on structures, nomenclature, properties, and reactions of monofunctional and poly functional carbon bases compounds; the chemistry of the main group and transition elements; thermodynamics, energetics and the packing arrangements of ionic structures. Additionally, students will become acquainted with the industrial and commercial applicability of certain elements and their compounds.

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

Method of Examination:
- Final examination (three hours) 60%
- 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: Three lectures and one tutorial per week.
Method of Final examination (3 hours) 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 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.


 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.


Teaching: Three lectures and one tutorial per week.

Method of Final examination (3 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%

CHEM2950 - CHEMISTRY ELECTIVE (4 Credits)

Pre-requisites: None

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

LEVEL III CHEMISTRY COURSES

CHEM3100 - INORGANIC CHEMISTRY II (4 credits)

Prerequisites: CHEM2100 Inorganic Chemistry I

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

Teaching: Three lectures and one tutorial per week.

Method of Examination: Final examination (3 hours) 60%
Examination: In-course tests and assignments 40%

CHEM3145 - BONDING IN INORGANIC CHEMISTRY (4 credits)

Prerequisites: CHEM3100 Inorganic Chemistry II


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

Method of Examination: Final Theory Examination (3 hours) 60%
Examination: In-course test(s)/Assignment(s) 40%
CHEM3200 - ORGANIC CHEMISTRY II (4 credits)

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

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

Teaching: Three lectures and one tutorial per week.

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

CHEM3300 - PHYSICAL CHEMISTRY II (4 credits)

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

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

Teaching: Three lectures and one tutorial per week.

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

CHEM3210 - BIOORGANIC & MEDICINAL CHEMISTRY (4 credits)

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

Restrictions: Not available to persons who have passed CHEM3225 Natural Products Chemistry or CHEM3235 Bio-organic Chemistry
CHEM3415 - ANALYTICAL CHEMISTRY III (4 Credits)

Prerequisites: CHEM2400 Analytical Chemistry I

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

Teaching: Two lectures, one tutorial and 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)


Restriction: Not to be taken with CHEM3505 Chemistry Research Project

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

Method of Examination: Practical Assessment 30%
Seminar 15%
Project Report 55%
CHEM3505 - CHEMISTRY RESEARCH PROJECT  
(8 credits)


Restrictions: Not to be taken with CHEM3500 Chemistry Project, BIOC3950 Biochemistry Research Project, BIOL3950 Biology Research Project, ECOL3950 Ecology Research Project or MICR3950 Microbiology Research Project.

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

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

CHEM3515 - ENVIRONMENTAL CHEMISTRY  
(4 credits)

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


The biosphere and xenobiotics: Global biogeochemical cycles. Persistent organic pollutants, toxic metals, pesticides. Toxicological Chemistry. Emerging Issues – e.g. personal care products, nanoparticles. Other environmental concerns e.g. energy
issues, waste, recycling, Caribbean issues. Sampling and analysis – an overview of the fundamentals of environmental sampling design, sampling techniques and quality assurance/quality control (QA/QC) essential to acquire quality environmental data.

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

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

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 in conjunction with other Faculties)

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

MAJOR IN COMPUTER SCIENCE:

LEVEL I
COMP1105 Computer Programming I
COMP1115 Computer Programming II
MATH1101 Basic Mathematics I

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
- COMP3165 Software Quality Assurance
- COMP3170 Web-Based Applications
- COMP3190 Special Topics in Computer Science
- COMP3210 Electronic Commerce
- COMP3220 Human-Computer Interaction
- COMP3230 Network and Computer Security
- COMP3240 Introduction to Distributed Computing
- COMP3260 Computer Graphics I
- COMP3910 Computer Science Research Project
- COMP3920 Computer Science Major Research Project
- COMP3930 Computer Science Group Research Project

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

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
- COMP3165 Software Quality Assurance
- COMP3170 Web-Based Applications
- COMP3190 Special Topics in Computer Science
- COMP3210 Electronic Commerce
- COMP3220 Human-Computer Interaction
- COMP3230 Network and Computer Security
- COMP3240 Introduction to Distributed Computing
- COMP3260 Computer Graphics I
- COMP3910 Research Project
- COMP3920 Computer Science Major Research Project
- COMP3930 Computer Science Group Research Project

N.B.: Students are not allowed to take both
MAJOR IN INFORMATION TECHNOLOGY:

LEVEL I
COMP1105 Computer Programming I
COMP1115 Computer Programming II
MATH1101 Basic Mathematics I

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
COMP2145 Software Engineering I
COMP2160 Object-Oriented Programming

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 Eight (8) Credits (including at least one Level III course) from:
COMP2125 Computer Architecture
COMP2150 Computer Networks I
COMP2950 Computer Science Elective
COMP3100 Operating Systems

AND At Most Eight (8) Credits From:
COMP2125 Computer Architecture
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
COMP3165  Software Quality Assurance
COMP3180  Algorithm Design and Analysis
COMP3190  Special Topics in Computer Science
COMP3210  Electronic Commerce
COMP3220  Human-Computer Interaction
COMP3230  Network and Computer Security
COMP3240  Introduction to Distributed Computing
COMP3260  Computer Graphics I
COMP3910  Research Project
COMP3920  Computer Science Major Research Project
COMP3930  Computer Science Group Research Project

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

DOUBLE MAJOR IN COMPUTER SCIENCE

LEVEL I
COMP1105  Computer Programming I
COMP1115  Computer Programming II
MATH1101  Basic Mathematics I

AND
ELET1110  Digital Electronics (Not required but strongly recommended)

OR
Four (4) Level I credits from this Faculty
PRELIMINARY COMPUTER COURSES

COMP0001 - PRELIMINARY COMPUTER SCIENCE
(6 credits)

Pre-requisite:  None

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

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

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

COMP0002 - PRELIMINARY COMPUTER SCIENCE II
(6 credits)

Pre-requisite:  None

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

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

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

LEVEL I COMPUTER SCIENCE COURSES

COMP1105 - COMPUTER PROGRAMMING I (4 Credits)

Pre-requisite:  None

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); Data Structures (Linear arrays).
Modules (Functions, Values and reference parameters, scope rules)

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

Method of Examination: Final Theory Examination (3 hours) 60%

Examination: In-course Tests/Assignments 40%

COMP1115 - COMPUTER PROGRAMMING II (4 Credits)

Pre-requisite: COMP1105 Computer Programming I

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 lectures and two hours of lab per week.

Method of Examination: Final Theory Exam 60%

Examination: In course Test/Assignments 40%

COMP1125 - INTRODUCTION TO UNIX (4 Credits)

Pre-requisite: None

Syllabus:
The role of UNIX, its current uses and applications and the UNIX family of operating systems. Interacting with UNIX – graphical and command line interfaces. File creation and their management. Navigating Directories - UNIX directory hierarchy, maintaining directories and locating files. Working with the C shell – wildcards, command history facility. Developing and executing shell scripts. Accessing servers remotely and transferring data. Data manipulation – selecting, searching, sorting, counting and trimming. Customizing and monitoring of the system.

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

Method of Examination: Final Theory Examination (2 hours) 60%

Examination: In-course Tests/Assignments 40%

COMP1130 - WEB TECHNOLOGY FUNDAMENTALS (4 Credits)

Pre-requisite: None

Syllabus:

Teaching: Three (3) lectures, one tutorial and two (2) hours of labs per week.
LEVEL II COMPUTER SCIENCE COURSES

COMP2105 - DISCRETE MATHEMATICS (4 Credits)

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

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

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

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

COMP2115 INFORMATION STRUCTURES (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

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

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

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

COMP2125 - COMPUTER ARCHITECTURE (4 Credits)

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

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

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

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

COMP2145 - SOFTWARE ENGINEERING I (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

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

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

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

COMP2150 - COMPUTER NETWORKS I (4 Credits)

Pre-requisite: COMP1115 Computer Programming II


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

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

COMP2160 - OBJECT-ORIENTED PROGRAMMING (4 Credits)

Pre-requisite: COMP1115 Computer Programming II

Syllabus: Fundamental Concepts (Encapsulation, information hiding, classes and objects, inheritance, polymorphism, dynamic binding), Fundamentals of Class Design (Inheritance vs composition relationships, constructors and destructors, copy constructors, selectors, modifiers) Design by Contract (Exception handling, assertions), Advanced Concepts (Abstract and concrete classes, frame-works and design patterns), Applications using Class Libraries.

