



THE UNIVERSITY OF THE WEST INDIES
MONA CAMPUS

FACULTY OF
SCIENCE AND TECHNOLOGY

UNDERGRADUATE STUDENT HANDBOOK

**LIFE SCIENCES
(EXTRACTED)**

**ACADEMIC YEAR
2022 – 2023**

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DISCLAIMER

This Undergraduate Handbook has been compiled to improve the communication between staff and students regarding programmes, that is, the majors, minors and options offered within the Faculty. The programme requirements outlined are to be adhered to by 1) Students enrolling in the Faculty for the 2022-2023 academic year; 2) Students who transferred into the Faculty for the 2022-2023 academic year; and 3) Students who changed their major/minor for the 2022-2023 academic year.

Though the Faculty worked assiduously to present the most updated information in the Handbook, students should communicate with their Departments/Sections for changes that possibly occurred after the publication of the Handbook.

CREDIT REQUIREMENTS FOR THE AWARDING OF BACHELOR'S DEGREES IN FST

LEVEL	MINIMUM CREDIT REQUIREMENT	NOTES
1	24	Eighteen (18) must be from FST courses
2 and 3 (Advanced)	60	All courses relating to the declared major(s) and or minor(s) must be completed
Foundation Courses *	9	<p>Three (3) FOUN courses required for FST Students:</p> <ol style="list-style-type: none"> 1. Either FOUN1014: Critical Reading and Writing in Science and Technology & Medical Science or FOUN1019: Critical Reading and Writing in the Disciplines 2. FOUN1101: Caribbean Civilization* 3. FOUN1301: Law, Governance, Economy and Society* <p>Students registered in FST should NOT register for FOUN1201 - Science, Medicine and Technology in Society</p>
TOTAL	93	Minimum credits required for BSc
<p>* Students may now substitute a Foundation course (except for English Language/Writing courses) with a foreign language at the level of their competence. They may choose from Chinese, French, Japanese, Portuguese or Spanish. Exemptions may also be granted from time to time by the Board for Undergraduate Studies.</p>		



DEPARTMENT OF LIFE SCIENCES

PROGRAMMES

B.Sc.

- 1. Biology with Education**
- 2. Environmental Biology**
- 3. Experimental Biology**

MAJORS

- 1. Animal Biology**
- 2. Horticulture**
- 3. Marine Biology**
- 4. Plant Biology**
- 5. Terrestrial and Freshwater Ecology**

MINORS

- 1. Animal Biology**
- 2. Coastal Ecosystems**
- 3. Plant Biology**
- 4. Terrestrial and Freshwater Ecology**

UNDERGRADUATE COURSES OFFERED BY THE DEPARTMENT OF LIFE SCIENCES

CODES	TITLES	CREDITS	SEMESTER OFFERED	PREREQUISITES
LEVEL 0				
BIOL0011	Preliminary Biology I	6	1	CSEC Biology or equivalent
BIOL0012	Preliminary Biology II	6	2	CSEC Biology or equivalent
LEVEL 1				
BIOL1017	Cell Biology	3	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1018	Molecular Biology and Genetics	3	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1262	Living Organisms I	3	2	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1263	Living Organisms II	3	2	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent

LEVEL 2 AND LEVEL 3 COURSES

Life Sciences Advanced courses are all 3 credits and will be offered as outlined below.

LEVEL 2 COURSES (10 courses available)

		6 Week Courses	12 Week Courses	6 Week Courses
Semester 1	Weeks 1 - 6	BOTN2401 Plant Form and Systematics	BIOL2401 Research Skills and Practices in Biology	BIOL2402 Fundamentals of Biometry
	Weeks 7 - 12	BIOL2406 Eukaryotic Microbiology		BIOL2407 Biological Evolution
Semester 2	Weeks 1 - 6	BIOL2402 Physiology of Plants	BIOL2403 Principles of Ecology	ZOOL2403 Maintenance Systems in Animals
	Weeks 7 - 12	BIOL2164 Principles of Molecular Biology		ZOOL2404 Coordination and Control in Animals
Summer		BIOL2408 - Diving for Scientists.		

LEVEL 3 COURSES

Possible Slot Combinations: A+B, A+C, B+C

Impossible Slot Combinations: A1+A2, B1+B2, C1+C2

A1	A2	B1	B2	C1	C2
<u>Tues/Thurs</u> Mon/Fri	<u>Tues/Thurs</u> Mon/Fri	<u>Fri/Mon</u>	<u>Fri/Mon</u>	Mon	Mon/Fri
BOTN3401 Principles of Plant Biotechnology	BOTN3402 Plant Breeding	ZOOL3403 Entomology	ZOOL3409 Aquaculture*	BIOL3407 Oceanography	BIOL3403 The Biology of Soil
BOTN3405 Plant Eco- Physiology	ZOOL3405 Vertebrate Biology	ZOOL3404 Parasitology	BOTN3406 Tropical Forest Ecology	BIOL3408 Coastal Ecosystems	BOTN3403 Fundamentals of Horticulture
BIOL3404 Virology	ZOOL3063 Comparative Animal Physiology	BIOL3405 Pest Ecology & Management	BIOL3406 Freshwater Biology	ZOOL3408 Sustainable Use of Fishable Resources	ZOOL3407 Human Biology*
BOTN3407 Post-Harvest* Technology	BIOL3410 Water Pollution	ZOOL3406 Immunology	BIOL3400 Issues in Conservation Biology	BIOL3409 Caribbean Coral Reefs	BOTN3404 Economic Botany

BIOL3412 – Internship | **BIOL3413** - Biology Project | **ZOOL3410** - Advanced Topics in Animal Science

* Not offered 2022/2023 Academic year

PROGRAMME DETAILS

BIOLOGY WITH EDUCATION (B.Sc.)

Introductory Courses (Level 1)

A B.Sc. Biology with Education requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
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BIOL1018	Molecular Biology and Genetics
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BIOL1262	Living Organisms I
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BIOL1263	Living Organisms II
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MICR1010 - Introductory Microbiology and Molecular Biology 1 and BIOC1020 - Cellular Biochemistry are highly recommended.

Advanced Courses (Level 2)

A B.Sc. Biology with Education requires a total of sixty-three (63) credits from Level 2 and must include:

BIOL2164	Principles of Molecular Biology
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BIOL2401	Research Skills and Practices in Biology
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BIOL2402	Fundamentals of Biometry
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BIOL2403	Principles of Ecology
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BIOL2406	Eukaryotic Microbiology
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BIOL2407	Biological Evolution
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BOTN2401	Plant Form and Systematics
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BOTN2402	Physiology of Plants
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ZOO2403	Maintenance Systems in Animals
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ZOO2404	Coordination and Control in Animals
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Please consult the Faculty of Humanities & Education regarding the selection of Education Courses.

ENVIRONMENTAL BIOLOGY (B.Sc.)

Introductory Courses (Level 1)

A B.Sc. in Environmental Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

Advanced Courses (Levels 2 and 3)

A B.Sc. in Environmental Biology requires a total of sixty (60) credits from Levels 2 and 3 and must include:

Level 2 - thirty (30) credits from:

BIOL2164	Principles of Molecular Biology
BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2406	Eukaryotic Microbiology
BIOL2407	Biological Evolution
BOTN2401	Plant Form and Systematics
BOTN2402	Physiology of Plants
ZOOL2403	Maintenance Systems in Animals
ZOOL2404	Coordination and Control in Animals

Level 3: twelve (12) core credits

BIOL3400	Issues in Conservation Biology
BIOL3406	Freshwater Biology
BIOL3408	Coastal Ecosystems
BOTN3405	Plant Ecophysiology

Level 3: and at least eighteen (18) credits from:

BIOL2408	Diving for Scientists
BIOL3402	Biology of Fungi
BIOL3403	The Biology of Soil
BIOL3407	Oceanography
BIOL3409	Caribbean Coral Reefs
BIOL3410	Water Pollution Biology
BIOL3412	Internship
or	or
BIOL3413	Research Project
BOTN3406	Tropical Forest Ecology
ZOOL3403	Entomology
ZOOL3405	Vertebrate Biology
ZOOL3407	Human Biology
ZOOL3408	Sustainable Use of Marine Fishable Resources
ZOOL3409	Aquaculture

EXPERIMENTAL BIOLOGY (B.Sc.)

Introductory Courses (Level 1)

A B.Sc. in Experimental Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

Advanced Courses (Level 2 and 3)

A B.Sc. in Experimental Biology requires a total of sixty (60) credits from Levels 2 and 3 and must include:

Level 2: thirty (30) credits

BIOL2164	Principles of Molecular Biology
BIOL2401	Research skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2406	Eukaryotic Microbiology
BIOL2407	Biological Evolution
BOTN2401	Plant Form and Systematics
BOTN2402	Physiology of Plants
ZOOL2403	Maintenance Systems in Animals
ZOOL2404	Coordination and Control in Animals

Level 3: At least thirty (30) credits from the three groups below with a minimum of three (3) credits from each group.

GROUP A

BIOL3402	Biology of Fungi
BIOL3403	The Biology of Soil
BIOL3404	Virology
BIOL3405	Pest Ecology and Management
BIOL3407	Oceanography
BIOL3410	Water Pollution Biology

GROUP B

BOTN3401	Principles of Plant Biotechnology
BOTN3402	Introduction to Plant Breeding
BOTN3403	Fundamentals of Horticulture
BOTN3404	Economic Botany
BOTN3405	Plant Ecophysiology
BOTN3407	Post-Harvest Technology

GROUP C

ZOOL3403	Entomology
ZOOL3404	Parasitology
ZOOL3405	Vertebrate Biology

ZOOL3406	Immunology
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ZOOL3407	Human Biology
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ZOOL3408	Sustainable Use of Marine Fishable Resources
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Plus

BIOL3413 - Biology Project

OR

BIOL3412 - Internship

ANIMAL BIOLOGY (MAJOR)

Introductory Courses (Level 1)

A major in Animal Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

Advanced Courses (Levels 2 and 3)

A major in Animal Biology requires a total of thirty (30) credits from Levels 2 and 3 and must include:

Level 2: minimum of fifteen (15) credits from:

BIOL2164	Principles of Molecular Biology
BIOL2403	Principles of Ecology
BIOL2407	Biological Evolution
ZOOL2403	Maintenance Systems in Animals
ZOOL2404	Coordination and Control in Animals

Level 3: minimum of nine (9) credits from:

ZOOL3403	Entomology
ZOOL3404	Parasitology
ZOOL3405	Vertebrate Biology

And 6 credits from below:

BIOL3404	Virology
BIOL3405	Pest Ecology and Management
BIOL3413	Research Project
ZOOL3063	Comparative Animal Physiology
ZOOL3406	Immunology
ZOOL3410	Advanced Topics in Animal Sciences

HORTICULTURE (MAJOR)

Introductory Courses (Level 1)

A major in Horticulture requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

Advanced Courses (Levels 2 and 3)

A major in Horticulture requires a total of thirty (30) Levels 2 and 3 credits, and must include:

Level 2: Minimum of fifteen (15) credits which must include:

BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BOTN2401	Plant Form and Systematics
BOTN2402	Physiology of Plants

Level 3: Nine (9) credits of core courses:

BIOL3403	The Biology of Soil
BIOL3405	Pest Ecology and Management
BOTN3403	Fundamentals of Horticulture

Level 3: And six (6) credits from:

