



DEPARTMENT OF
LIFE SCIENCES



Student Handbook

2019/2020 Academic Year

Excerpt from
the **Faculty of Science & Technology**
Student Handbook
www.mona.uwi.edu/fst

Department of **LIFE SCIENCES**

PROGRAMMES

BSc. Programmes

1. Biology with Education
2. Experimental Biology
3. Environmental 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	CREDIT	SEMESTER OFFERED	LEVEL	PRE-REQUISITES
PRELIMINARY LEVEL					
BIOL0011	Preliminary Biology I	6	1	0	CSEC Biology or equivalent
BIOL0012	Preliminary Biology II	6	2	0	CSEC Biology or equivalent
LEVEL 1					
BIOL1017	Cell Biology	3	1	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1018	Molecular Biology and Genetics	3	1	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1262	Living Organisms I	3	2	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent
BIOL1263	Living Organisms II	3	2	1	BIOL0011 and BIOL0012 OR CAPE Unit 1 & 2 ('A' level) Biology or equivalent

LEVEL 2 AND 3

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

Pre-requisites for all Life Sciences Level 2 courses are:

BIOL1017, BIOL1018, BIOL1262, BIOL1263 or equivalent.

LEVEL 2 COURSES (10 courses of 3 credits each available)

ADVANCED COURSES OFFERED BY THE LIFE SCIENCES DEPARTMENT

	6 Week Courses	12 Week Courses	6 Week Courses
Semester 1	BOTN2401		BIOL2402
Week 1 - 6	Plant Form and Systematics	BIOL2401	Fundamentals of Biometry
Semester 1	BIOL2406	Research Skills and Practices in Biology	BIOL2407
Week 7 - 12	Eukaryotic Microbiology		Biological Evolution
Semester 2	BOTN2402		ZOOL2403
Week 1 - 6	Physiology of Plants	BIOL2403	Maintenance Systems in Animals
Semester 2	BIOL2164	Principles of Ecology	ZOOL2404
Week 7 - 12	Principles of Molecular Biology		Coordination and Control in Animals
Summer: BIOL2408 - Diving for Scientists.			

LEVEL 3 COURSES

Possible Combinations : A+B, A+C, B+C Impossible Combinations: A1+A2, B1+B2, C1+C2

A1	A2	B1	B2	C1	C2
<u>Tues/Thurs</u> <u>Mon/Fri</u>	<u>Tues/Thurs</u> <u>Mon/Fri</u>	<u>Fri/Mon</u>	<u>Fri/Mon</u>	<u>Mon</u>	<u>Mon/</u> <u>Fri</u>
BOTN3401 Principles of Plant Biotechnology	BOTN3402 Plant Breeding	ZOOL3404 Parasitology	ZOOL3409 Aquaculture	BIOL3407 Oceanography	BIOL3403 The Biology of Soil
BOTN3405 Plant Eco- Physiology	ZOOL3405 Vertebrate Biology	ZOOL3403 Entomology	BOTN3406 Tropical Forest	BIOL3408 Coastal Ecosystems	BOTN3403 Fundamentals of Horticulture
BIOL3404 Virology	ZOOL2402 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

AGBU3008 - Internship; AGBU3012 - Research Project; BIOL3412 - Internship; BIOL3413 - Biology Project; ZOOL3410 - Advanced Topics in Animal Science

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

A major in Animal 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:

BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2164	Principles of Molecular Biology
BIOL2407	Biological Evolution
ZOOL2403	Maintenance Systems in Animals
ZOOL2404	Coordination and Control in Animals

Level 3: minimum of fifteen (15) credits from:

ZOOL2402	Animal Physiology
ZOOL3403	Entomology
ZOOL3404	Parasitology
ZOOL3405	Vertebrate Biology
ZOOL3410	Advanced Topics in Animal Science

And 3 credits from below:

BIOL3404	Virology
BIOL3405	Pest Ecology and Management
ZOOL3406	Immunology

Advanced Courses (Levels 2 and 3)

BIOLOGY WITH EDUCATION (B.Sc.)

A B.Sc. in 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:

Introductory Courses (Level 1)

BIOL1017 Cell Biology

BIOL1018 Molecular Biology and Genetics

BIOL1262 Living Organisms I

BIOL1263 Living Organisms II

MICR1010 - Introductory Microbiology and Molecular Biology 1 and BIOG1020 - Cellular Biochemistry are highly recommended.