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

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

COMP2155 - BUILDING WEB APPLICATIONS (4 Credits)

Pre-requisite: COMP1115 - Computer Programming II

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

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

Method of Examination: 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-requisites: COMP2115 Information Structures & COMP2125 Computer Architecture
Syllabus: Evolution of Operating Systems
Characteristics of Modern Operating systems
Process Management (Processes and threads, process synchronization, Scheduling, deadlock), Memory Management (Memory partitioning, paging, virtual memory segmentation), File Management (File organization, file system implementation, example file systems), Device Management (I/O devices, device drivers, I/O design issues, disk-scheduling), Security (Security threats, protection mechanisms, trusted systems).
Teaching: Three (3) lectures and one tutorial per week.
Method of Examination: Final Theory Examination (2 hours) 60%
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
Teaching: Three (3) lectures and two hours of Lab per week.
Method of Examination: Final Theory Examination (2 hours) 60%
In-course Tests/Assignments 40%

COMP3125 - ARTIFICIAL INTELLIGENCE (4 Credits)
Pre-requisites: COMP2105 Discrete Mathematics & COMP2115 Information Structures
Syllabus: Problems and Search (Problem spaces, heuristic search), Knowledge Representation (Predicate logic, rule-based systems, Reasoning, slot-and-filler), Advanced Topics (Game playing, natural language, planning, learning), Applications (Expert systems, software agents, programming-by-example) Software Development Approaches (e.g. prototyping, agile development), Testing Strategies (black box, white box, usability).
COMP3135 - PROGRAMMING LANGUAGES (4 Credits)

Pre-requisite: COMP2115 Information Structures

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

Teaching: Three (3) lectures and one tutorial per week.
Method of Final Theory Examination (2 hours) 60%
Examination: In-course Tests/Assignments 40%

COMP3140 - SOFTWARE ENGINEERING II (4 Credits)

Pre-requisite: COMP2145 Software Engineering I


Teaching: Three (3) lectures and one tutorial per week.
Method of Final Theory Examination (2 hours) 60%
Examination: In-course Tests/Assignments 40%

COMP3155 - COMPUTER NETWORKS II (4 Credits)

Pre-requisite: COMP2150 Computer Networks I


Teaching: Three (3) lectures and one tutorial per week.
Method of Final Theory Examination (2 hours) 60%
Examination: In-course Tests/Assignments 40%

COMP3160 - DATABASE MANAGEMENT SYSTEMS (4 Credits)

Pre-requisite: COMP2115 Information Structures

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

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

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

**COMP3165 - SOFTWARE QUALITY ASSURANCE**
(4 Credits)

**Pre-requisite:**
COMP2145 Software Engineering I

**Syllabus:**

**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

**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 (GGI, server side scripting, web services), Database Connectivity (Server to database connectivity issues), Security (Policy development, physical security, securing web applications), Design Issues (User interface factors, hardware issues).

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

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

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

**Pre-requisites:**
COMP2105 Discrete Mathematics & COMP2115 Information Structures

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

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

Method of Examination: 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.

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

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

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

COMP3220 - HUMAN-COMPUTER INTERACTION (4 Credits)

Pre-requisites: COMP2115 Information Structures & COMP2145 Software Engineering I


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

COMP3210 - ELECTRONIC COMMERCE (4 Credits)

Pre-requisite: COMP2160 Object-Oriented Programming

Syllabus: Internet concepts and technology, Economic foundation of electronic commerce, Storefronts, shopping carts and Landing pages, Order processing, Pricing and payment processing, Security issues, Shipping and handling, Products, Internet marketing and legal issues.

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

Method of Examination: Final Theory Examination (2 hours) 60% In-course Tests/Assignments 40%
COMP3230 - NETWORK AND COMPUTER SECURITY
(4 Credits)

Pre-requisites: COMP2105 Discrete Mathematics &
COMP2150 Computer Networks I

Syllabus: Introduction to cryptography. Symmetric-key
encryption and authentication. Public-key
encryption and authentication. Cryptographic
hash functions. Message authentication
codes and digital signatures. Key distribution
and certification. Authorization and access
Web security. Payment systems. Email
security. Digital rights management. Social
issues such as usability, privacy and risk
assessment.

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

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

COMP3240 - INTRODUCTION TO DISTRIBUTED
COMPUTING (4 Credits)

Pre-requisites: COMP2115 Information Structures &
COMP2125 Computer Architecture

Syllabus: Introduction to Distributed Systems.
Communication Mechanism. Distributed
Fault Tolerance. Security. Distributed Files
Systems. Distributed File System design
and implementation. NFS, Coda. Cluster
Computing.

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

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

COMP3260 - COMPUTER GRAPHICS I (4 Credits)

Pre-requisites: COMP2115 - Information Structures &
COMP2105 - Discrete Mathematics

Syllabus: Output primitives. 2-dimensional
transformations and clipping. 3-dimensional
display techniques. Representations and
transformations. Projection algorithms. 2D
Raster Graphics Algorithms. Illumination and
color models. Hidden-surface elimination.
Bézier and B-Spline curves.

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

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

COMP3910 - COMPUTER SCIENCE RESEARCH
PROJECT (4 Credits)

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

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

Teaching: Students are required to meet with their supervisors at least once a week.

Method of
Examination: Proposal Presentation 10%
Proposal Report 10%
Final Presentation 15%
Demonstration 15%
Final Report 50%

COMP3930 - COMPUTER SCIENCE GROUP RESEARCH PROJECT (4 Credits)

COMP3920 - COMPUTER SCIENCE MAJOR RESEARCH PROJECT (8 Credits)

Pre-requisite: Restricted to finalists majoring in Computer Science or Information Technology and by permission of the Computer Science discipline

Syllabus: This course provides students with the opportunity to complete a major project utilizing classroom knowledge to solve a realworld or research-based problem. Students are required to realize a significant software application from inception through to implementation or proof of concept. The project runs throughout the academic year (semesters I and II) giving students the needed time to thoroughly research and solve a problem that can produce usable outcomes with either commercial or research applications.

Syllabus: This course provides groups comprised of 2-4 students with the opportunity to implement a substantive software system under the supervision of a staff member. The software may address a problem in any domain, but must meet the minimum standards of design.
and functionality, appropriate for a Computer Science or Information Technology major.

**Teaching:**
Students are required to meet with their supervisors at least once a week.

<table>
<thead>
<tr>
<th>Method of Examination</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-term presentation</td>
<td>10%</td>
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<tr>
<td>Final project presentation</td>
<td>15%</td>
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<tr>
<td>Product Demonstration</td>
<td>15%</td>
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<tr>
<td>Web Page</td>
<td>10%</td>
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<tr>
<td>Report</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Project Restrictions:** Students can only receive credits for one project course.

**EARTH SCIENCES**
Earth Sciences is an interdisciplinary programme of the Faculty comprising individual courses as well as a Minor in Earth Sciences. The Minor is restricted to students in the Faculty of Science and Technology.