BIOL3412	Internship
BIOL3413	Biology Research Project
BOTN3401	Principles of Plant Biotechnology
BOTN3402	Introduction to Plant Breeding
BOTN3404	Economic Botany
BOTN3405	Plant Ecophysiology
BOTN3407	Post-harvest Technology

MARINE BIOLOGY (MAJOR)

Introductory Courses (Level 1)

A major in Marine Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

A major in Marine Biology requires a total of thirty-nine (39) credits from Levels 2 and 3 and must include:

Level 2: minimum of twenty-one (21) credits from:

BIOL2164	Principles of Molecular Biology
BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2406	Eukaryotic Microbiology
ZOOL2403	Maintenance Systems in Animals
ZOOL2404	Coordination and Control in Animals

Level 3: Nine (9) credits of core courses

BIOL3407	Oceanography
BIOL3408	Coastal Ecosystems
BIOL3409	Caribbean Coral Reefs

And nine (9) credits from:

BIOL2408	Diving for Scientists
BIOL3410	Water Pollution Biology
BIOL3412	Internship
or	
BIOL3413	Biology Project
ZOOL3405	Vertebrate Biology
ZOOL3408	Sustainable Use of Marine Fishable Resources
ZOOL3409	Aquaculture

Advanced Courses (Levels 2 and 3)

PLANT BIOLOGY (MAJOR)

Introductory Courses (Level 1)	<p>A major in Plant Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">BIOL1017</td><td>Cell Biology</td></tr> <tr><td>BIOL1018</td><td>Molecular Biology and Genetics</td></tr> <tr><td>BIOL1262</td><td>Living Organisms I</td></tr> <tr><td>BIOL1263</td><td>Living Organisms II</td></tr> </table>	BIOL1017	Cell Biology	BIOL1018	Molecular Biology and Genetics	BIOL1262	Living Organisms I	BIOL1263	Living Organisms II																								
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Advanced Courses (Levels 2 and 3)	<p>A major in Plant Biology requires a total of thirty-nine (39) credits from Levels 2 and 3 and must include:</p> <p>Level 2: minimum of fifteen (15) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">BIOL2164</td><td>Principles of Molecular Biology</td></tr> <tr><td>BIOL2401</td><td>Research Skills and Practices in Biology</td></tr> <tr><td>BIOL2403</td><td>Principles of Ecology</td></tr> <tr><td>BOTN2401</td><td>Plant Form and Systematics</td></tr> <tr><td>BOTN2402</td><td>Physiology of Plants</td></tr> </table> <p>Level 3: minimum of nine (9) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">BOTN3401</td><td>Principles of Plant Biotechnology</td></tr> <tr><td>BOTN3404</td><td>Economic Botany</td></tr> <tr><td>BOTN3405</td><td>Plant Ecophysiology</td></tr> </table> <p>And six (6) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">BIOL3403</td><td>The Biology of Soil</td></tr> <tr><td>BIOL3404</td><td>Virology</td></tr> <tr><td>BIOL3405</td><td>Pest Ecology and Management</td></tr> <tr><td>BIOL3413</td><td>Research Project</td></tr> <tr><td>BOTN3402</td><td>Introduction to Plant Breeding</td></tr> <tr><td>BOTN3403</td><td>Fundamentals of Horticulture</td></tr> <tr><td>BOTN3406</td><td>Tropical Forest Ecology</td></tr> <tr><td>BOTN3407</td><td>Post-Harvest Technology</td></tr> </table>	BIOL2164	Principles of Molecular Biology	BIOL2401	Research Skills and Practices in Biology	BIOL2403	Principles of Ecology	BOTN2401	Plant Form and Systematics	BOTN2402	Physiology of Plants	BOTN3401	Principles of Plant Biotechnology	BOTN3404	Economic Botany	BOTN3405	Plant Ecophysiology	BIOL3403	The Biology of Soil	BIOL3404	Virology	BIOL3405	Pest Ecology and Management	BIOL3413	Research Project	BOTN3402	Introduction to Plant Breeding	BOTN3403	Fundamentals of Horticulture	BOTN3406	Tropical Forest Ecology	BOTN3407	Post-Harvest Technology
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BOTN3406	Tropical Forest Ecology																																
BOTN3407	Post-Harvest Technology																																

TERRESTRIAL AND FRESHWATER ECOLOGY (MAJOR)

Introductory Courses (Level 1)

A major in Terrestrial and Freshwater Ecology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:

BIOL1017	Cell Biology
BIOL1018	Molecular Biology and Genetics
BIOL1262	Living Organisms I
BIOL1263	Living Organisms II

Advanced Courses (Levels 2 and 3)

A major in Terrestrial and Freshwater Ecology requires a total of thirty-nine (39) credits from Levels 2 and 3 and must include:

Level 2: Fifteen (15) credits from:

BIOL2164	Principles of Molecular Biology
BIOL2401	Research Skills and Practices in Biology
BIOL2403	Principles of Ecology

BIOL2407	Biological Evolution
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BOTN2401	Plant Form and Systematics
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Level 3: Nine (9) credits from:

BIOL3400	Issues in Conservation Biology
BIOL3406	Freshwater Biology
BOTN3406	Tropical Forest Ecology

And six (6) credits from:

BIOL3403	The Biology of Soil
BIOL3405	Pest Ecology and Management
BIOL3410	Water Pollution Biology
BIOL3413	Research Project
BOTN3405	Plant Ecophysiology
ZOOL3403	Entomology

ANIMAL BIOLOGY (MINOR)

Introductory Courses (Level 1)	A minor in Animal Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:	
	BIOL1017	Cell Biology
	BIOL1018	Molecular Biology and Genetics
	BIOL1262	Living Organisms I
	BIOL1263	Living Organisms II
Advanced Courses (Levels 2 and 3)	A minor in Animal Biology requires a total of fifteen (15) credits from Levels 2 and 3 and must include:	
	Level 2: Six (6) credits which must include:	
	ZOOL2403	Maintenance Systems in Animals
	ZOOL2404	Coordination and Control in Animals
	Level 3: Nine (9) credits from:	
	ZOOL3063	Comparative Animal Physiology
	ZOOL3403	Entomology
	ZOOL3404	Parasitology
	ZOOL3405	Vertebrate Biology
ZOOL3406	Immunology	

COASTAL ECOSYSTEMS (MINOR)

Introductory Courses (Level 1)	A minor in Coastal Ecosystems requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:	
	BIOL1017	Cell Biology
	BIOL1018	Molecular Biology and Genetics
	BIOL1262	Living Organisms I
	BIOL1263	Living Organisms II
Advanced Courses (Levels 2 and 3)	A minor in Coastal Ecosystems requires a total of eighteen (18) credits from Levels 2 and 3 and must include:	
	Level 2: Nine (9) credits which must include:	
	BIOL2403	Principles of Ecology
	BIOL2406	Eukaryotic Microbiology
	BOTN2402	Physiology of Plants
	Level 3: Nine (9) credits which must include:	
	BIOL3408	Coastal Ecosystems
	BIOL3409	Caribbean Coral Reefs
BOTN3405	Plant Ecophysiology	

PLANT BIOLOGY (MINOR)

Introductory Courses (Level 1)	<p>A minor in Plant Biology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL1017</td><td>Cell Biology</td></tr> <tr><td>BIOL1018</td><td>Molecular Biology and Genetics</td></tr> <tr><td>BIOL1262</td><td>Living Organisms I</td></tr> <tr><td>BIOL1263</td><td>Living Organisms II</td></tr> </table>	BIOL1017	Cell Biology	BIOL1018	Molecular Biology and Genetics	BIOL1262	Living Organisms I	BIOL1263	Living Organisms II								
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BIOL1262	Living Organisms I																
BIOL1263	Living Organisms II																
Advanced Courses (Levels 2 and 3)	<p>A minor in Plant Biology requires a total of fifteen (15) credits from Levels 2 and 3 and must include:</p> <p>Level 2: Nine (9) credits which must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL2403</td><td>Principles of Ecology</td></tr> <tr><td>BOTN2401</td><td>Plant Form and Systematics</td></tr> <tr><td>BOTN2402</td><td>Physiology of Plants</td></tr> </table> <p>Level 3: Six (6) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BOTN3401</td><td>Principle of Plant Biotechnology</td></tr> <tr><td>BOTN3402</td><td>Introduction to Plant Breeding</td></tr> <tr><td>BOTN3403</td><td>Fundamentals of Horticulture</td></tr> <tr><td>BOTN3404</td><td>Economic Botany</td></tr> <tr><td>BOTN3405</td><td>Plant Ecophysiology</td></tr> </table>	BIOL2403	Principles of Ecology	BOTN2401	Plant Form and Systematics	BOTN2402	Physiology of Plants	BOTN3401	Principle of Plant Biotechnology	BOTN3402	Introduction to Plant Breeding	BOTN3403	Fundamentals of Horticulture	BOTN3404	Economic Botany	BOTN3405	Plant Ecophysiology
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TERRESTRIAL AND FRESHWATER ECOLOGY (MINOR)

Introductory Courses (Level 1)	<p>A minor in Terrestrial and Freshwater Ecology requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL1017</td><td>Cell Biology</td></tr> <tr><td>BIOL1018</td><td>Molecular Biology and Genetics</td></tr> <tr><td>BIOL1262</td><td>Living Organisms I</td></tr> <tr><td>BIOL1263</td><td>Living Organisms II</td></tr> </table>	BIOL1017	Cell Biology	BIOL1018	Molecular Biology and Genetics	BIOL1262	Living Organisms I	BIOL1263	Living Organisms II		
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BIOL1018	Molecular Biology and Genetics										
BIOL1262	Living Organisms I										
BIOL1263	Living Organisms II										
Advanced Courses (Levels 2 and 3)	<p>A minor in in Terrestrial and Freshwater Ecology requires a total of fifteen (15) credits from Levels 2 and 3 and must include:</p> <p>Level 2: Six (6) credits which must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL2403</td><td>Principles of Ecology</td></tr> <tr><td>BIOL2407</td><td>Biological Evolution</td></tr> </table> <p>Level 3: Nine (9) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL3400</td><td>Issues in Conservation Biology</td></tr> <tr><td>BIOL3406</td><td>Freshwater Biology</td></tr> <tr><td>BOTN3406</td><td>Tropical Forest Ecology</td></tr> </table>	BIOL2403	Principles of Ecology	BIOL2407	Biological Evolution	BIOL3400	Issues in Conservation Biology	BIOL3406	Freshwater Biology	BOTN3406	Tropical Forest Ecology
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BIOL3400	Issues in Conservation Biology										
BIOL3406	Freshwater Biology										
BOTN3406	Tropical Forest Ecology										

COURSE DESCRIPTIONS

BIOL0011

PRELIMINARY BIOLOGY I

(6 P-Credits) (Level 0) (Semester 1)

Pre-requisite:

CSEC Biology **OR** equivalent.

Course Content:

1. Cell theory, structure & function; Physical & chemical basis of life (water, mixtures, biological macromolecules); Cellular processes (transmembrane transport; enzyme activity, cell division, DNA replication, protein synthesis).
2. Biological techniques.
3. Mendelian Genetics; Mutation; Genetic Engineering; Natural Selection; Variation; Mechanisms of Speciation; Taxonomy; Variety of life (bacteria, protists, fungi, plants and animals).
4. **Practical Work:** Experiments to demonstrate biochemical and biological processes, principles and techniques. Problem sets to illustrate major genetic concepts. Observation and illustration of living and preserved cells, and organisms to demonstrate diversity. Laboratory reports are submitted the end of the session.