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

Advanced Courses (Level 2)

BIOL2401 Research skills and Practices in Biology

BIOL2402 Fundamentals of Biometry

BIOL2403 Principles of Ecology

BIOL2164 Principles of Molecular Biology

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

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-three (63) credits from Levels 2 and 3 and must include:

Level 2: thirty (30) credits from:

BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2164	Principles of Molecular Biology
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-three (33) credits from:

BIOL3400	Issues in Conservation Biology
BIOL3406	Freshwater Biology
BIOL3407	Oceanography
BIOL3408	Coastal Ecosystems
BIOL3409	Caribbean Coral Reefs
BOTN3405	Plant Eco-physiology
ZOOL3408	Sustainable Use of Marine Fishable Resources
ZOOL3409	Aquaculture

Including three (3) credits from:

BOTN3406	Tropical Forest Ecology
ZOOL3403	Entomology

Plus one (1) other advanced DLS course and either BIOL3413 - Biology Project OR BIOL3412 - Internship

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

A B.Sc in Experimental Biology requires a total of sixty-three (63) credits from Levels 2 and 3 and must include:

Level 2: thirty (30) credits

BIOL2401	Research skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2164	Principles of Molecular Biology
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

Advanced Courses (Level 2 and 3)

Level 3: At least thirty-three (33) credits from the three groups below with a minimum of three (3) credits from each group.

GROUP A

BIOL3402	Biology of Fungi (not offered in 2018/2019)
BIOL3403	The Biology of Soil
BIOL3404	Virology
BIOL3405	Pest Ecology and Management

GROUP B

BOTN3401	Principles of Plant Biotechnology
BOTN3402	Introduction to Plant Breeding
BOTN3403	Fundamentals of Horticulture
BOTN3404	Economic Botany
BOTN3405	Plant Eco-physiology

GROUP C

ZOOL3403	Entomology
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ZOOL3404	Parasitology
ZOOL3405	Vertebrate Biology
ZOOL3406	Immunology
ZOOL3407	Human Biology

***Plus BIOL3413 - Biology Project OR
BIOL3412 - Internship***

MAJOR IN HORTICULTURE

Introductory Courses (Level 1)	<p>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:</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 major in Horticulture requires a total of forty-two (42) Levels 2 and 3 credits and must include:</p> <p style="background-color: #cccccc; padding: 5px;">Level 2: minimum of twenty- one (21) credits which must include:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL3403</td><td>The Biology of Soil</td></tr> <tr><td>BIOL2401</td><td>Research Skills and Practices in Biology</td></tr> <tr><td>BIOL2402</td><td>Fundamentals of Biometry</td></tr> <tr><td>BIOL2403</td><td>Principles of Ecology</td></tr> <tr><td>BIOL2164</td><td>Principles of Molecular Biology</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 style="background-color: #cccccc; padding: 5px;">Level 3: minimum of seventeen (17) credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">AGBU3008</td><td>Internship</td></tr> <tr><td>AGBU3012</td><td>Research Project</td></tr> <tr><td>AGCP3406</td><td>Fruit Crop Production</td></tr> <tr><td>AGCP3407</td><td>Post-harvest Technology</td></tr> <tr><td>AGLS3001</td><td>Irrigation and Drainage Technology</td></tr> </table> <p>And (six) 6 credits from:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">BIOL3405</td><td>Pest Ecology and Management</td></tr> <tr><td>BOTN3402</td><td>Introduction to Plant Breeding</td></tr> <tr><td>BOTN3403</td><td>Fundamentals of Horticulture</td></tr> </table>	BIOL3403	The Biology of Soil	BIOL2401	Research Skills and Practices in Biology	BIOL2402	Fundamentals of Biometry	BIOL2403	Principles of Ecology	BIOL2164	Principles of Molecular Biology	BOTN2401	Plant Form and Systematics	BOTN2402	Physiology of Plants	AGBU3008	Internship	AGBU3012	Research Project	AGCP3406	Fruit Crop Production	AGCP3407	Post-harvest Technology	AGLS3001	Irrigation and Drainage Technology	BIOL3405	Pest Ecology and Management	BOTN3402	Introduction to Plant Breeding	BOTN3403	Fundamentals of Horticulture
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AGCP3407	Post-harvest Technology																														
AGLS3001	Irrigation and Drainage Technology																														
BIOL3405	Pest Ecology and Management																														
BOTN3402	Introduction to Plant Breeding																														
BOTN3403	Fundamentals of Horticulture																														

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

Advanced Courses (Levels 2 and 3)