**MINOR IN EARTH SCIENCES**

- ERSC1001 Dynamic Earth
- METE1200 (ERSC1002) Oceans & Climate

AND Sixteen (16) credits from:

- ERSC2001 Earth & Life
- ERSC2002 Climatology
- ERSC2003 Oceanography
- ERSC2004 Renewable Energy Sources
- ERSC3001 Natural Hazards
- ERSC3002 Climate Variability & Predictability
- ERSC3900 Earth Science Research Project
- ERSC3910 Sustainable Energy Research Internship

**ERSC1001 - DYNAMIC EARTH (4 credits)**

**Pre-requisites:** None

**Syllabus:**
An introduction to geology with specific reference to the Caribbean. Earthquakes, magnetism and the structure of the Earth. The geological processes that shape the Earth’s surface – volcanism, weathering, erosion, transport and deposition; large-scale dynamic processes – plate tectonics. The Earth through geological time. Introduction to rocks, minerals and geological maps.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Pre-requisites</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERSC1003</td>
<td>ASTRONOMY: PLANETS, STARS AND SPACE (4 credits)</td>
<td>None</td>
<td>Foundations - Constellations and the celestial sphere, Earth’s orbital motion, Lunar motion</td>
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<td>and eclipses, Light and matter, Telescopes; The solar system - The formation of the solar</td>
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<td>system, The Earth-Moon system, Terrestrial planets, The Jovian planets, Moons, rings</td>
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<td>and dwarf planets; Stars - Our closest star: The Sun, Stellar measurements: Giants, dwarfs</td>
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<td>and the main sequence, Stellar evolution: the lives and deaths of stars, Neutron stars and</td>
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<td>black holes; Galaxies and the Universe, - The Milky Way Galaxy, Normal and active galaxies,</td>
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<td>Galaxies and Dark Matter, Cosmology: the Big Bang and the Fate of the Universe, Life in the</td>
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<td></td>
<td></td>
<td></td>
<td>Universe</td>
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<tr>
<td>ERSC2001</td>
<td>EARTH &amp; LIFE (4 credits)</td>
<td>ERSC1001 Dynamic Earth</td>
<td>What is life? Atoms &amp; molecules. The formation of the solar system. Hypotheses on the origins</td>
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<td>of life. Factors that make the earth hospitable to life. Temperature regulation of the earth.</td>
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<td>The carbon cycle. The impact of volcanism on the Earth system. The role of plate tectonics as</td>
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<td>an influence on climate. Climate modelling of atmospheric oxygen during the Phanerozoic.</td>
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<td>Development of the Earth’s atmosphere during the Cryptozoic. Regulation of atmospheric oxygen</td>
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<td>during the Phanerozoic. The importance of ozone in shielding life from harmful radiation.</td>
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<tr>
<td></td>
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<td></td>
<td>Climate modelling of atmospheric carbon dioxide during the Phanerozoic. Life in the</td>
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<tr>
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<td></td>
<td>Phanerozoic. The links between the evolution of land plants and global atmospheric conditions.</td>
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<td></td>
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<td></td>
<td>Case studies for environmental conditions during two scenarios.</td>
</tr>
<tr>
<td>ERSC2002</td>
<td>CLIMATOLOGY (4 credits)</td>
<td>ERSC1002 Oceans &amp; Climate or METE1200 Oceans &amp; Climate</td>
<td></td>
</tr>
</tbody>
</table>

**ERSC1003 ASTRONOMY: PLANETS, STARS AND SPACE (4 credits)**

- **Teaching:** Two lectures, one tutorial and three hours of labs per week.
- **Method of Examination:**
  - Final Examination (2 hours) 60%
  - Coursework & Practical 40%
- **Pre-requisite:** None
- **Syllabus:**
  - Foundations - Constellations and the celestial sphere, Earth’s orbital motion, Lunar motion and eclipses, Light and matter, Telescopes;
  - The solar system - The formation of the solar system, The Earth-Moon system, Terrestrial planets, The Jovian planets, Moons, rings and dwarf planets; Stars - Our closest star: The Sun, Stellar measurements: Giants, dwarfs and the main sequence, Stellar evolution: the lives and deaths of stars, Neutron stars and black holes; Galaxies and the Universe, - The Milky Way Galaxy, Normal and active galaxies, Galaxies and Dark Matter, Cosmology: the Big Bang and the Fate of the Universe, Life in the Universe

**ERSC2001 - EARTH & LIFE (4 credits)**

- **Pre-requisites:** ERSC1001 Dynamic Earth

**ERSC2002 - CLIMATOLOGY (4 credits)**

- **Pre-requisites:** ERSC1002 Oceans & Climate or METE1200 Oceans & Climate
**ERSC2001 - CLIMATE SYSTEMS (4 credits)**

Syllabus:

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

Method of Examination:
Theory Examination (3 hours) 60%

Examination:
Laboratory 20%
In-course assignments/tests 20%

**ERSC2003 - OCEANOGRAPHY (4 credits)**

Pre-requisites:
CSEC Chemistry and ERSC1002 Oceans & Climate or METE1200 Oceans & Climate.

Syllabus:

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

Method of Examination:
Theory Examination (3 hours) 60%

Examination:
Laboratory 20%
In-course assignments/tests 20%

**ERSC2004 - RENEWABLE ENERGY SOURCES (4 credits)**

Pre-requisite:
16 Level 1 FPAS credits

Restriction:
Available only to FPAS students

Syllabus:
Current and future energy generation systems. Resources, extraction, conversion, and end-use, with emphasis on meeting regional and global energy needs in the 21st century in a sustainable manner. Aspects of energy production and consumption. Patterns of national, regional and global energy patterns of supply and utilization. Environmental effects of energy and the energy-prosperity-environmental dilemma. Mathematical representations of sustainability. Allowability, efficiency, and production rates of different renewable energy sources - solar energy, wind energy, tidal power, wave energy, geothermal energy, hydroelectricity, and bio-energy. Energy systems and sustainability systems in the renewable energy context. Major economic issues of production, storage, transportation, and distribution of energy.

Teaching:
Two hours of lecture, one hour of tutorial, and three hours of project work per week.
<table>
<thead>
<tr>
<th>Method of Assessment</th>
<th>50%</th>
<th>14. The assessment and management of natural hazard risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Examination (3 hrs)</td>
<td>50%</td>
<td>15. Reducing the impact of disaster</td>
</tr>
<tr>
<td>Project:</td>
<td>25%</td>
<td>16. The human response to hazard</td>
</tr>
<tr>
<td>In-course Test(s):</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

**ERSC3001 - NATURAL HAZARDS (4 Credits)**

<table>
<thead>
<tr>
<th>Pre-requisites:</th>
<th>ERSC1001: The Dynamic Earth and ERSC2003: Oceanography or ERSC2002: Climatology</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Syllabus:</th>
<th>The following topics, concepts and issues will be discussed in this course:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hazard, risk and disaster</td>
</tr>
<tr>
<td>2.</td>
<td>The role of plate tectonics in natural hazards</td>
</tr>
<tr>
<td>3.</td>
<td>Earthquakes distribution, magnitude, intensity, hazard assessment and mitigation</td>
</tr>
<tr>
<td>4.</td>
<td>Tsunami causes, speed, amplitude, hazards and mitigation</td>
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<tr>
<td>5.</td>
<td>Volcanoes distribution, eruptive styles, hazards monitoring and mitigation</td>
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<tr>
<td>6.</td>
<td>Flooding and drought</td>
</tr>
<tr>
<td>7.</td>
<td>Mass wasting</td>
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<tr>
<td>8.</td>
<td>Subsidence</td>
</tr>
<tr>
<td>9.</td>
<td>Severe weather events</td>
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<tr>
<td>10.</td>
<td>Hurricanes distribution, structure, hazards intensity and mitigation</td>
</tr>
<tr>
<td>11.</td>
<td>Coastal processes waves, vulnerable regions, coastal erosion, mitigation</td>
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<tr>
<td>12.</td>
<td>Climate and Climate Change</td>
</tr>
<tr>
<td>13.</td>
<td>The economic and human cost of disaster</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching:</th>
<th>Two lectures, one tutorial, three hours of research/practical work each week</th>
</tr>
</thead>
</table>

**ERSC3002 - CLIMATE VARIABILITY & PREDICTABILITY (4 credits)**

<table>
<thead>
<tr>
<th>Pre-requisite:</th>
<th>ERSC2002 Climatology</th>
</tr>
</thead>
</table>