Evaluation:

- | | | |
|---------------------------------|-----|-----|
| • Final Examination | | 60% |
| • Comprehensive Paper (2 hours) | 30% | |
| • Theory Paper (2 hours) | 30% | |
| • Course Work: | | 40% |
| • Laboratory Reports | 10% | |
| • 2 In-course Practical Tests | 20% | |
| • 2 In-course Theory Tests | 10% | |

BIOL0012

PRELIMINARY BIOLOGY II

(6 P-Credits) (Level 0) (Semester 2)

Pre-requisite:

CSEC Biology **OR** equivalent.

Course Content:

1. **Systems in Angiosperms (Anatomy and Physiology):** Structure of roots, stems, leaves; Transpiration; Translocation; Photosynthesis.
2. **Metabolism:** Energy and Energetics; Cellular respiration

- 3. Systems in Mammals (Anatomy and Physiology):** Nutrition and Digestion, Circulation, Respiration, Coordination and Control, Excretion and Osmoregulation; Movement and Support; Reproduction.
- 4. Practical Work:** Gross and histological study of fresh and preserved angiosperms and mammals to demonstrate the relationship between form and function. Dissection of a mammal is included. Laboratory reports are submitted the end of the session.

Evaluation:

- Final Examination 60%
 - Comprehensive Paper (2 hours) 30%
 - Theory Paper (2 hours) 30%
- Course Work: 40%
 - Laboratory Reports 10%
 - 2 In-course Practical Tests 20%
 - 2 In-course Theory Tests 10%

BIOL1017

CELL BIOLOGY

(3 Credits) (Level 1) (Semester 1)

Pre-requisites:

A pass in one of the following:

BIOL0011 - Preliminary Biology I **AND**

BIOL0012 - Preliminary Biology II **OR**

CAPE (Units 1 and 2) Biology **OR** equivalent.

Course Content:

- 1. Identify and Characterize various types of Cells and their levels of Biological Organization:** Mount living organisms for proper examination under the various types of light microscopes; Explain how the cellular components are used in the transfer and utilization of energy and information in cells; Interpret experimental data derived from hypothetical investigations into cell function; Analyse the effectiveness of the mechanisms utilized by cells to maintain internal thermodynamic stability; Apply their knowledge of cell biology to selected examples of response(s) that take place within cells consequent upon defined environmental or physiological changes; Outline the processes by which cells gather raw materials from the environment, construct out of these a new cell in its own image, complete with a new copy of the hereditary information; Describe the basic functional events involved in cell reproduction and the factors that regulate this process.
- 2. Microscopical Techniques to study Living and Fixed Cells:** Structural organization of cells; specialization in cells; Basic functional processes in cells and their regulation; Mitosis and Meiosis.

- Practical Work:** Observation of living cells and permanent microscopical preparation; Making microscopical preparations; Interpretation of electron micrographs.

Evaluation:

- Comprehensive Paper (2 hours) 50%
- Course Work: 50%
 - Tutorial Attendance and Assignments 10%
 - 1 In-course Test (1 hour) 20%
 - Laboratory Reports 20%

BIOL1018

MOLECULAR BIOLOGY AND GENETICS

(3 Credits) (Level 1) (Semester 1)

Pre-requisites:

BIOL0011 - Preliminary Biology I **AND**

BIOL0012 - Preliminary Biology II **OR**

CAPE (Units 1 and 2) Biology **OR** equivalent.

Course Content:

1. **Molecular Biology:** The nature of genes; DNA replication; Transcription; Protein synthesis; Control of gene expression; PCR, cloning and DNA sequencing.
2. **Genetics:** Mendelian Inheritance; Probability, binomial theorem and chi-square test; Quantitative traits; Linkage, crossing over and mapping; Sex linkage and sex determination; Gene frequencies in natural populations.
3. **Practical Work:** DNA isolation, restriction digestion and agarose electrophoresis; Exercises on Mendelian crosses and gene frequencies.

Evaluation:

- Comprehensive Paper (2 hours) 50%
- Course Work: 50%
 - Tutorial Attendance and Assignments 10%
 - 1 In-course Test (1 hour) 20%
 - Laboratory Reports 20%

BIOL1262

LIVING ORGANISMS I

(3 Credits) (Level 1) (Semester 2)

Pre-requisites:

BIOL0011 - Preliminary Biology I **AND**

BIOL0012 - Preliminary Biology II **OR**

CAPE (Units 1 and 2) Biology **OR** equivalent.

Course Content:

1. **Evolutionary Concepts:** Archaeobacteria & Eubacteria; Autotrophic protists; Phylogeny and classification of plants; Bryophytes; Seedless vascular plants; Seed plants – Gymnosperms; Seed plants – Angiosperms (form and function); Photosynthetic systems; Reproductive systems; Plant Ecology.
2. **Practical Work:** Structure of bacteria and protists; Classification of plants; Studies of the structure of the main groups of plants; Demonstrations of adaptive radiation of main groups of plants; The virtual and actual herbarium; The dichotomous key.

Evaluation:

- Comprehensive Paper (2 hours) 50%
- Course Work: 50%
 - Tutorial Attendance and Assignments 10%
 - 1 In-course Test (1 hour) 20%
 - Laboratory Reports (10 x 2% each) 20%

BIOL1263**LIVING ORGANISMS II**

(3 Credits) (Level 1) (Semester 2)

Pre-requisites:

BIOL0011 - Preliminary Biology I **AND**

BIOL0012 - Preliminary Biology II **OR**

CAPE (Units 1 and 2) Biology **OR** equivalent.

Course Content:

Origin of animals; Evolution of diversity; Classification and phylogeny of animals; Ecological principles; Animal-like protists; Animal Architecture; Invertebrate animals; Vertebrate animals; Major groups of fungi; Classification of animals; Studies of the morphology of the main groups of animals and fungi; Dissection of selected animals to show internal anatomy and evolutionary development of the taxonomic group; Demonstrations of adaptive radiation of main groups of animals and fungi. Extensive practical/laboratory work illustrating all the various animal groups.

Evaluation:

- Comprehensive Paper (2 hours) 50%
- Course Work: 50%
 - Tutorial Attendance and Assignments 10%
 - 1 In-course Test (1 hour) 20%
 - Laboratory Reports (10 x 2% each) 20%

BIOL2164

PRINCIPLES OF MOLECULAR BIOLOGY

(3 Credits) (Level 2) (Semester 2)

Pre-requisites:

BIOL1017 - Cell Biology **AND**

BIOL1018 - Molecular Biology and Genetics.

Course Content:

This course introduces recombinant DNA technology, R-DNA cloning, and applications of R-DNA technology. It examines the importance of restriction endonucleases in gene cloning, methods of construction of vectors and their applications in developing gene libraries. The methods of screening and enrichment of libraries are also examined. The principles of the Polymerase Chain Reaction (PCR) and its applications including paternity testing and fingerprinting, are also discussed. The principles of sequencing and the expansion of next-generation sequencing techniques are examined. Approaches to locating genes, including map-based gene isolation, and methods of regulating gene expression, including RNAi, co-suppression, and over-expression are discussed using detailed examples. All techniques are further examined under general and holistic approaches to studying the genome, through forward and reverse genetics approaches, functional genomics, transcriptomics, proteomics and metabolomics. In this course, the theoretical principles discussed during the lectures are reinforced by practical activities that aid in student learning and understanding. As this is a practical – based course, activities in the lab, such as quizzes, lab reports and discussions are all assessed.

Evaluation:

- | | |
|-------------------------------------|-------------|
| • Written Final examination (2 hrs) | 50% |
| • Course work | 50% |
| • Laboratory reports | 10% (2x5%) |
| • Case Studies | 20% (2x10%) |
| • MCQ In-course test (2 hrs) | 20% |

BIOL2401

RESEARCH SKILLS AND PRACTICES IN BIOLOGY

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1017 - Cell Biology **OR** BIOL1018 - Molecular Biology and Genetics **AND** BIOL1262 - Living Organisms II **OR** BIOL1263 - Living Organisms II **OR** equivalent.

Course Content:

Transferable skills (time management, note-taking, production of accurate illustrations of microscopic and macroscopic specimens, group dynamics and

coordination of group activities); Information technology and library resources; Bioethics: Plagiarism, fabrication and falsification of data; Scientific Communication; Laboratory techniques and procedures; Field work-approaches and procedures; Analytical skills; Collecting and identifying specimens; Manipulating and observing specimens; Basic analysis and presentation of data; Data handling, display and interpretation, and basic statistical analysis.

Evaluation:

- | | |
|--------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Literature Review | 6% |
| • Tutorial Exercises | 6% |
| • Oral Presentation and Poster | 8% |
| • Laboratory Reports | 10% |
| • MCQ In-course Test (1 hour) | 20% |

BIOL2402

FUNDAMENTALS OF BIOMETRY

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1262 - Living Organisms I **OR** BIOL1263 - Living Organisms II.

Course Content:

1. **Data in Biology:** Types of variables; accuracy and significant figures; data management.
2. **Populations and Samples:** Statistical populations; the need for samples; sampling procedures.
3. **Descriptive Statistics:** Frequency distributions; measures of central tendency; measures of dispersion.
4. **The Normal Distribution:** Probability density functions; properties of the normal distribution; the distribution of sample means; confidence intervals.
5. **Statistical Hypothesis Testing:** Making decision about populations based on samples; null and alternative hypotheses; alpha and beta error;
6. **One-Sample Hypotheses:** Hypotheses concerning population parameters; testing goodness of fit.
7. **Testing the relationship between two variables:** The nature of a statistical relationship; criteria used to select appropriate tests; overview of major tests.
8. **Applying tests for two variables:** Contingency tests; analysis of variance; regression and correlation; rank tests; multiple comparisons; assessing validity of statistical assumptions.

9. **Tests for more than two variables:** Separating the influences of multiple independent variables on a dependent variable; statistical interaction.

Evaluation:

- Final Examination (2 hours) 60%
- Course Work: 40%
 - Practical Test (2 hours) 20%
 - Laboratory Reports (4 x 5% each) 20%

BIOL2403

PRINCIPLES OF ECOLOGY

(3 Credits) (Level 2) (Semester 2)

Pre-requisites:

BIOL1262 - Living Organisms I **AND**

BIOL1263 – Living Organisms II **OR** equivalent.

This course may require participation in weekend field trips.

Course Content:

Ecology and its domain; Geographic range habitat and niche, abiotic and biotic environment; Ecological role of abiotic factors (climatic and edaphic) on plant and animal populations Population performance along physical gradients; Population structure and demography; population change over time, growth models, dispersal, life tables and resource allocation patterns; Species interactions: competition, predation, herbivory, commensalism, ammensalism, proto cooperation and mutualism; Communities; community classification, concepts and attributes; Island Communities; Primary and secondary ecological succession; Nutrient cycling and energy flow; Primary and secondary production, trophic levels and ecological efficiency.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - MCQ In-course Test (1 hour) 10%
 - Practical Test (2 hours) 20%
 - Laboratory and Field Reports 20%

BIOL2406

EUKARYOTIC MICROBIOLOGY

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1017 - Cell Biology,

BIOL1262 - Living Organisms I **AND**

BIOL1263 - Living Organisms II

OR

BIOC1020 - Cellular Biochemistry, BIOC1021 - Practical Biochemistry 1,

MICR1010 - Introductory Microbiology & Molecular Biology **AND**

MICR1011 - Practical Microbiology & Molecular Biology.