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:

BIOL2401 Research Skills and Practices in Biology

BIOL2402 Fundamentals of Biometry

BIOL2403 Principles of Ecology

BIOL2406 Eukaryotic Microbiology

BOTN2401 Plant Form and Systematics

ZOOL2403 Maintenance Systems in Animals

ZOOL2404 Coordination and Control in Animals

Level 3: minimum of fifteen (15) credits from:

BIOL3407 Oceanography

BIOL3408 Coastal Ecosystems

BIOL3409 Caribbean Coral Reefs

ZOOL3408 Sustainable Use of Marine Fishable Resources

ZOOL3409 Aquaculture

And three (3) credits from:

BIOL3410 Water Pollution Biology

ZOOL3405 Vertebrate Biology

The following companion courses are strongly recommended:

BIOL2408 Diving for Scientists

BIOL3413 Biology Project

BIOL3412 Internship

PLANT BIOLOGY (MAJOR)

Introductory Courses (Level 1)

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:

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

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

Level 2: minimum of eighteen (18) credits from:

BIOL2401	Research Skills and Practices in Biology
BIOL2402	Fundamentals of Biometry
BIOL2403	Principles of Ecology
BIOL2164	Principles of Molecular Biology

Advanced Courses (Levels 2 and 3)

BOTN2401	Plant Form and Systematics
BOTN2402	Physiology of Plants

Level 3: minimum of fifteen (15) credits from:

BIOL3403	The Biology of Soil
BOTN3402	Introduction to Plant Breeding
BOTN3404	Economic Botany
BOTN3405	Plant Ecophysiology
BOTN3406	Tropical Forest Ecology

And six (6) credits from:

BIOL3404	Virology
BIOL3405	Pest Ecology and Management
BOTN3401	Principles of Plant Biotechnology
BOTN3403	Fundamentals of Horticulture

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

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: twenty-one (21) credits from:

BIOL2401 Research Skills and Practices in Biology

BIOL2402 Fundamentals of Biometry

BIOL2403 Principles of Ecology

BIOL2407 Biological Evolution

BOTN2401 Plant Form and Systematics

ZOOL2403 Maintenance Systems in Animals

ZOOL2404 Coordination and Control in Animals

Level 3: twelve (12) credits from:

BIOL3400 Issues in Conservation Biology

BIOL3406 Freshwater Biology

BIOL3410 Water Pollution Biology

BOTN3406 Tropical Forest Ecology

And six (6) credits from:

BIOL3403 The Biology of Soil

BIOL3405 Pest Ecology and Management

BOTN3405 Plant Ecophysiology

Advanced Courses (Levels 2 and 3)

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:	
	ZOOL2402	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 Microorganisms

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)

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:

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 Plant Biology requires a total of fifteen (15) credits from Levels 2 and 3 and must include:

Level 2: nine (9) credits which must include:

BIOL2403	Principles of Ecology
BOTN2401	Plant Form and Systematics
BOTN2402	Physiology of Plants

Level 3: six (6) credits from:

BOTN3401	Principle of Plant Biotechnology
BOTN3402	Introduction to Plant Breeding
BOTN3403	Fundamentals of Horticulture
BOTN3404	Economic Botany
BOTN3405	Plant Ecophysiology

TERRESTRIAL AND FRESHWATER ECOLOGY (MINOR)

Introductory Courses (Level 1)	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:	
	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 in Terrestrial and Freshwater Ecology requires a total of fifteen (15) credits from Levels 2 and 3 and must include:	
	Level 2: six (6) credits which must include:	
	BIOL2403	Principles of Ecology
	BIOL2407	Biological Evolution
	Level 3: nine (9) credits from:	
	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 Written 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 Written 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, 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.
3. **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:

A pass in one of the following:

BIOL0011 - Preliminary Biology I **AND** BIOL0012 - Preliminary Biology II, 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:

A pass in one of the following:

BIOL0011 - Preliminary Biology I **and** BIOL0012 - Preliminary Biology II,
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:

A pass in one of the following:

BIOL0011 - Preliminary Biology I **AND** BIOL0012 - Preliminary Biology II, 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% |

AGSL2401**MANAGEMENT OF SOILS (Not offered 2019/2020)**

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

Pre-requisites:

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

Course Content:

Soil basics- texture and structure; Methods of land clearing and their effects on soil structure; Soil tillage and the management of soil structure for plant growth; Management of soil structure to improve water intake, transmission and storage; Soil and crop water relations, water management for salinity control; soil erosion and the management of hillsides; Management of dry and wet lands; Management of forest soils; management of specific problem soils: Management for agriculture, soil management and its effects on microbes, microbial activity and soil fertility; Soil fertility management; soil quality, carbon sequestration; Soil management practices case studies.