<p>| Teaching: | Two lectures, one tutorial and three hours of labs per week. |</p>
<table>
<thead>
<tr>
<th>Method of Examination:</th>
<th>Theory Examination (3 hours)</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>In-course assignments/tests</td>
<td>20%</td>
</tr>
</tbody>
</table>

**ERSC900**  
**EARTH SCIENCE RESEARCH PROJECT**  
(4 Credits)

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

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

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

<table>
<thead>
<tr>
<th>Method of Examination:</th>
<th>Supervisor’s Assessment</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seminar</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Project Report</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Method of Supervisor’s Assessment:**  
15%

**Method of Examination:**  
A 20-minute seminar on internship and research findings.

**Pre-requisite:** ERSC2004 Renewable Energy Sources or PHYS3107 Fundamentals of Photovoltaic Physics, and Minimum GPA of 2.5

**ERSC910**  
**SUSTAINABLE ENERGY RESEARCH INTERNSHIP** (4 Credits)

**Syllabus:** A list of potential internship placements will be made available during semester II. Students are expected to apply for internship placements by submitting their curriculum vitae with a covering letter. Successful applicants will then join the host organisation over a 2-month summer period. Working alongside supervisors from the host organisation and the FPAS, students will gain practical exposure to a workplace environment and apply what they have learned in their studies to enhance their knowledge and research skills in the field of sustainable energy.

**Teaching:** Students must submit an inception report, a mid-term report and final internship report; these reports will aid the supervisors in their final assessment report. As well as the research project report, students must give a seminar on their findings.

<table>
<thead>
<tr>
<th>Method of Examination:</th>
<th>Supervisor assessment by both the host and FST supervisor</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A 20-minute seminar on internship and research findings</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Research Project Paper</td>
<td>70%</td>
</tr>
</tbody>
</table>
This course is only offered subject to availability.

STUDENT MAY ONLY TAKE ONE OF ERSC3900 OR ERSC3910.

ELECTRONICS

The Department of Computer Science, Mathematics & Physics offers a Major and Minor in Electronics, and a Minor in Medical 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
ELET2140 Medical Instrumentation

LEVEL III
At Most Twenty (20) Credits (Five Courses) From:
ELET3041 Microcontrollers & Applications
ELET3110 Control and Instrumentation
ELET3120 Communication Circuits
ELET3130 Intro. to Digital Signal Processing (DSP)
ELET3151 Digital Communications II
ELET3152 Mobile Communications and Applications
ELET3160 Electronics Research Project
ELET3210 Sensor and Actuator Technology
## MINOR IN ELECTRONICS [Sixteen (16) Credits]

Sixteen (16) Credits (Four Courses) From:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELET2100</td>
<td>Microprocessors I</td>
</tr>
<tr>
<td>ELET2110</td>
<td>Circuit Simulation</td>
</tr>
<tr>
<td>ELET2120</td>
<td>Discrete Device Electronics</td>
</tr>
<tr>
<td>ELET2130</td>
<td>Digital Communications I</td>
</tr>
<tr>
<td>ELET2140</td>
<td>Medical Instrumentation</td>
</tr>
<tr>
<td>ELET3041</td>
<td>Microcontrollers &amp; Applications</td>
</tr>
<tr>
<td>ELET3110</td>
<td>Control and Instrumentation</td>
</tr>
<tr>
<td>ELET3120</td>
<td>Communication Circuits</td>
</tr>
<tr>
<td>ELET3130</td>
<td>Intro. to Digital Signal Processing (DSP)</td>
</tr>
<tr>
<td>ELET3151</td>
<td>Digital Communications II</td>
</tr>
<tr>
<td>ELET3152</td>
<td>Mobile Communications and Applications</td>
</tr>
<tr>
<td>ELET3160</td>
<td>Electronics Research Project</td>
</tr>
<tr>
<td>ELET3210</td>
<td>Sensor and Actuator Technology</td>
</tr>
</tbody>
</table>

## LEVEL I ELECTRONICS COURSES

### ELET1100 - CIRCUIT ANALYSIS (4 Credits)

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


**Teaching:** Two (2) lectures, one tutorial per week and 26 hours of practical work.

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

## MINOR IN MEDICAL ELECTRONICS

### [Sixteen (16) Credits]

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>ELET2120</td>
<td>Discrete Device Electronics</td>
</tr>
<tr>
<td>ELET2140</td>
<td>Medical Instrumentation</td>
</tr>
<tr>
<td>ELET3041</td>
<td>Microcontrollers &amp; Applications</td>
</tr>
<tr>
<td>ELET3210</td>
<td>Sensor and Actuator Technology</td>
</tr>
</tbody>
</table>

**A student with a Minor in Medical Electronics cannot count any of these courses as part of their Major or Minor in Electronics**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Pre-requisite</th>
<th>Syllabus</th>
<th>Teaching</th>
<th>Method of Examination</th>
<th>Examination</th>
<th>Method of Examination</th>
<th>Examination</th>
<th>Method of Examination</th>
<th>Examination</th>
<th>Method of Examination</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELET1110</td>
<td>DIGITAL ELECTRONICS (4 Credits)</td>
<td></td>
<td>None</td>
<td>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, de-multiplexer, clocks, one-shot Asynchronous &amp; synchronous circuits (latches, flip-flops, asynchronous counters, synchronous counters, applications of counters, shift registers). Design and analysis of asynchronous &amp; 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 &amp; hold, D/A &amp; A/D ICs, introduction to the microprocessor, number systems, floating point representation.</td>
<td>Two (2) lectures, one tutorial per week and 26 hours of practical work.</td>
<td>Final Theory Examination (2 hours)</td>
<td>In-course Tests/Assignments</td>
<td>Laboratory</td>
<td></td>
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</tr>
<tr>
<td>ELET1120</td>
<td>BASIC ELECTRONICS (4 Credits)</td>
<td></td>
<td>None</td>
<td>Resistors, capacitors, inductors &amp; their applications in circuits. Characteristics and applications of diodes including photodevices. Other semiconductor devices and their applications (SCR, TRIACS, etc...). Transistors (BJT &amp; 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.</td>
<td>Two (2) lectures, one tutorial per week and 26 hours of practical work.</td>
<td>Final Theory Examination (2 hours)</td>
<td>In-course Tests/Assignments</td>
<td>Laboratory</td>
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</tbody>
</table>
LEVEL II ELECTRONICS COURSES

ELET2100 - MICROPROCESSORS I (4 Credits)

Pre-requisite: ELET1110 Digital Electronics

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

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

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

ELET2120 - DISCRETE DEVICE ELECTRONICS (4 Credits)

Pre-requisite: ELET1120 Basic Electronics


Teaching: Two (2) 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%

ELET2110 - CIRCUIT SIMULATION (4 Credits)

Pre-requisite: ELET1100 Circuit Analysis

Syllabus: Introduction to SPICE, Language syntax, netlists, Source specification and passive element models, Active device modeling, macro models, AC, DC, transient, frequency and Monte Carlo analysis, Issues of convergence and stability.