Course Content:

A study of the structure and function, taxonomy, reproduction, physiology and ecological applications of the protists and fungi inclusive of: The evolution of the eukaryotic condition; The biological diversity and phylogeny of the protists and fungi; The nutrition and adaptations within the protists and fungi; A systematic study of the major taxonomic groups: Diplomonads, Parabasalids, Euglenoids, Alveolates, Stramenopiles; The Algae: Cyanophyta; Glaucophyta; Rhodophyta; Chlorophyta, Streptophyte algae; The Fungi & fungal-like microorganisms; Reproduction in the protists and fungi; Ecology and economic importance of the protists and fungi; Management of the protists and fungi; Ecology, economic importance and management of the protists and fungi. Ecology and economic importance of the protists and fungi; Management of the protists and fungi.

Laboratory exercises include two group projects directed at the investigation of the morphology, physiology and ecology of selected protists and fungi involving the techniques of: light microscopy, isolation, inoculation techniques, aseptic technique and sterilization, making media, culture of microorganisms, and staining. Students are required to actively participate in interactive tutorial sessions in which they are required to apply their understanding of the material presented in lectures and demonstrate their understanding of the laboratory exercises.

Evaluation:

- | | |
|-------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Project Reports | 10% |
| • Practical Test (2 hours) | 20% |
| • Laboratory Reports | 20% |

BIOL2407

BIOLOGICAL EVOLUTION

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1262 - Living Organisms I **OR** BIOL1263 - Living Organisms II **OR** equivalent.

Course Content:

A historical perspective to evolution and variation; Hardy-Weinberg equilibrium, mutation, selection, migration, and genetic drift; non-random mating and

inbreeding; Evolution below the species level, adaptation; Sex ratio, sexual selection, kin selection; Speciation, systematics, and the evolution of hominids.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - Laboratory Reports (1 x 10%) 10%
 - MCQ In-course Test (2 x 20%) 40%

BIOL2408

DIVING FOR SCIENTISTS (SUMMER ONLY)

(3 Credits) (Level 2) (Semesters 3 & 4)

Pre-requisites:

Lecturer's approval required.

Students must have 24 first-year credits in the FST, a certificate of "Fitness to Dive" from the University Health Centre and be able to pass a test of swimming competence.

This course may require participation in weekend field trips.

Course Content:

Principles of diving: the properties of water, pressure and buoyancy, gas laws, and air consumption; Physiology of diving: effect of pressure on the human body, adverse effects of gases, barotraumas, the role of nitrogen in decompression illness (DCI), signs and symptoms of DCI; Safe diving practices: use of decompression tables, diver rescue techniques and emergency ascents; Diving Equipment; Diving as a tool for scientific research: introduction to the fauna and flora of coral reefs; Underwater sampling and survey methods, data collation and analysis.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - MCQ In-course Test 10%
 - Oral Presentation of research Project 10%
 - 5 Open Water Skills Test 30%

BOTN2401

PLANT FORM AND SYSTEMATICS

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1017 - Cell Biology,

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1262 - Living Organisms I **OR** equivalent.

Course Content:

Plant body organization; Plant form and the environment structures involved in: Accessing raw materials from the environment, Structural support of the plant body; Anatomical specializations and structural adaptations of plants; Excretory processes; Plant reproduction; Plant habit types and their anatomical features; The evolution of plants; Plant life cycles; Plant systematics; Sources of taxonomic data; Contemporary taxonomic system and nomenclature of plants; Analysis and interpretation of taxonomic data; Herbaria and plant taxonomic research; Plant identification; Sporiferous non-vascular Plants: Anthocerotophyta, Hepaticophyta, Bryophyta; Sporiferous vascular plants: Pteridophyta; Sphenophyta; Seed-bearing plants: The seed habit, Gymnosperms, Angiosperms.

Evaluation:

- | | |
|------------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • MCQ In-course Test | 10% |
| • Practical Test (2 hours) | 20% |
| • Laboratory Reports (4 x 5% each) | 20% |

BOTN2402**PHYSIOLOGY OF PLANTS**

(3 Credits) (Level 2) (Semester 1)

Pre-requisites:

BIOL1017 - Cell Biology,

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1262 - Living Organisms | **OR** equivalent.

Course Content:

How plants function at the level of cells, tissues, organs and the whole plant; Carbon fixation and the different photosynthetic pathways; Growth, development and differentiation of plant tissues and organs; Roles of Plant Growth Regulators in the physiology and biochemistry of cells and whole plants; Soil-plant relations, where and how water and nutrients are transported in plants; Source sink relations and translocation of photosynthates; Introduction to secondary metabolites and their roles in the physiology and the biochemistry of plants.

Evaluation:

- | | |
|------------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • In-course Test | 10% |
| • Practical Test (2 hours) | 20% |
| • Laboratory Reports (4 x 5% each) | 20% |

ZOOL2403

MAINTENANCE SYSTEMS IN ANIMALS

(3 Credits) (Level 2) (Semester 2)

Pre-requisites:

BIOL1017 - Cell Biology,

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1263 - Living Organisms II **OR** equivalent.

Course Content:

1. **Feeding and Digestion:** Structures a used for mastication, digestion, absorption and storage of food.
2. **Gut Systems:** types of gut systems, overview gut systems of vertebrates and invertebrates.
3. **Gaseous Exchange:** Important physical considerations: oxygen availability in different environments, diffusion of gases in air and water, impact of shape and size. Breathing in water and air, adaptations for diving.
4. **Circulatory Systems:** Comparison of gastrovascular and blood vascular systems; open and closed systems, Components of circulatory systems of selected invertebrates and vertebrates, Evolution of vertebrate circulatory system, microcirculation in vertebrates.
5. **Excretion and Osmoregulation:** Chemicals involved in excretion and osmoregulation, Contractive vacuoles, nephredia, malpighian tubules and nephrons, Secondary structures: salt glands, rectal glands, urate cells.
6. **Reproduction:** Comparison of asexual and sexual reproduction. Alternation of generations. Sexual and asexual reproduction various animal groups.
7. **Colonial Life:** Case studies from Prolifera and Cnidaria.

Evaluation:

- | | |
|------------------------------------|------|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • MCQ In-course Test | 10 % |
| • Practical Test (2 hours) | 20% |
| • Laboratory Reports (4 x 5% each) | 20% |

ZOOL2404

COORDINATION AND CONTROL IN ANIMALS

(3 Credits) (Level 2) (Semester 2)

Pre-requisites:

BIOL1017 - Cell Biology,

BIOL1018 - Molecular Biology and Genetics **AND**

BIOL1263 - Living Organisms II **OR** equivalent.

Course content:

1. **Embryonic Development and Structure of the Vertebrate and Invertebrate Nervous System:** Neurulation in the vertebrate, Regional specialization in the vertebrate brain, Meninges and tracts, Evolutionary trends in vertebrate brain development.
2. **Reflex Action and Autonomic Function:** Structural basis of visceral and somatic reflexes; Comparative anatomy of the autonomic nervous system in vertebrates; Development and evolution of the eye in animals considering mollusc and vertebrate eyes and the compound eyes of Arthropoda; The acoustic-lateralis system; Structure and functioning of hair cells in the teleost lateral line system and in the inner ear; Evolutionary development of the mammalian middle ear bones.
3. **The Structure of Selected Endocrine Glands and their Function:** Origins and embryonic development of the vertebrate hypophysis and adrenal gland; survey of the endocrine system of insects, crustaceans and cephalopods.
4. **Muscle Development and Function:** Embryological origins of the different muscle types, their location and functions; Detail of the sliding filament theory of muscle contraction; The derivation of jaw muscles and facial muscles from the branchiomeric musculature
5. **The Integument:** Formation of the integument in insects and vertebrates, Epidermal and dermal derivatives, and their functions.

Evaluation:

- | | |
|-------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • MCQ In-course Test | 10% |
| • Practical Test (2 hours) | 20% |
| • 9 Laboratory Reports | 20% |

BIOL3400

ISSUES IN CONSERVATION BIOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BIOL2403 - Principles of Ecology **AND**

BIOL2407 - Biological Evolution.

This course may require participation in weekend field trips.

Course Content:

Biological diversity and its values; Threats to biological diversity: habitat destruction, exotic species, pollution, global climate change, and over-exploitation; Conservation genetics and the population biology of threatened species; Managing threatened species: *in-situ* and *ex-situ* interventions; Establishing and managing protected areas; Social framework for the conservation of biodiversity.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work 50%

BIOL3401**ENVIRONMENTAL MICROBIOLOGY**

(3 Credits) (Level 3) (Semester 2)

Pre-requisite:

BIOL2406 - Eukaryotic Microbiology.

Course Content:

1. **Cell Biology and Genetics:** Overview of the chemical composition of microbial cells, cell structure, genetic elements, mutation and genetic exchange, taxonomy and phylogeny.
2. **Biosynthesis:** Metabolism, anabolism, key enzymes, biosynthesis, nutrient assimilation, fuelling reactions, energetics.
3. **Metabolic Diversity:** Aerobic respiration, diversity of aerobic metabolism, fermentation, anaerobic respiration, anaerobic food chains, autotrophy, regulation of activity.
4. **Methods:** Sampling, detection, identification, enumeration.
5. **Populations, Communities, Ecosystems:** Interactions within and between populations, interactions with plants and animals, structure and dynamic of communities, abiotic factors.
6. **Applied Environmental Microbiology:** importance of microorganisms in bio-deterioration, solid and liquid waste (sewage) treatment, bioremediation, biodegradation, biological pest control and public health.
7. **Laboratory:** based exercises on the techniques necessary to grow and identify microorganisms, recognition and differentiation of microbial characteristics in culture, identification based on metabolic differences and nucleic acid-based techniques.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - Tutorial Participation 5%
 - Laboratory Reports 15%
 - Participation in Tutorials 15%
(Submission of PBL responses)
 - In-course Test 15%

BIOL3402

BIOLOGY OF THE FUNGI (Not offered 2022/2023 academic year)

(3 Credits) (Level 3) (Semester)

Pre-requisites:

BIOL2406 - Eukaryotic Microbiology.

Course Content:

The structural and ultra-structural characteristics and the ecological significance of the major groups of fungi of importance in the West Indies; The influence of genetic, nutritional and environmental factors on fungal growth, differentiation, reproduction and dispersal and germination of spores; The practical exploitation by man of fungal interactions (Fungi as sources of food, Fungal metabolite production, The roles of fungi in biotechnology); Prevention and control of fungal growth responsible for the bio-deterioration of commercial products; Collection, culture and preservation of fungi.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - Oral Tutorial Presentation 10%
 - Laboratory Reports (5 x 4%) 20%
 - In-course Test 20%

BIOL3403

THE BIOLOGY OF SOIL

(3 Credits) (Level 3) (Semester 1)

Pre-requisite:

BIOL2403 - Principles of Ecology.

Course Content:

The soil environment; soil formation and soil abiotic components; soil organisms: prokaryotic and eukaryotic microorganisms, animals and plant parts; Biological processes occurring in soil; Environmental issues affecting life in the soil: acid rain, metal toxicity, salinity, radioactivity, pesticides, and the introduction of organisms; The impact of agricultural practices and climate change on soil ecology and biodiversity.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - MCQ In-course Test 15%
 - Short-answer Test 15%
 - Laboratory and Field Reports (5 x 4%) 20%

BIOL3404
VIROLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BIOL2404 - Molecular and Population Genetics **OR**

BIOL2312 - Molecular Biology I

Course Content:

Fundamental concepts of virology; structure, replication cycles, transmission, epidemiology of human, animal, plant and microbial viruses; laboratory diagnostic techniques; laboratory-based exercises on the detection and basic characterization of viruses to include virus purification, bio-indexing, electron microscopy, serology, polymerase chain reaction and transmission.