Evaluation:

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

BIOL2164**PINCIPLES OF MOLECULAR BIOLOGY**

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

Pre-requisites:

BIOL1017 - Cell Biology **AND** BIOL1018 - Molecular Biology and Genetics.

Course Content:

This course provides an introduction to 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% (2 X 5%) |
| • Case Studies | 20% (2 X 10%) |
| • MCQ Incourse 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 Written 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 Written 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, protooperation 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 Written 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 Written 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 Written Examination (2 hours) | 50% |
| • Course Work: | 50% |
| • Laboratory Reports (1 x 10%) | 10% |
| • MCQ In-course Test (2 x 20%) | 40% |

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 Written 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 I **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 Written Examination (2 hours) 50%
- Course Work: 50%
 - In-course Test 10%
 - Practical Test (2 hours) 20%
 - Laboratory Reports (4 x 5% each) 20%

ZOOL2402

ANIMAL PHYSIOLOGY

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

Pre-requisites:

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

Course Content:

1. Digestive physiology; Exchange and transport of respiratory gases; Excretion of nitrogenous waste and salt and water balance; Generation of nervous impulses and neuromuscular control; Hormonal control and homeostasis.
2. **Practical Work:** examination of anatomy relating to differing physiologies; experiments on organ system physiology under different conditions; research on applications of physiological knowledge, and analysis of research papers.

Evaluation:

- Final Written Examination (2 hours) 50%
- Course Work: 50%
 - MCQ In-course Tests 10 %
 - Presentation/ Practical Test 12%
 - Laboratory Reports (4 x 7 % each) 28%

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

BIOL2408

DIVING FOR SCIENTISTS (Summer)

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

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 including the properties of water, pressure and buoyancy, gas laws, and air consumption; Physiology of diving including the 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 including the use of decompression tables, diver rescue techniques and emergency ascents; Diving Equipment; Diving as a tool for scientific research including an introduction to the fauna and flora of coral reefs; Underwater sampling and survey methods data collation and analysis.

Evaluation:

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

AGBU3008

AGRICULTURE INTERNSHIP

(4 Credits) (Level 3) (Summer)

Pre-requisites:

Lecturer's approval required.

Co-requisite:

AGBU3012 - Research Project.

Course Content:

The basics of scientific writing, experimental design, project reporting and presentation; Aims and means of assessing feasibility of projects; Techniques in data collection, collation and analysis; Investigation and written report on an approved topic.

Evaluation:

- Report Projects 50%
- Oral Examination 50%

AGBU3012

RESEARCH PROJECT

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

Pre-requisites:

Lecturer's approval required.

Course Content:

The basics of scientific writing, experimental design, project reporting and presentation; Aims and means of assessing feasibility of projects; Techniques in data collection, collation and analysis; Investigation and written report on an approved topic.

Evaluation:

- Report Projects 50%
- Oral Examination 50%

NOTE: Students will be examined at the end of the Semester in which they are registered.

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

BIOL3402

BIOLOGY OF THE FUNGI

(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 Written 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)

Pre-requisites:

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 Written 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 Written 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 Written 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% |

BIOL 3406**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 Written 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 Written 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 Written 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 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 Written 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 Written 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; Power point presentations; Review of research ethics.

Evaluation:

- Project Report (at least 2000 words) 75%
- Oral Examination (includes Power Point 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 Written 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 Description:

This course will expose students to the achievements of plant breeding efforts from several countries and crops; discover the genetic basis of crop plant phenotypes; explore the wild and domesticated ancestors of our modern field crops as well as fruit and vegetable crops; design improvement strategies for self-pollinating, cross-pollinating and asexually propagated crops; run, work in a successful crop breeding program; develop molecular tools that will directly assist in the crop breeding process; formulate conservation strategies of the world's crop biodiversity through gene/germplasm banks.

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

BOTN3407

POSTHARVEST TECHNOLOGIES

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

ZOOL3403

ENTOMOLOGY

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

Pre-requisites:

BIOL2401 **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 Written 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 Written 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, tumor 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)

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 FISHABLE
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 modeling & Evaluation software.
3. **Caribbean Fisheries:** Jamaica 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 invasive 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)

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% |



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