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

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

ELET2130 - DIGITAL COMMUNICATIONS I (4 credits)

Pre-requisite: MATH1120 Calculus I and ELET1110 Digital Electronics

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

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

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

ELET2140 - MEDICAL INSTRUMENTATION (4 credits)

Pre-requisite: ELET1110 Digital Electronics

Syllabus: The following topics and concepts will be discussed during the course:
- Introduction to Anatomy and Physiology
- Overview of Medical Electronics Equipments
- Preparation of Biosensor
- Types of Biosensors and their Applications
- Electrodes Bio-Medical Recorders
- Patient Monitoring Systems
- Safety Aspects of Medical Instruments

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

Method of Examination: Final Theory Examination (2 hours) 40%
In-course Tests/Assignments 20%
Laboratory/Mini-Project 40%

ELET2950 - ELECTRONICS ELECTIVE (4 credits)

Pre-requisites: None

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

LEVEL III ELECTRONICS COURSES

ELET3041 - MICROCONTROLLERS AND APPLICATIONS (4 credits)

Pre-requisite: ELET2100 Microprocessors I

Syllabus: A Microcontroller Framework - hardware architecture, instruction set, addressing modes, program memory, register file structure and uses, simple program operations. The Assembler and Its Use – application code source file, list, hex, and object file generation, table use, macros, subroutines, directives. Input and Output Peripherals - ports, displays, buttons, keypads, sensors, actuators, relays, interrupts, timers, counters, pre-scalars, A/D, D/A, motors, PWM, serial communication Protocols. Memory – RAM, ROM, PROM, EPROM, EEPROM, Flash, and Error Correction. Applications – a variety of applications from consumer electronics to research instruments

Teaching: Two hours of lectures, one hour of tutorial and three hours of laboratory each week.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Pre-requisite</th>
<th>Syllabus</th>
<th>Method of Teaching</th>
<th>Examination:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELET3110</td>
<td>CONTROL &amp; INSTRUMENTATION</td>
<td>4</td>
<td>ELET2120 Discrete Device Electronics</td>
<td>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.</td>
<td>Final Theory</td>
<td>In-course</td>
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<tr>
<td></td>
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<td></td>
<td>Examination</td>
<td>Tests/Assignments</td>
</tr>
<tr>
<td>ELET3120</td>
<td>COMMUNICATION CIRCUITS</td>
<td>4</td>
<td>ELET2120 Discrete Device Electronics</td>
<td>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.</td>
<td>Final Theory</td>
<td>In-course</td>
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<td>Examination</td>
<td>Tests/Assignments</td>
</tr>
<tr>
<td>ELET3130</td>
<td>INTRODUCTION TO DIGITAL SIGNAL PROCESSING (DSP)</td>
<td>4</td>
<td>ELET2130 Digital Communications I</td>
<td>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.</td>
<td>Final Theory</td>
<td>In-course</td>
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<td>Examination</td>
<td>Tests/Assignments</td>
</tr>
<tr>
<td>ELET3151</td>
<td>DIGITAL COMMUNICATIONS II</td>
<td>4</td>
<td>ELET2130 Digital Communications I</td>
<td>Signals and Spectra, Bandpass Transmission, Error Control Coding (Convolutional), Satellite Communications, Wireless Communications.</td>
<td>Final Theory</td>
<td>In-course</td>
</tr>
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<td>Examination</td>
<td>Tests/Assignments</td>
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<tr>
<td>Course Code</td>
<td>Course Name</td>
<td>Credits</td>
<td>Prerequisite</td>
<td>Syllabus</td>
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<tr>
<td>ELET3152</td>
<td>MOBILE COMMUNICATION &amp; APPLICATIONS (4 credits)</td>
<td></td>
<td>ELET2130 Digital Communications I or COMP2150 Computer Networks I</td>
<td>Radio basics, Electromagnetic energy, frequency and wavelength, Spectrum management, Information theory, Coding theory, Core wireless communications, technologies and standards, FSK, PSK, QAM, TDMA, FDMA, OFDM, CDMA, SDMA, GSM, UMTS, HSPA, LTE, Wi-Fi, WiMAX, Bluetooth, Wireless Networking, Network design, Cellular infrastructure, WAN, MAN, LAN, PAN, HRAN, Mobile Internet and the protocol Stack, Circuit and packet switching TCP/IP, mobile IPv4, mobile IPv6, Technological convergence and multi-purpose mobile computing, SMS, MMS, VoIP, Video conferencing, Geolocation, Mobile operating systems, Symbian, Microsoft, iPhone, Android, Mobile application development, Mobile application environment, Context-aware mobile applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELET3160</td>
<td>ELECTRONICS RESEARCH PROJECT (4 credits)</td>
<td></td>
<td>Restricted to Finalists Majoring in Electronics</td>
<td>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.</td>
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</tbody>
</table>

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

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

Method of Teaching: Two lectures & Four hours of Lab work per week

Method of Examination: Final Theory Examination (2 hours) 60% Course & Lab work 40%

Teaching: Two lectures, one tutorial, 3 hours of Practical per week

Method of Examination: In course test(s) / Assignment(s) 20%
Laboratory/ Mini-Project 40%
Final Theory Examination (2 hrs) 40%

MATHEMATICS

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

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

MAJOR IN MATHEMATICS:

LEVEL I
- MATH1101 Basic Mathematics I
- MATH1102 Basic Mathematics II
- MATH1120 Calculus I
- MATH1130 Calculus II

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

LEVEL III
Sixteen (16) Credits from Levels II and III courses (including AT LEAST two Level III courses) from:
- MATH2140 Probability Theory
- MATH2150 Mathematical Statistics
- MATH3100 Multivariate Analysis
- MATH3110 Design of Experiments
- MATH3120 Numerical Analysis
- MATH3130 Optimization Theory
- MATH3140 Fourier Analysis and PDE
### MINOR IN MATHEMATICS (Sixteen (16) Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH2100</td>
<td>Abstract Algebra</td>
</tr>
<tr>
<td>MATH2120</td>
<td>Analysis &amp; Methods I</td>
</tr>
</tbody>
</table>

AND Eight (8) Credits From:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH2110</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH2130</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MATH2140</td>
<td>Probability Theory</td>
</tr>
<tr>
<td>MATH2150</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH3100</td>
<td>Multivariate Analysis</td>
</tr>
<tr>
<td>MATH3110</td>
<td>Design of Experiments</td>
</tr>
<tr>
<td>MATH3120</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>MATH3130</td>
<td>Optimization Theory</td>
</tr>
<tr>
<td>MATH3140</td>
<td>Fourier Analysis and PDE</td>
</tr>
<tr>
<td>MATH3150</td>
<td>Complex Variables I</td>
</tr>
<tr>
<td>MATH3160</td>
<td>Number Theory</td>
</tr>
<tr>
<td>MATH3170</td>
<td>Advanced Algebra</td>
</tr>
<tr>
<td>MATH3180</td>
<td>Introduction to Topology</td>
</tr>
<tr>
<td>MATH3190</td>
<td>Matrix Analysis</td>
</tr>
<tr>
<td>MATH3220</td>
<td>Sampling Theory</td>
</tr>
<tr>
<td>MATH3375</td>
<td>Discrete and Computational Geometry</td>
</tr>
</tbody>
</table>

### MINOR IN STATISTICS (Sixteen (16) Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 2140</td>
<td>Probability Theory</td>
</tr>
<tr>
<td>MATH 2150</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH 3100</td>
<td>Multivariate analysis</td>
</tr>
<tr>
<td>MATH 3460</td>
<td>Statistical Theory II</td>
</tr>
</tbody>
</table>

### DOUBLE MAJOR IN MATHEMATICS

#### LEVEL I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH1101</td>
<td>Basic Mathematics I</td>
</tr>
<tr>
<td>MATH1102</td>
<td>Basic Mathematics II</td>
</tr>
<tr>
<td>MATH1120</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH1130</td>
<td>Calculus II</td>
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</tbody>
</table>

#### LEVEL II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH2100</td>
<td>Abstract Algebra</td>
</tr>
<tr>
<td>MATH2110</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH2120</td>
<td>Analysis &amp; Methods I</td>
</tr>
<tr>
<td>MATH2130</td>
<td>Ordinary Differential Equations</td>
</tr>
</tbody>
</table>

#### LEVEL III

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>MATH2140</td>
<td>Probability Theory</td>
</tr>
<tr>
<td>MATH2150</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>MATH3100</td>
<td>Multivariate Analysis</td>
</tr>
<tr>
<td>MATH3120</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>MATH3130</td>
<td>Optimization Theory</td>
</tr>
<tr>
<td>MATH3140</td>
<td>Fourier Analysis and PDE</td>
</tr>
</tbody>
</table>
MATH3150  Complex Variables I
MATH3160  Number Theory
MATH3170  Advanced Algebra
MATH3180  Introduction to Topology
MATH3190  Matrix Analysis
MATH3300  Mathematics Research Project
MATH3450  Statistical Theory I
MATH3460  Statistical Theory II

**PRELIMINARY MATHEMATICS COURSES**

**MATH0101 - PRELIMINARY MATHEMATICS I**

*(6 Credits)*

Pre-requisite: CXC Mathematics or equivalent.