Evaluation:

- Final Examination (2 hours) 60%
- Course Work: 40%
 - Participation in Tutorials (Submission of PBL responses) 5%
 - Laboratory Reports 15%
 - In-course Test 20%

BIOL3405
PEST ECOLOGY AND MANAGEMENT

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BIOL2401 - Research Skills and Practices in Biology **AND**

BIOL2403 - Principles of Ecology.

Course Content:

Pest evolution; Population dynamics of pest species; Pest-host and pest-natural enemies interactions; Insects and diseases; Assessing pest populations and related economic impact; The concept of pest management; Pest management strategies.

Evaluation:

- Final Examination (2 hours) 45%
- Course Work: 55%
 - Oral Presentation on Pest Survey 5%
 - Oral Examination 5%
 - Oral Presentations 5%
 - Insect Pest Collection 20%
 - Laboratory Reports (5 x 4%) 20%

BIOL3406

FRESHWATER BIOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisite:

BIOL2403 - Principles of Ecology.

This course may require participation in weekend field trips.

Course Content:

Lotic habitats; Physico-chemical characteristics; Concepts of subdivision of rivers and their applicability to tropical locations; The allochthonous food web; Resilience and refuge theory; Lentic habitats; Stratification and lake classification Productivity; Bio-manipulation and the cascade effect; Lake benthos; Field based collection of material and Evaluation of physico-chemical data Laboratory based identification of freshwater organisms.

Evaluation:

- | | |
|-------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Tutorial Participation | 10% |
| • Laboratory Reports | 20% |
| • Practical Examination | 20% |

BIOL3407

OCEANOGRAPHY

(3 Credits) (Level 3) (Semester 1)

Pre-requisite:

BIOL2403 - Principles of Ecology.

Course Content:

Ocean basins: their origin and structure; Chemical and physical properties of ocean water; Circulation and mixing: currents, waves and tides; Marine sediments: their origin and deposition; Form and function of planktonic organisms; Distribution of planktonic organisms; Primary production and its measurement; Secondary production and its measurement; Food chains/food webs in the pelagic province; Ocean Nekton; Vertical migration and the deep-sea pelagic area.

Evaluation:

- | | |
|--|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Oral Presentation of Tutorial Topics | 5% |
| • Practical Examination (5 x 5%) | 20% |
| • Laboratory Reports | 25% |

BIOL3408

COASTAL ECOSYSTEMS

(3 Credits) (Level 3) (Semester 1)

Pre-requisite:

BIOL2403 - Principles of Ecology.

Course Content:

An examination of the diversity, productivity and functions associated with: beaches and dunes; coral reefs; mangroves forests; seagrass beds; estuaries and wetlands; An examination of the range and impact of pollution affecting coastal ecosystems especially: organic; hydrocarbons; pesticides; heavy metals; physical and thermal pollution; Exercises in evaluation of: coastal surveys; environmental monitoring; water quality ranges and criteria; zoning, parks and protected areas as conservation options of coastal ecosystems.

Evaluation:

- | | |
|--|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Research Topic/Oral Presentation | 10% |
| • Laboratory and Field Report (5 x 5%) | 20% |
| • Practical Test | 20% |

BIOL3409

CARIBBEAN CORAL REEFS

(3 Credits) (Level 3) (Semester 1)

Pre-requisite:

BIOL2403 - Principles of Ecology.

Students may be required to demonstrate satisfactory competency in the water before embarking on this course.

Course Content:

An introduction to the reef geography of the wider Caribbean and history of reef resource use in the Caribbean; Coral Biology including taxonomy, anatomy and skeletal morphology, endosymbiosis with zooxanthellae, calcification and growth, nutrition, defensive behaviour, reproduction and recruitment; Environmental conditions required for coral reef formation, geological history of Caribbean reef formation and types of reefs; dynamics of reef structure formation and erosion; Reef community structure, zonation and dynamics; Major reef-associated organisms with attention to their ecological function; Uses including reef fisheries, tourism and recreation, biodiversity and marine products, and ecosystem services; Valuation including Total Economic Value, use values, option values and non-use values; The threats and future challenges to Caribbean coral reefs including natural disturbances and anthropogenic activities; Hurricanes, tsunamis, and earthquakes; Coral diseases and diseases of reef organisms; Overfishing, deterioration of water quality, physical destruction

of reefs, climate change, invasive species; An introduction to monitoring methods and the ecosystem-based approach to reef management, including examples of mitigation actions appropriate to different geographic scales.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - 1 In-Water Practical Test 10%
 - 1 Tutorial Research Essay 10%
 - 5 Laboratory and Field Report 30%

BIOL3410

WATER POLLUTION BIOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**

ZOOL2404 - Coordination and Control in Animals.

Course Content:

Sources and effects of water pollution; Biological monitoring of water quality; Toxicity of pollutants to aquatic organisms; Water pollution and public health; Water pollution control; Invasive species and their consequences to aquatic habitats.

Field and laboratory-based exercises including examination of sources of pollution, conducting a bio-monitoring programme in Jamaican rivers, determining toxicity levels, determining coliform levels and BOD.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - Tutorials 10%
 - Laboratory Report 20%
 - Practical Examination 20%

BIOL3411

RESEARCH PROJECT

(6 Credits) (Level 3) (Semester 1 and 2)

Pre-requisite:

Approval from Head of Department.

Course Content:

Aims and means of assessing feasibility of projects; Techniques in data collection, collation and analysis; Ethical research, experimental design, project reporting and presentation; Scientific writing; Investigation and written report on an approved topic; Multi-media-based oral presentations.

Evaluation:

- Project Written Report 50%
- Oral Examination: 50%
 - Presentation 10%
 - Knowledge and Understanding 20%
 - Response to Questions 20%

BIOL3412

INTERNSHIP

(3 Credits) (Level 3) (Semester 3)

Pre-requisites:

BIOL2401 - Research Skills and Practices in Biology **AND**

BIOL2402 - Fundamentals of Biometry

*Internships are available to students doing BSc degrees in Life Sciences, but placement is based on the availability of appropriate host companies. **Head of department approval of course selection is therefore required.***

Course Content:

On the job operations in a selected area of the Life Sciences disciplines; Daily log generation and production of written reports related to specially designed or general activities; Self-Evaluation of performance and operations in the work environment; Evaluation of the practices, efficiencies and suggest possible improvement of the operations for the main enterprise(s) at the host institution.

Note for Student:

The student is expected to spend 30 hours per week for approximately 6 weeks working in one of the pre-selected participating organisations. The student is required to: 1). Meet regularly with the Departmental Internship Coordinator to discuss the internship experience and any work-related or logistical issues 2). Maintain a daily log of hours worked and a brief description of the work performed 3). Submit a final report summarising and evaluating the internship experience; and 4). Complete a résumé and interview at the Office of Placement and Career Services, UWI (Mona).

Evaluation:

Internship report (graded by the Department coordinator) which summarize the activities carried out during the internship and how it relates to the BSc

programme being pursued, documentation of the main operations and structure of the host organization, evaluation of the efficiency of the enterprise, and the student's own evaluation of the experience.

- Evaluation of Performance 25%
- Oral Presentation 25%
- The daily log of activities should be included as an appendix at the end of the report 50%

BIOL3413

BIOLOGY PROJECT

(3 Credits) (Level 3) (Semester 1, 2, 3)

Pre-requisites

BIOL2402 - Fundamental of Biometry **AND** Head of Department approval.

Course Content:

The basic elements of scientific method, experimental design, project reporting and presentation; Aims and means of assessing feasibility of projects; Techniques in conducting a scientific study: data collection, collation and critical analysis; Scientific report writing on an approved topic; PowerPoint presentations; Review of research ethics.

Evaluation:

- Project Report (at least 2000 words) 75%
- Oral Examination (includes PowerPoint presentation) 25%

BOTN3401

PRINCIPLES OF PLANT BIOTECHNOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BOTN2402 - Physiology of Plants **OR**

BIOL2312 - Molecular Biology I.

Course Content:

Fundamental concepts of plant biotechnology; plant tissue culture, transformation of plants or plant cells, stress, pathogen and herbicide tolerance, Improved nutritional content and functional foods, phytoremediation, forest biotechnology, plants as green factories; production of plastics, fats/oils, fibers, proteins and biofuels; GMO regulations; Laboratory-based exercises on plant micropropagation, transformation and molecular markers.

Evaluation:

- | | |
|--|-----|
| • Final Examination (2 hours) | 60% |
| • Course Work: | 40% |
| • Participation in tutorials (PBL responses) | 5% |
| • Laboratory Report (2 x 7.5%) | 15% |
| • In-course Test (1 hour) | 20% |

BOTN3402**INTRODUCTION TO PLANT BREEDING**

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BIOL2404 - Molecular and Populations Genetics.

Course Content:

Plant domestication and crop evolution; Reproduction in crop plants; Inheritance of quantitative characters and plant breeding; Breeding self-pollinated crops; Breeding cross-pollinated and clonally propagated crops; Breeding hybrid varieties by manipulation of fertility regulating mechanisms; Breeding for biotic and abiotic stress factors; Polyploidy and plant breeding; Germplasm resources, gene banks and conservation; New variety testing, release, maintenance and seed production; and Molecular breeding.

Evaluation:

- | | |
|-------------------------------------|-----|
| • Final Examination (2 hours) | 60% |
| • Course Work: | 40% |
| • Laboratory Report (5 x 2%) | 10% |
| • Mid-semester Examination (1 hour) | 10% |
| • Practical Examination | 20% |

BOTN3403**FUNDAMENTALS OF HORTICULTURE**

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

BOTN2401 - Plant Form and Systematics **AND**

BOTN2402 - Physiology of Plants.

Course Content:

1. **Horticultural Plants** (as distinct from routine agricultural plants): morphology, taxonomy, environmental physiology.
2. **Propagation of Horticultural Plants:** Sexual propagation, Seed production and certification, methods of seeding, seed nursery, transplantation Asexual

propagation: cuttings, grafting, budding, layering, specialised underground structures, micropropagation; Nursery Management.

3. **Controlled Environment Horticulture:** Greenhouse design and construction, Internal environment control, Light, irrigation, temperature, humidity, substrate, pot and bed culture.
4. **Out-door Environment Culture:** principles of landscaping, nursery production, bedding plants, ground cover/grasses, trees and shrubs.
5. **Growing Garden Crops:** ornamentals, vegetables, herbs, fruit trees; Post-Harvest Handling and Marketing of Horticultural Produce; Computers in Horticulture.

Evaluation:

- | | |
|------------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Laboratory and Field Trip Report | 15% |
| • Research and Oral Presentation | 15% |
| • Practical Test (2 hours) | 20% |

BOTN3404

ECONOMIC BOTANY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BOTN2401 - Plant Form and Systematics **AND**

BOTN2402 - Physiology of Plants.

Course Content:

1. Plant families of medicinal and economic importance.
2. Origin of Agriculture.
3. Ethnobotany: **Medicinal Plants:** Herbs and spices; Phytochemicals; Nutraceuticals; Aromatherapy; Conventional and Alternative Medical Systems; Naturopathy; Integrative medicine; Traditional medical systems and botany. **Social Uses of Plants:** Fumitories, Masticatories, Ethnic, cultural & religious influences on plant usage; Plant Products: flavours and fragrances, gums, resins, oils, fibres; Under-utilized tropical plant food; Timber and non-timber forest products; Economic uses of algae, bryophytes and pteridophytes; Conservation of medicinal and economically important plant genetic resources.

Evaluation:

- | | |
|-----------------------------------|-----|
| • Final Examination (2 hours) | 40% |
| • Course Work: | 60% |
| • Field Projects | 10% |
| • Laboratory Report (5 x 3%) | 15% |
| • Oral Presentation and Tutorials | 15% |
| • In-course Test (2 hours) | 20% |

BOTN3405

PLANT ECOPHYSIOLOGY

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

BOTN2401 - Plant Form and Systematics **AND**

BOTN2402 - Physiology of Plants.

Course Content:

An examination of the physiological adaptations of tropical plants to their environments using the following as examples: Tropical Forests (the physiology of nutrient cycling and photosynthetic plastic response); Epiphytes and Lianas (the physiology of foliar absorption); Mangroves and salinas (the physiology of water uptake and salt extrusion); Aquatic habitats (respiration and photosynthesis underwater); Savannas, deserts and dunes (the physiology of C3, C4 CAM, CAM shifting and CAM idling).

Evaluation:

- | | |
|---|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Research Project with Oral Presentation | 10% |
| • Practical Test (2 hours) | 20% |
| • Laboratory and Field Report (5 x 4%) | 20% |

BOTN3406

TROPICAL FOREST ECOLOGY

(3 Credits) (Level 3) (Semester 1)

Pre-requisite:

BIOL2403 - Principle of Ecology.

This course may require participation in weekend field trips.

Course Content:

Origins of tropical rain forests; Origins of tropical forest diversity; Characteristics of tropical rain forests; Tropical rainforest formations; Tropical dry forests; Reproductive ecology of tropical rain forest trees; Reproductive ecology of tropical dry and moist forest trees; Principles of tropical forest hydrology; Tropical forest nutrient cycles; The effects of deforestation and habitat fragmentation; Payments of ecosystem services and REDD (reducing emissions from deforestation and forest degradation); Global climate change and tropical forest ecosystems.

Evaluation:

- | | |
|-------------------------------|-----|
| • Final Examination (2 hours) | 60% |
| • Course Work: | 40% |
| • Research Topic | 10% |
| • Fieldwork Report (2 hours) | 30% |

BOTN3407

POSTHARVEST TECHNOLOGIES (*Not being offered 2022/2023*)

(3 Credits) (Level 3) (Semester 2)

Pre-requisite:

BOTN2402 - Physiology of Plants.

Course Content:

Ripening and Senescence of Fruits; Maturation, Ripening, Senescence; Determinants of Readiness for Harvest; Maturation index, ripening index; Harvesting Practices; Manual harvesting, Mechanical harvesting; Best Agricultural Practices and harvesting; Preparation for Storage and Transport Transportation, Handling, Packaging; Storage Technologies Refrigeration, MA/CA packaging, Irradiation, Chemicals Other physical technologies (IR, UVc, hot water, etc.); Post-harvest Changes and Loss of Value.

Evaluation:

- Final Examination (2 hours) 50%
- Course Work: 50%
 - Practical Test 15%
 - Field Exercise/Field Trip Report 15%
 - Research and Oral Presentation 20%

ZOOL3063

COMPARATIVE ANIMAL PHYSIOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**

ZOOL2404 - Coordination and Control in Animals.

Course Content:

Comparison of the following in vertebrates and arthropods:

1. **Circulatory Physiology.** Types of circulation; Physiology of open circulation; Physiology of closed circulation: vascular flow, pressure and resistance; Nervous control of myogenic and neurogenic hearts; Capillary fluid exchange; Endocrine control of heart; Electrocardiograms; Metabolic scaling: heart size, blood pressure, cardiac output
2. **Digestive Physiology.** Functions of components of the digestive system; Nervous control of feeding; Nutrient acquiring modes for particulate, mass, and fluid food; endosymbionts; Meal processing design; Nervous control of feeding and peristalsis; Chemical digestion of carbohydrates, lipids, proteins; Transmembrane proteins for absorption of monosaccharides, fatty acids and amino acids; Metabolic scaling: dietary needs
3. **Respiratory Physiology.** Respiratory media; Ventilation mechanisms and capacity; Gaseous exchange mechanisms; Diffusion of gases in animals;

Respiratory pigments; Factors affecting gas delivery (oxygen and carbon dioxide dissociation curves, Bohr effect, Root effect, Haldane effect); Cellular respiration processes; Nervous and endocrine control of respiration; Transmembrane proteins for electron transport chain; Energy metabolism; Metabolic rates: scaling O₂ consumption and CO₂ output

4. **Excretory and Osmoregulatory Physiology.** Ammonotelic, ureotelic and purinotelic urine formation; Kidney regulation of blood composition; Transmembrane transport of water and ions; Flow and clearance of solutes and water in tubes; Osmotic concentration of urine; Endocrine control of excretion; Maintenance of salt and water balance in aquatic and terrestrial environments; Metabolic scaling: excretory units

Evaluation:

- | | |
|-------------------------------------|------|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Laboratory Reports (3 x 10% each) | 30% |
| • 1-hour MCQ or SAQ Test | 10 % |
| • Multimedia Group Presentation | 10% |

ZOOL3403

ENTOMOLOGY

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

BIOL2401 - Research Skills and Practices in Biology **AND**

ZOOL2403 - Maintenance Systems in Animals **and**

ZOOL2404 - Coordination and Control in Animals **OR**

BOTN2401 - Plant Form and Systematics **and**

BOTN2402 - Physiology of Plants.

This course may require participation in weekend field trips.

Course Content:

Biology of the insects including external and internal morphology in relation to taxonomy and evolution, life histories, social organizations where applicable, place in biosphere; Diversity of the insects including: taxonomy, an order-by-order survey with emphasis on Caribbean fauna and economically important groups; Examples of harmful groups including pests and vectors; Examples of beneficial taxa, such as those important for pollination, natural control of populations, and ecotourism; Practical Component: Laboratory exercises to study basic morphological structures as well as modifications; Exercises in taxonomy including use of binomial keys; Practice of techniques in the collection and curation of insects; Field trips to practice and evaluate various techniques; opportunities to collect insects and study their adaptations to a wide variety of habitats.

Evaluation:

- | | |
|-------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Laboratory Reports | 10% |
| • Oral Examination | 15% |
| • Insect Collection | 25% |

ZOOL3404**PARASITOLOGY**

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **and**
 ZOOL2404 - Coordination and Control in Animals **OR**
 BIOC2014 - Bioenergetics and Cell Metabolism,
 BIOL2312 - Molecular Biology I, **and**
 MICR2211 - Microbiology **AND**
 BIOL2406 - Eukaryotic Microbiology.

Course Content:

Fundamental concepts of parasitology; morphology, lifecycle, transmission, pathology and control of selected protist, helminth and arthropod parasites of humans and domesticated animals; laboratory diagnostic techniques; parasite ecology and evolution; parasite immunology; epidemiology of soil-transmitted helminth (STH) infections in the Caribbean region; Laboratory-based exercises to include recognition and diagnosis of a range of parasitic infections of humans and domesticated animals.

Evaluation:

- | | |
|--------------------------------------|-----|
| • Final Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Participation in Tutorials | 5% |
| • Visual Media Examination (2 hours) | 15% |
| • Laboratory Report (10x3%) | 30% |

ZOOL3405**VERTEBRATE BIOLOGY**

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**
 ZOOL2404 - Coordination and Control in Animals.
This course may require participation in weekend field trips.

Course Content:

Vertebrate relationships and basic structure; Diversity and radiation of fishes; Radiation of tetrapod; Avian specializations; Radiation and diversity of birds; The evolution and biogeography of mammals; Mammalian characteristics, specializations and diversity; Aquatic mammals. Primate evolution. Ecology and social behaviour of mammals and birds; Herbivory; Reproductive strategies and population dynamics of vertebrate populations; Commensal vertebrates and vertebrate pests; Practical Component: Field and laboratory-based exercises including, ecomorphology of fishes, lizard behaviour, composition of bird communities in different habitats, mammalian feeding strategies.

Evaluation:

- | | |
|--------------------------------------|-----|
| • Final Theory Examination (2 hours) | 60% |
| • Course Work: | 40% |
| • Tutorial Participation | 5% |
| • Laboratory Report (5 x 3%) | 15% |
| • Group Presentation | 20% |

ZOOL3406**IMMUNOLOGY**

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**
 ZOOL2404 - Coordination and Control in Animals) **OR**
 BIOC2014 - Bioenergetics and Cell Metabolism,
 BIOL2312 - Molecular Biology I, **AND**
 MICR2211 - Microbiology).

Course Content:

1. **Basic Immunology:** Components of innate and acquired immunity; immunogens and antigens; antibody structure and function; antibody-antigen interactions; the complement system; ontogeny of immune cells; triggering the immune response; the major histocompatibility complex in immune responses; control mechanisms in the immune response.
2. **Immunity in Action:** Immunoassays, hypersensitivity reactions, disorders of the immune response, HIV infection, autoimmunity, transplantation immunology, tumour immunology.
3. **Laboratory Work:** Histology of lymphoid organs of the mouse; viable counts of splenic lymphocytes; precipitation & agglutination reactions; diagnostic immunology; problem-based learning exercises, etc.

Evaluation:

- | | |
|--------------------------------------|-----|
| • Final Theory Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • 1 MCQ Paper (2 hours) | 20% |
| • Laboratory Reports (5 x 6% each) | 30% |

ZOOL3407

HUMAN BIOLOGY

(3 Credits) (Level 3) (Semester 1) (*Not being offered 2022/2023*)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**
ZOOL2404 - Coordination and Control in Animals **OR**
BIOC2014 - Bioenergetics and Cell Metabolism,
BIOL2312 - Molecular Biology I, **AND**
MICR2211 - Microbiology.

Course Content:

Human identity; Human development; Human functional systems; Musculo-skeletal; Neuro-sensory; Metabolic; Respiration; Circulatory; Urinary; Reproductive; Immune; Abnormalities e.g., cancer, congenital, autoimmune; Human heredity and genetics; aging; Human evolution; Man and the environment; Normative ethics; environmental ethics.

Evaluation:

- Final Theory Examination (2 hours) 50%
- Written Project 50%

ZOOL3408

SUSTAINABLE USE OF MARINE FISABLE RESOURCES

(3 Credits) (Level 3) (Semester 1)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**
ZOOL2404 - Coordination and Control in Animals.

Course Content:

1. **Fish Biology:** External form and functional design; Locomotion; swim bladders; red muscle; Growth and estimation of growth rates, ageing techniques; reproduction & larval life.
2. **Fisheries Evaluation:** Fishing techniques; Fish population dynamics, stocks, populations, recruitment, mortality; Fish populations & exploitation, fishing effort, CPUE, yield, yield models, MSY, OEY; Introduction to fisheries modelling & Evaluation software.
3. **Caribbean Fisheries:** Jamaican reef fisheries; Pelagics; Guyana shelf fisheries; Lobster & queen conch industrial fisheries, Spearfishing.
4. **World Fisheries:** Case study - Peruvian anchoveta collapse, El Nino ENSO phenomenon; Lionfish invasion in Atlantic & Jamaica; Large marine mammal exploitation; Major harvesting methods.
5. **Fisheries Management:** Principles of fisheries management; Paradigm shifts in management; Marine Protected Areas/Fish Sanctuaries, Ecosystem Based Management (EBM).