Syllabus: Algebra: Sets. Cartesian Product, functions, operations, the integers, mathematical induction, algebraic operations on polynomials and rational quadratics, step functions, modulus function. Geometry: Coordinate geometry, trigonometrical functions and identities, complex numbers, Argand diagram; vectors. Calculus: Limits, continuity, intermediate-value theorem, gradient of a tangent, differentiation, Mean value theorem and its consequences (motivation, but no proof), curve sketching, integration as inverses of differentiation, fundamental theorem of calculus, techniques of integration, numerical techniques.

Teaching: Five (5) lectures and one tutorial per week.

Method of Examination: Final Theory Examination (3 hours) 80%

In-course Tests/Assignments 20%
MATH0102  PRELIMINARY MATHEMATICS II  
(6 Credits)

Pre-requisite:  CXC Mathematics or equivalent

Syllabus:  Sequences and Series: Use of ∑ 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.


Teaching:  Five (5) lectures and one tutorial per week.

Method of Final Theory Examination (3 hours)  80%
Examination:  In-class Tests/Assignments  20%

LEVEL I MATHEMATICS COURSES

MATH1101 - BASIC MATHEMATICS I (4 Credits)

Pre-requisites:  CAPE Pure Mathematics Units 1 & 2 or MATH0101 & MATH0102 or equivalent.

Syllabus:  The following topics, concepts or issues will be discussed in this course:
Logic, Sets, Relations, Functions, Number and Mathematical Systems

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

Method of Final Theory Examination (2 hours)  75%
Examination:  In-class Test(s)/Assignment(s)  25%

MATH1102 - BASIC MATHEMATICS II (4 Credits)

Pre-requisites:  MATH1101 Basic Mathematics I

Syllabus:  The following topics, concepts or issues will be discussed in this course:
Vector Spaces, Matrices & Determinants, Equations, Euclidean spaces, Conic sections and quadratic surfaces

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

Method of Final Theory Examination (2 hours)  75%
Examination:  In-class Test(s)/Assignment(s)  25%
MATH1110 - APPLIED STATISTICS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 or MATH0101 & MATH0102 or equivalent.


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 or equivalent.

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

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: MATH1101 Basic Mathematics I and MATH1102 Basic Mathematics II
Teaching: Three (3) lectures and one tutorial per week.
Method of Examination: Final Theory Examination (2 hours) 70%
Examination: In-class Tests/Assignments 30%

MATH2110 - LINEAR ALGEBRA (4 Credits)
Pre-requisite: MATH1101 Basic Mathematics I, MATH1120 Calculus I & MATH1130 Calculus II
Teaching: Three (3) lectures and one tutorial per week.
Method of Examination: Final Theory Examination (2 hours) 70%
Examination: In-class Tests/Assignments 30%

MATH2120 - ANALYSIS & METHODS I (4 Credits)
Pre-requisite: MATH1101 Basic Mathematics I, MATH1102 Basic Mathematics II, MATH1120 Calculus I & MATH1130 Calculus II
Syllabus: The real number system. Countability and topology of the real line; Continuity and differentiability. The Riemann integral. Infinite series and power series.
Teaching: Three (3) lectures and one tutorial per week.
Method of Examination: Final Theory Examination (2 hours) 70%
Examination: In-class Tests/Assignments 30%

MATH2130 - ORDINARY DIFFERENTIAL EQUATIONS (4 Credits)
Pre-requisite: MATH1101 Basic Mathematics I, MATH1102 Basic Mathematics II, MATH1120 Calculus I & MATH1130 Calculus II
FACULTY OF SCIENCE AND TECHNOLOGY
UNDERGRADUATE PROGRAMMES & COURSES HANDBOOK 2012-2013

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

Method of Examination: Final Theory Examination (2 hours) 70%

Examination: In-class Tests/Assignments 30%

MATH2140 - PROBABILITY THEORY (4 Credits)

Pre-requisite: MATH1120 Calculus I & MATH1130 Calculus II

Syllabus: Basic probability theory: Combinational Methods, Laws of probability, conditional probability, independence. Bayes formula; random variables, discrete and continuous distributions, expectations, moments, moment generating functions, functions of random variables, jointly distributed random variable. Special distributions: binomial, geometric, negative binomial, Poisson, hypergeometric, uniform, exponential, gamma, normal, bivariate normal. Law of large numbers, the central limit theorem.

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

Method of Examination: Final Theory examination (2 hours) 70%

Examinations: 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 Probability Theory.

Syllabus: Notions of multivariate distributions, Bivariate normal distributions, conditional distribution and multiple correlation coefficients, moments. Estimation of the mean vector and covariance matrix of the multivariate normal distributions; Inferences
concerning the mean vector. Introduction to
the T2 statistics and its uses. Discriminant
analysis and its applications. Principal
components analysis. Cluster analysis.

Teaching: Three lectures and one tutorial per week.

Examination: One 2-hour written paper 60%
Coursework 40%

MATH3120 - NUMERICAL ANALYSIS (4 Credits)

Pre-requisite MATH2110 Linear Algebra, MATH2120
Analysis & Methods I, MATH2130 Ordinary
Differential Equations

Syllabus: Types of error, Finite Differences and
Interpolation; Numerical Evaluation and
Integrals; Numerical solution of Differential
equations; Roots of Equations: Linear
Systems and Matrices.; Construction of
Algorithms for Computation using MATLAB.

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

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

MATH3150 - COMPLEX VARIABLES 1 (4 credits)

Pre-requisite: MATH2120 Analysis & Methods I

Description: This is a first course in the theory and
methods of complex variables. Many
concepts in complex variable are
generalizations of topics in calculus and real
analysis, while other results and methods are
specific to the subject itself. The material
in this course is a blend of mathematical
theorems and computational techniques.
This course will be of interest to students
majoring in mathematics or physics.

MATH3140 - FOURIER ANALYSIS AND PDE (4 Credits)

Pre-requisite: MATH2130 Ordinary Differential Equations

Syllabus: Orthogonal systems (Fourier, Haar, Bessel,
Sturm-Liouville etc.). Periodic functions,
Fourier expansion, Fourier coefficients,
periodic extension. Fourier series for odd
and even functions. Problem of convergence.
Drichlet theorem. Minimal property of
partial sums. Bessel’s inequality. Parseval’s
identity. Integration and differentiation of
Fourier series. Fourier series in complex
form. Multiple Fourier series. Fourier
transform its properties. Convolution. Partial
differential equations, their classification.
Basic differential equations of mathematical
physics: wave equation; Laplace equation,
heat equation. Application of the Fourier
method to the solution of the PDE. The
Discrete Fourier transform. The Fast
Fourier transform.
MATH3160 - NUMBER THEORY (4 Credits)

Pre-requisite: MATH2100 Abstract Algebra


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

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

MATH3170 - ADVANCED ALGEBRA (4 Credits)

Pre-requisite: MATH2100 Abstract Algebra


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

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

MATH3180 - INTRODUCTION TO TOPOLOGY

Pre-requisites: MATH2100 Abstract Algebra & MATH2120 Analysis & Methods I


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

Method of Examination: Final Theory Examination (2 hours) 60%
In-class Tests/Assignments 40%
MATH3190 - MATRIX ANALYSIS (4 Credits)

Pre-requisite: MATH 2110 – Linear Algebra


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

Method of Examination: Final Theory Examination (2 hours) 60%

Examination: In-class Tests/Assignments 40%

MATH3220 - SAMPLING THEORY (4 Credit)

Pre-requisite: MATH1110 Applied Statistics and MATH2150 Mathematical Statistics

Syllabus: Basic ideas concerning the design and uses of sample surveys. Sampling techniques: Simple random sampling (with Derivations of basic results), Stratified sampling, Cluster sampling, (one and two stage). Systematic sampling. Non-response and missing data in sample surveys. Designing forms and collecting data. Interpretation of data.