6. **Practical Component:** Laboratory demonstration of fishable species showing variability and difficulties of exploitation; Investigation of Fishable resources of Kingston Harbour demonstrating gear operation, gear selectivity; ecological factors affecting resource distribution; Lionfish research at the Discovery Bay Marine Lab (DBML), St. Ann, management of invasives, lionfish behaviour and distribution studies; Caribbean Coastal Area Management Foundation (CCAMF), Salt River, Clarendon & fish sanctuary tour to demonstrate fisheries co-management issues, ecology of sanctuaries, reality of management of a major coastal zone.

Evaluation:

- Final Theory Examination (2 hours) 50%
- Course Work: 50%
 - In-course Test (2 hours) 25%
 - Practical Assignment (5 x 6% each) 25%

ZOOL3409

AQUACULTURE

(3 Credits) (Level 3) (Semester 1) (**Not being offered 2022/2023**)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**

ZOOL2404 - Coordination and Control in Animals.

Course Content:

1. **Water Quality:** Dissolved gases, alkalinity and hardness, Nitrogen cycles, Phosphorus cycle, Sulphur cycles, iron cycle and Redox potential.
2. **Hatchery Management Practices:** Modern hatchery systems, fish seed production, hormonal treatment, fish propagation in hatcheries, fry handling and transportation.
3. **Pond Construction:** Site selection criteria, site surveying and pond design, water supply, pond management.
4. **Fish Culture, Nutrition and Diseases:** Fish culture, fish production principles, stocking rates, fertilization, food chemistry, feed composition, common diseases, prophylaxis and treatment.
5. **Shrimp Culture and Oyster Culture:** Marine shrimps and freshwater prawns, lobsters, oyster culture, harvesting technologies.
6. **Practical Components:** Water quality on a commercial fish farm, monitoring and evaluation; Hatchery on commercial fish farm, Longville Park, Clarendon; Pond infrastructure and construction principles, surveying ponds, Twickenham Park Station, St. Catherine; Tilapia fry production, food fish production on commercial fish farm, Barton Isle, St. Elizabeth; Oyster culture technologies and harvesting methods, Bowden Bay, St. Thomas.

Evaluation:

- | | |
|--------------------------------------|-----|
| • Final Theory Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • In-course Test (2 hours) | 20% |
| • Practical Reports (5 x 6%) | 30% |

ZOOL3410**ADVANCED TOPICS IN ANIMAL SCIENCE**

(3 Credits) (Level 3) (Semester 2)

Pre-requisites:

ZOOL2403 - Maintenance Systems in Animals **AND**

ZOOL2404 - Coordination and Control in Animals.

Course Description:

This seminar course will provide students with advanced, transferrable, specialized or applied exposure to current topics in animal and human biology through a structured series of formal presentations by local and overseas experts in the industry. It aims to equip students with in-depth awareness of the relevance of a diverse array of topical issues to the Caribbean, and with such transferable skills prepare them for the industry, or advanced studies in the field of animal or human biology.

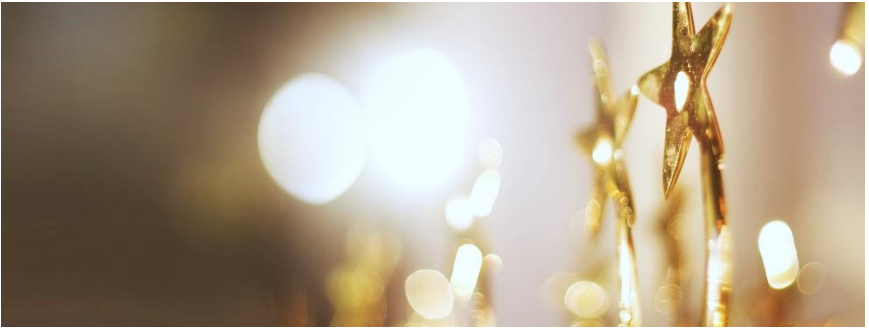
Course Content:

Loss of biodiversity and ecosystem balance; Ethical treatment of animals; Research ethics; Animal diseases; Rapid survey techniques; Horizontal gene transfer; Animal behaviour; Embryology; Climate change; diverse perspectives; Overpopulation; Genetics and Epigenetics; Zoological gardens; Professional zoology; Paleozoology; Permitting of investigations; Logical framework approach; Euthanasia; Evolution of HIV; Taxonomic techniques; Thinking critically.

Evaluation:

- | | |
|---------------------------------------|-----|
| • Reflective Journal Record (10 x 5%) | 50% |
| • In-depth Analysis | 50% |
| • Oral | 10% |
| • Written | 40% |

Practical work is assessed throughout the duration of the course. Students whose practical work is considered to be unsatisfactory are required to sit a practical examination of not more than six hours. Candidates must provide the ORIGINAL worksheets of their laboratory work at the practical examination. These must be certified by the laboratory course Supervisor and may be taken into consideration by the Examiners.



AWARDS, PRIZES AND BURSARIES

DEPARTMENT OF CHEMISTRY

- **The Cedric Hassall Scholarship**

The Cedric Hassall Prize is the premier award in the Department of Chemistry. It was first awarded as a prize in 1971 and was given to the Chemistry student who had shown the best overall performance in the examinations associated with the first year of advanced Chemistry courses. This prize has been upgraded to a Scholarship and is awarded to a final year student majoring in Chemistry who satisfies the above criteria. The scholarship is named in honour of Professor Cedric Hassall (1919-2017), the first Professor of Chemistry at the University and former Head of the Department of Chemistry (1948-1957), who delivered the inaugural lecture to the original batch of medical students. It is intended to foster and encourage students to achieve standards of excellence which Professor Hassall insisted should be the hallmark of students pursuing courses in Chemistry. The prize was established largely through the initiative of Professor Gerald Lalor during his tenure as Head of the Department.

- **The Wilfred Chan Award**

Wilfred Chan completed the requirements for the BSc degree in 1952 and went on to pursue research under the direction of Prof. Cedric Hassall. He completed his research in 1956 and was the first West Indian to receive the PhD degree at Mona. In 1959 he was appointed Lecturer and began a vigorous research programme and rose through the ranks to become the first West Indian to be promoted to a personal chair (1971). In 1966 the Chemistry Department hosted the first Mona Symposium (on Natural Products Chemistry) with him as its Organizing Secretary. Prof. Chan later served as Head of the Chemistry Department at Mona from 1972 to 1975. In 1979 he moved to the St. Augustine Campus to boost research efforts in its young Chemistry Department. He retired from St. Augustine in 1997, having served as Head and Dean during his tenure there. Prof. Chan's contributions over the years to natural products chemistry are internationally recognized.

The Wilfred Chan Award was first made in 2000 and is for a student who has the best academic performance in the advanced Organic Chemistry core courses and who is pursuing a major in Chemistry. The awardee should not simultaneously hold any other Chemistry Department prize.

- **The Bert Fraser-Reid Award**

Bertram Fraser-Reid is a synthetic organic chemist who has been recognized worldwide for his work in carbohydrate chemistry and his effort to develop a carbohydrate-based malaria vaccine.

Prof. Fraser-Reid earned his BSc and MSc degrees at Queen's University in Canada and a PhD at the University of Alberta in 1964 before doing post-doctoral work with Nobel Laureate and Sir Derek Barton from 1964 -1966. In 2007, the Institute of Jamaica awarded the Musgrave Gold Medal to Prof. Fraser-Reid for his outstanding work in Chemistry. Apart from his interests in

science, Prof. Fraser-Reid is an accomplished musician who has given piano and organ recitals at several notable venues.

The Bert Fraser-Reid Award is given to a student with the second best academic performance in the advanced Organic Chemistry courses. The awardee should not simultaneously hold any other Chemistry Department prize.

- **The Garfield Sadler Award**

Garfield Sadler graduated from the Chemistry Department of the University of the West Indies, Mona, with a degree in Special Chemistry in 1980. He then pursued doctoral studies in Inorganic Chemistry under the supervision of Professor Tara Dasgupta and graduated three years later with a PhD having specialized in the study of Reaction Mechanisms.

In 1983, Dr. Sadler joined the staff of the Department as a Lecturer of Inorganic Chemistry. This marked the start of a vibrant career in teaching and research. His contribution, however, to the development of Chemistry was short-lived as he died tragically in 1991.

The Garfield Sadler Award, which is a tribute to the life and work of Garfield Sadler, is presented to the student with the best academic performance in the inorganic chemistry core courses and who is pursuing a major in Chemistry. The awardee should not simultaneously hold any other Chemistry Department award.

- **The Willard Pinnock Prize**

Willard Pinnock served the Department of Chemistry for more than 29 years and retired as a Senior Lecturer in Physical Chemistry in 2011. He is known for his outstanding contribution to teaching and to student guidance and welfare and has been recognized several times by the Faculty for his high scores on the student assessment surveys. He was the first recipient of the Guardian Life Premium Teaching Award at Mona in the academic year 2003/4 and later that year he also received the Vice Chancellor's Award for Excellence in Teaching.

A UWI alumnus, he earned both BSc (Chemistry and Physics) and MSc (Atmospheric Physics) degrees from the University of the West Indies and holds a PhD degree in Medical Bio-Physics from the University of Dundee.

The Willard Pinnock Prize is awarded to a Chemistry Major who has the best academic performance in the Physical Chemistry core courses and who is pursuing a major in Chemistry. The awardee should not simultaneously hold any other Chemistry Department prize.

- **The Kenneth E Magnus Applied Chemistry Prize**

Kenneth Magnus was a member of the first batch of students who graduated from the then University College of the West Indies. He completed a Master's and a PhD in the Department of Chemistry at UWI. He subsequently lectured in the Department retiring as Professor of Applied Chemistry. During his tenure at the UWI, Professor Magnus served in the capacity as Head of the Department of

Chemistry (1977-1986) and Dean of the Faculty of Natural Sciences. He was the driving force behind the establishment of the Applied Chemistry Programme in 1969 and subsequently the Food Chemistry Programme in 1982.

The Kenneth Magnus Prize is awarded to a final year student who is currently enrolled as an Applied Chemistry Major and who has the best academic performance in the courses comprising the major. The awardee should not simultaneously hold any other Chemistry Department prize.

- **The Food Chemistry Prize**

The Food Chemistry Prize was first awarded in 2016. It is awarded to a final year student who is currently enrolled as a Food Chemistry Major and who has the best academic performance in the courses comprising the major. The awardee should not simultaneously hold any other Chemistry Department prize.

- **The L. J. Haynes Award**

Professor Leonard J. Haynes joined the staff of the Chemistry Department, University College of the West Indies in 1956. A Natural Products Chemist by training, he was instrumental in launching the Mona Symposium in 1966 and it remains the longest running Natural Products conference of its kind within the Caribbean.

He served the Department as Professor, carrying out research and lecturing in Organic Chemistry, and was the second Head of Department (1957-1969). The award named in his honour is presented annually to the student with the best academic performance in the Introductory Level Chemistry courses and who is proceeding to Level 2 Chemistry courses. Seed funding for the award came from a donation made by his widow Mrs. Mary Haynes, in January 1994 and the award was first handed out in 1998. The awardee should not be in receipt of any other Chemistry Department prize in the year of consideration.

- **The Chemistry Department Prize**

The Chemistry Department Prize is awarded to a student who has the second best academic performance in the Introductory Level Courses in Chemistry and who is proceeding to Level 2 Chemistry courses. The awardee should not be in receipt of any other Chemistry Department prize in the year of consideration.

- **The Pavelich/Honkan Prize**

Michael Pavelich, Professor of Chemistry at the Colorado School of Mines, U.S.A., spent a year as a visiting Professor in the Department of Chemistry as a sabbatical replacement for Professor Tara Dasgupta during 1984-85. At the end of his stay, he donated funds towards a prize to recognize scholarship and excellence among Level 1 students. Dr. Vidya Honkan completed her PhD degree in Organic Chemistry in 1980 under the supervision of Professor Wilfred Chan and Dr. Basil Burke. While visiting the U.S.A. she died in a tragic automobile accident. Her husband later visited the Department and made a donation to establish an award in commemoration of his wife's love for chemistry.

The Pavelich/Honkan Prize, named in honour of Prof. Michael Pavelich and Dr. Vidya Honkan, is awarded to a student who has the third best academic performance in the Introductory Level Courses in Chemistry and who is proceeding to Level 2 Chemistry courses. The awardee should not be in receipt of any other Chemistry Department prize in the year of consideration.

DEPARTMENT OF COMPUTING

- **The Karl Robinson Award in Computer Science**

The Karl Robinson Award is a tribute to the life and work of the late Karl Robinson who distinguished himself as an invaluable member of the then Department of Mathematics & Computer Science. This award is presented to a final year student with the best academic performance in Computer Science. The winner of this award is the student with the highest average in first year, second year and Semester I of the third year Computer Science courses. In case of a tie, the award will be split equally among the winners.

- **NCB Best 2nd Year Computer Science/Software Engineering Award**

The National Commercial Bank Jamaica Ltd. celebrates the achievement of excellence in a field of study that will directly impact the digital economy. The winner of this award is the student with the highest average in first year, and Semester I of the second year Computer Science/ Software Engineering courses.

- **NCB Best 2nd Year Information Technology Award**

The National Commercial Bank Jamaica Ltd. recognizes the accomplishments of future contributors to the ICT sector in Jamaica. The winner of this award is the student with the highest average in first year, and Semester I of the second year Information Technology Engineering courses.

- **The Ezra Mugisa Award**

The Ezra Mugisa Award was introduced in 2020/2021 by the Department of Computing in honour of Dr. Ezra Mugisa in recognition of his contribution to the Department and as a motivation to the students of Computer Science. This award is a tribute to the work of Ezra Mugisa who retired from the University in 2018. He distinguished himself as an invaluable member of the Department of Mathematics & Computer Science and later the Department of Computing. He joined the UWI, Mona Campus in 1982 as a Data Controller in the then Sub-Department of Computer Science and subsequently obtained his Ph.D. in Computer Science at Imperial College, University of London. Dr. Mugisa taught numerous courses at both the B.Sc. and M.Sc. levels and served a number of terms as Head of the Computer Science Section and later as Head of the

Department of Computing. The award is presented to a second-year student with the highest average in first year and Semester I of the second year Computing courses.

DEPARTMENT OF GEOGRAPHY AND GEOLOGY

- **The Barry Floyd Prizes**

The Barry Floyd Prizes in Geography were named after the first Head of the Department of Geography at the University of the West Indies, Mona Campus, Dr. Barry Floyd. These prizes are awarded annually to the best First and Second year Geography students

- **The Geological Society of Jamaica Scholarship**

This scholarship was inaugurated in 1981 to identify outstanding students in the undergraduate Geology programme and to single out such talent for recognition and support. This award is made to a student who possesses outstanding scholastic abilities and has secured excellent grades at two successive University Examinations. The Level I Geology Prize (Sponsored by the Geological Society of Jamaica) is awarded to the geology student with the best Level I results. The Level II Geology Prize (Sponsored by the Geological Society of Jamaica) is awarded to the geology student producing the best geology field map in GEOL2204. The Level III Geology Prize (sponsored by the Geological Society of Jamaica) is awarded to the geology student producing the best final year research project.

DEPARTMENT OF LIFE SCIENCES

- **The Don Skelding Prize**

Professor Arthur Donald Skelding, D.Sc. was the second Professor of Botany at the University of the West Indies, Mona from 1955 to 1973. When he returned to Jamaica in June 1985 in his capacity as External Examiner for the B.Sc. in Botany, he made a donation to the Botany Department which the then Professor of Botany invested. The interest from that investment is used for an annual prize to the best student in the *Preliminary Biology*.

- **The L.B. Coke Prize in Plant Physiology**

The late Dr. L.B. Coke, former Senior Lecturer and Head of the then Department of Botany, taught Plant Physiology for fifteen years. The Department of Botany has instituted the prize in his honour after his sudden death on 31 December, 1990. This prize is awarded every year to the student who obtains highest mark in *Plant Physiology*. This prize is maintained by contributions from the Consultancy Fund of the former Botany Department.

- **The Charlotte Goodbody Prize**

Mrs. Charlotte Goodbody was employed as a Teaching Assistant in the Department of Zoology with responsibility for the first-year classes (Cell Biology and Animal Diversity). She conducted laboratory classes and occasionally gave lectures. Her fascination with experimental Biology and Zoology made her an invaluable resource to the first-year students, demonstrators and lecturers for many years. She retired in 1989 and now lives in Aberdeen with her husband, retired Professor Ivan Goodbody. The award named in her honour, made for the first time in 2011, is a book grant to be given to the best student in the *First year (first semester) courses*.

- **The Vincent Hugh Wilson McKie Prize in Zoology**

Vincent Hugh Wilson McKie in addition to being a Zoologist was President of the Guild of Undergraduates, Hall Chairman for Taylor Hall, President of the UWI Drama Club, President of the UWI Camera Club and of the Tennis Club while attending the UWI. He achieved excellence as a science teacher and was awarded the Silver Musgrave Medal for his work in (a) the Sciences (b) Education and (c) the Fine Arts. This Award in his honour is based on the results of the examinations taken at the end of Level 2 of the Degree Programme and is given to a student with high grades in the *Level 2 Zoology courses*. The Award is not based on academic excellence alone but also takes into account participation in extra-curricular activities.

- **The Ivan Goodbody Prize**

Professor Ivan Goodbody arrived at the University College of the West Indies in 1955 and began to immediately investigate the marine organisms found in the Kingston Harbour and Port Royal Cays area using the newly established Port Royal Marine Laboratory (PRML) as his base. He was academic coordinator of the PRML and Lecturer for the Marine Biology courses from 1955 – 1964. Professor Goodbody was Head of Department of Zoology (now Life Sciences) from 1964 – 1986 and served as Dean of the Faculty from 1975 - 1977. He retired in 1989 and was appointed Emeritus professor in 1991. The award named in his honour, made for the first time in 2011, is to the best second year student majoring in *Marine Biology*.

DEPARTMENT OF MATHEMATICS

- **The Caribbean Actuarial Scholarship**

The Caribbean Actuarial Scholarship was established in memory of Basil L. and Monica G. Virtue by their son-in-law, S. Michael McLaughlin, an actuary who graduated from the University of the West Indies (UWI). This scholarship is intended to be an annual award to UWI actuarial student(s) who demonstrate a strong record of accomplishment, leadership qualities and a commitment to becoming an actuary.

- **The Harold Chan Scholarship**

Dr. Harold Chan, a graduate of this Faculty and a member of the Department of Pathology, Faculty of Medical Sciences, has donated funds for the award of an Annual Scholarship to the best second-year student in Pure Mathematics.

- **The Merville Campbell Prize: Level I and II**

The Merville Campbell Prize was established by the Mathematics and Computer Science Department in 1995 in memory of Merville Campbell who had served the Department of Mathematics for several years. It is given to the student with the best performance in *MATH1140* and *MATH1150* and the student with the best performance in Level II Mathematics.

- **The University Lodge/Leslie Robinson Prize**

The Euclid King/Lodge Prize was established by the University Lodge of the West Indies, as a book grant to a Level I student in honour of one of our members, the late Euclid King who was a lecturer. It has also been decided to commemorate another of its members, Professor Leslie Robinson and each year award the grant in memory of Messrs King and Robinson alternately. This is given to the best first year student.

DEPARTMENT OF PHYSICS

- **The Francis Bowen Bursary**

The Francis Bowen Memorial Bursary was established in memory of the late Francis Bowen who was the first Head of the Department of Physics. The award is restricted to students in the Faculty of Science and Technology, Mona Campus, who are committed to the study of Physics on the basis of performance in the P200 Level examinations.

- **Level II - Departmental Prize**

The Department has been awarding prizes for many years to students who do well in the "200" level examinations. The purpose is to reward and encourage, and so only those students who go on to "300" level Physics qualify. It is possible, in any case, that no prize is awarded if no student gains a good enough grade, B+ and better. The two (2) students with the highest marks are awarded prizes.

- **The Michael Tharmanahthan Physics Bursary**

Dr. Ponnambalam, a Senior Lecturer in the Department of Physics, made a donation to the Department of Physics in memory of his *late father, Michael Tharmanahthan*, to provide bursaries for students reading Physics at the Mona Campus. The Bursary is intended to ensure that financial need does not stand in the way of academic achievement.

- **The John Lodenquai Prize for Introductory Physics**

The John Lodenquai Prize has been established by the family of the late Prof. John Lodenquai, a former Professor of Astrophysics and a graduate of the University of the West Indies. It is to be presented to the student with the best performance in Level I.

GLOSSARY

- **Anti-requisites** - Two mutually exclusive courses of which credit may be granted for only one.
- **Co-requisite** - A course which must be taken along with another specified course, in order to ensure the attainment of complementary and/or interdependent competencies.
- **Course** - A body of knowledge circumscribed by a syllabus to be imparted to students by sundry teaching methods and usually followed by an examination.
- **Credit** - A measure of the workload required of students in a course. 1 Credit Hour = 1 hour lecture/tutorial/problem class per week OR 2 hours laboratory session per week, for a Semester.
- **Discipline** - A body of knowledge encapsulated in a set of courses distinguishable from other such bodies on the basis of criteria such as method of enquiry, axioms, areas of application.
- **Elective** - A course within a programme taken by free choice of the student.
- **Faculty Courses** - All approved courses offered by a Faculty of the University for credit towards a degree, except Foundation and Co-curricular courses.
- **In-Faculty** - All Faculty courses originating in the Science Faculties.
- **Level** - A measure of the standard of a course, designated at UWI by the first digit in the course number.
- **Major** - 32 or more credits from prescribed courses at Levels 2 & 3 (See Departmental course listings).
- **Minor** - 15 - 16 credits from prescribed courses at Levels 2 &/or 3 (See Departmental course listings).
- **Out-of-Faculty** - All Faculty courses originating in Faculties other than the Courses Science Faculties.
- **Part** - A stage of a program:
 - Part I (Introductory Stage) - Preliminary and Level 1 courses
 - Part II (Advanced stage) - Level 2 and 3 courses

- **Pre-requisite** - A course which must be passed before another course for which it is required may be pursued.
- **Programme** - A selection of courses (designed to achieve pedagogical goals) the taking of which is governed by certain regulations and the satisfactory completion of which (determined by such regulations) makes a candidate eligible for the award of a degree/diploma/certificate.
- **Subject** - An area of study traditionally assigned to the purview of a department.



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