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

Method of Examination: 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

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%

Examination: Oral Presentation 20%

Proposal and Literature Review 20%
### MATH3375 - DISCRETE AND COMPUTATIONAL GEOMETRY (4 credits)

**Pre-requisite:**
- MATH1102 Basic Mathematics II or
- COMP2105 Discrete Mathematics, and
- 12 additional credits from Level II & III Mathematics or Computer Science courses

**Syllabus:**
- Polygons, convex hulls, Delaunay triangulation, Voronoi diagrams, Euler's polyhedral formula, Gauss-Bonnet theorem

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

**Method of Examination:**
- Final Theory Examination (2 hour) 60%
- In-class Test(s)/Assignment(s) 40%

### MATH3450 - STATISTICAL THEORY I (4 Credits)

**Pre-requisite:**
- MATH2120 Analysis & Methods and
- MATH2140 Probability Theory and
- MATH2150 Mathematical Statistics

**Syllabus:**
- Measure Theory & Law of Large Numbers, Conditional Expectation, Bounding Probability & Expectations, Introduction to Queuing Theory, Renewal Theory

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

**Method of Examination:**
- Final Theory Examination (2 hour) 60%
- Class tests/computer assignments 40%

### MATH3460 - STATISTICAL THEORY II (4 Credits)

**Pre-requisite:**
- MATH2140 Probability Theory and
- MATH2150 Mathematical Statistics

**Syllabus:**
- Methods of finding estimators and their properties; Bayesian Inference; Regression Analysis; Time Series Analysis; Testing of Hypothesis; Design of Experiments; Sampling Theory.

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

**Method of Examination:**
- Final Theory Examination (2 hour) 60%
- Class tests/computer assignments 40%
METEOROLOGY

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

MAJOR IN METEOROLOGY

LEVEL I
METE1000  Introduction to Physical Meteorology & Weather Observations
METE1100  Introduction to Dynamic Meteorology & Weather Systems
METE1200  Oceans & Climate

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 Four (4) Credits from:
METE2300  Hydrometeorology
METE3400  Weather Radar and Satellites
METE3500  Bioclimatology

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

METE1000 - INTRODUCTION TO PHYSICAL METEOROLOGY & WEATHER OBSERVATIONS
(4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).


Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.
Method of Final Theory Examination (2 hours) 70%  The biosphere – atmosphere interaction.
Examination: In-course Tests/Assignments 30%  The biosphere – hydrosphere interaction.

METE1100 - INTRODUCTION TO DYNAMIC
METEOROLOGY & WEATHER SYSTEMS (4 Credits)

Pre-requisites: CAPE Pure Mathematics Units 1 & 2 (or equivalent) & CAPE Physics Unit 1 (or equivalent).

Syllabus: Air pressure and winds. Wind: small-scale and local systems. Wind: global systems. Air masses and fronts. Middle-latitude cyclones. Thunderstorms and tornadoes. Tropical weather systems. Laboratory classes will include basic scalar analysis, computation exercises of geostrophic gradients and thermal winds, frontal analysis utilizing surface and upper air charts.

Teaching: Two (2) lectures, one (1) tutorial and three (3) hours of practical per week.

Method of Final Theory Examination (2 hours) 60%  Classification of oceans and seas.
Examination: In-course Tests/Assignments 40%  Topography of ocean floor. Chemistry of the ocean: temperature, salinity and density.

Waves and tides. Drivers of natural climate variability and anthropogenic climate change. Laboratory classes will involve basic analysis of earth science datasets by hand, and using the Grid Analysis and Display System (GrADS), a computer based application for manipulation and visualization of earth science datasets.

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

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

METE1200 - OCEANS AND CLIMATE (4 Credits)

Pre-requisites: None.

Restriction: Not to be taken with ERSC1002 Oceans & Climate.


METE1300 - CLIMATE CHANGE EDUCATION AND AWARENESS (4 Credits)

Pre-requisites: None

Restriction: Cannot be taken by majors and minors in Meteorology. Students are not allowed to take BOTH METE1200 and METE1300 for credit.

Syllabus: The biosphere: definition, evolution and contributions to climate and climate change.

Teaching: Three (3) lectures, one (1) tutorial hour per week.
Method of Examination: Final Theory Examination (2 hours) 60%
Examination: In-course Tests/Assignments 40%

LEVEL II METEOROLOGY COURSES

METE2000 - PHYSICAL METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.


Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.
Method of Examination: Final Theory Examination (2 hours) 70%
Examination: In-course Tests/Assignments 30%

METE2001 - PHYSICAL METEOROLOGY II (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.


Teaching: Two (2) lectures, one (1) tutorial and two (2) hours of practical per week.
Method of Examination: Final Theory Examination (2 hours) 70%
Examination: In-course Tests/Assignments 30%
METE2100 - DYNAMIC METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations, METE1100 Introduction to Dynamic Meteorology and Weather Systems and METE1200 Oceans and Climate and MATH1120 Calculus I & MATH1130 Calculus II.

Syllabus: Elementary vector methods in meteorology. Derivation of the equation of motion from Newton's law. The equation of motion in various co-ordinate systems. Simplification of the equation of motion. The conservation of mass and the conservation of total energy. The basic equations with pressure as the vertical coordinate. Horizontal balanced motions; the geostrophic thermal wind. Concepts of circulation and vorticity; the circulation theorems and the vorticity equation and their applications. Structure and dynamics of the planetary boundary layer.

Teaching: Three (3) lectures and one (1) tutorial per week.

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

METE2200 - SYNOPTIC METEOROLOGY I (4 Credits)

Pre-requisites: METE1000 Introduction to Physical Meteorology and Weather Observations,


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

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

METE2300 - HYDRO-METEOROLOGY (4 Credits)

Pre-requisites: MATH1120 Calculus I & MATH1130 Calculus II.

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

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

METE2950 - METEOROLOGY ELECTIVE (4 credits)

Pre-requisites: None

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

LEVEL III METEOROLOGY COURSES

METE3100 - DYNAMIC METEOROLOGY II (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I & METE2200 Synoptic Meteorology I

Syllabus: The dynamics of developing synoptic scale systems in mid-latitudes. The theory and behaviour of pure wave motions in the atmosphere. Introduction to numerical weather prediction; barotropic and filtered baroclinic models; primitive equation models. The physical basis of baroclinic instability and cyclogenesis. The energy cycle and momentum budget of the atmosphere.

Teaching: Three (3) lectures and one (1) tutorial per week.

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

METE3200 - SYNOPTIC METEOROLOGY II (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I and METE2200 Synoptic Meteorology I

Syllabus: The Polar front jet stream - structure and characteristics and its role in mid-latitude development. The pressure tendency equation and its applications. Four-dimensional analysis of mid-latitude synoptic systems; use of thickness maps, sounding and cross-sections. Theories of mid-latitude cyclone development; Characteristic and formation of cut-off cyclones, upper level anticyclones, and blocking systems; Development theories associated with polar lows and dry lines; Familiarization with and use of numerical products and satellite and radar data in analysis and forecasting.

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

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

METE3300 - TROPICAL METEOROLOGY (4 Credits)

Pre-requisites: METE2100 Dynamic Meteorology I and METE2200 Synoptic Meteorology I
METE3400 - WEATHER RADARS AND SATELLITES
(4 Credits)

Pre-requisites: METE2000 Physical Meteorology I, METE2001 Physical Meteorology II and METE2200 Synoptic Meteorology I


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

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

METE3500 - BIOCLIMATOLOGY (4 Credits)

Pre-requisites: METE1200 Oceans & Climate or BIOL1051 Biodiversity 1 and 28 FPAS Level II/III credits.

Syllabus: Characteristics of Caribbean climate; inter-seasonal, inter-annual and inter-decadal climate variability. Role of climate in vegetation distribution. Influence of weather parameters on vegetation and terrestrial ecosystems. Bioclimatic indices and natural ecosystems. Weather, climate and coastal and marine ecosystems. Climate change and terrestrial, coastal and marine ecosystems. Role of vegetation in determining climate (biogeochemical cycles, albedo,
roughness and fluxes). Carbon trading, clean development mechanism (CDM).

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

Method of Examination:
- Final Theory Examination (2 hours) 60%
- In-course Tests 10%
- Essay Assignments 30%
- & Computer Exercises

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
MATH1120 Calculus I

LEVEL II

PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics & Special Relativity
PHYS2103 Classical Mechanics
PHYS2106 Advanced Physics/Technology Laboratory I
PHYS2107 Advanced Physics/Technology Laboratory II

LEVEL III

PHYS3100 Quantum Mechanics
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics

AND Four (4) Credits From:

- ELET2100 Microprocessors I
- ELET2110 Circuit Simulation
- ELET2120 Discrete Device Electronics
- ELET2130 Digital Communications I
- ELET2140 Medical Instrumentation
- PHYS2102 Solid State Physics
- PHYS2105 Computational Physics I
- PHYS2950 Physics Elective
ELET3041 Microcontrollers and Applications
ELET3110 Control and Instrumentation
ELET3120 Communication Circuits
ELET3130 Introd. to Digital Signal Processing (DSP)
ELET3151 Digital Communications II
ELET3152 Mobile Communication & Applications
ELET3160 Electronics Research Project
ELET3210 Sensors & Actuator Technology
PHYS3102 Optics and Lasers
PHYS3103 Astrophysics
PHYS3106 Physics Research Project
PHYS3107 Fundamentals of Photovoltaic Physics

MINOR IN PHYSICS (Sixteen (16) Credits)

At Least Eight (8) Credits From:
PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics & Special Relativity
PHYS2103 Classical Mechanics
PHYS2106 Advanced Physics/Technology Laboratory I
PHYS2107 Advanced Physics/Technology Laboratory II
PHYS3100 Quantum Mechanics
PHYS3101 Electrodynamics
PHYS3105 Statistical Mechanics

AND at Most Eight (8) Credits From:
PHYS2100 Mathematical Methods in Physics
PHYS2101 Quantum Mechanics & Special Relativity
PHYS2102 Solid State Physics
PHYS2103 Classical Mechanics
PHYS2105 Computational Physics I
PHYS2106 Advanced Physics/Technology Laboratory I
PHYS2107 Advanced Physics/Technology Laboratory II
PHYS2950 Physics Elective
PHYS3100 Quantum Mechanics

PHYS3101 Electrodynamics
PHYS3103 Astrophysics
PHYS3102 Optics and Lasers
PHYS3105 Statistical Mechanics
PHYS3106 Physics Research Project
PHYS3107 Fundamentals of Photovoltaic Physics

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

PRELIMINARY PHYSICS COURSES

PHYS0070 - PRELIMINARY PHYSICS I (6 Credits)

Pre-requisite: None

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

### PHYS0071 - PRELIMINARY PHYSICS II (6 Credits)

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<tr>
<th>Pre-requisite:</th>
<th>None</th>
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#### Teaching:
Three (3) lectures, one tutorial per week and 52 hours of practical work.

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

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

Method of Final Theory Examination (3 hours) 70%
Examination: 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.


Teaching: Three (3) lectures, one tutorial per week and 26 hours of practical work.

Method of Final Theory Examination (2 hours) 70%
Examination: 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.

Syllabus: Electric charge, Coulomb's law, electric field. 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

Teaching: Three (3) lectures, one tutorial per week and 26 hours of practical work.

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.


Teaching: Three (3) lectures, one tutorial per week and 26 hours of practical work.

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

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.

PHYS2101 - QUANTUM MECHANICS & SPECIAL RELATIVITY (4 Credits)

Pre-requisite: PHYS1100 Mechanics, PHYS1102 Optics, Thermodynamics & Modern Physics, and MATH1120 Calculus I


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

Method of Examination: Final Theory Examination (2 hours) 80%

PHYS2102 – SOLID STATE PHYSICS (4 Credits)

Pre-requisite: PHYS1101 Electricity & Magnetism


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

Method of Examination: Final Theory Examination (2 hours) 80%

PHYS2103 - CLASSICAL MECHANICS (4 Credits)

Pre-requisite: PHYS1100 Mechanics & MATH1120 Calculus I


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

Method of Final Theory Examination (2 hours) 80%
Examination: In-class Tests/Assignments 20%

**PHYS2105 - COMPUTATIONAL PHYSICS I (4 Credits)**

Pre-requisite: PHYS1100 Mechanics, PHYS1101 Electricity & Magnetism and MATH1120 Calculus I


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

Teaching: Three (3) lectures and one tutorial per week
Method of Examination: Final Theory Examination (2 hours) 80%
Examination: In-class Tests/Assignments 20%

**LEVEL III PHYSICS COURSES**

**PHYS3100 - QUANTUM MECHANICS (4 Credits)**

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity


**PHYS3101 - ELECTRODYNAMICS (4 Credits)**

Pre-requisite: PHYS1102 Optics, Thermodynamics & Modern Physics and PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Development of Maxwell's equations. Potentials. E-m waves in free space, conducting medium, plasmas. Reflection of e-m waves from dielectric and metallic boundaries, waveguides, special relativity and electrodynamics. Transformation of electric and magnetic fields.
Teaching: Three (3) lectures and one tutorial per week.

Method of Examination: Final Theory Examination (2 hours) 80%
In-class Tests/Assignments 20%

PHYS3102 - OPTICS & LASERS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity


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

Method of Examination: Final Theory Examination (2 hours) 80%
In-class Tests/Assignments 20%

PHYS3103 - ASTROPHYSICS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity

Syllabus: Structure of the sun and planets. Introduction to General Relativity Stellar Evolution Types and evolution of galaxies Cosmological models

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

Method of Examination: Final Theory Examination (2 hours) 80%
In-class Tests/Assignments 20%

PHYS3105 - STATISTICAL MECHANICS (4 Credits)

Pre-requisite: PHYS2101 Quantum Mechanics & Special Relativity


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 Credits)**  

Pre-requisite: Restricted to Final Year students, Majoring in Physics.  

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

N.B. Limited to those students who have demonstrated a sound academic background and an aptitude for research.  

Method of Final Written Project Report 80%  
Examination: Oral Presentation 20%  

**PHYS3107 - FUNDAMENTALS OF PHOTOVOLTAIC PHYSICS (4 credits)**  

Pre-requisites: PHYS1101 Electricity & Magnetism & MATH1120 Calculus I  

Syllabus: Group III-V semiconductors, p-n junctions, and wide-band-gap metal-oxide semiconductors with good optical properties. Fundamentals of photoelectric conversion, i.e. charge photoexcitation and separation, charge conduction and transport (diffusion and drift), and charge collection. First, second, and third generation photovoltaic technologies. Characterization of photovoltaic cells: open-circuit photovoltage, short-circuit photocurrent, fill factor, photoconversion efficiency, charge recombination, and charge trapping and detrapping are discussed. Photovoltaic cells manufacturing, systems, reliability, life-cycle analysis, and risk analysis. The economics of photovoltaic technology evolution in the context of markets, policies, society, and environment.  

Teaching: Two lectures, one hour of tutorial, and 26 hours of practical work.  

Method of Final Examination (2 hours) 50%  
Assessment: Laboratory Work 25%  
Assignments 25%
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