



Department OF Life Sciences

BSc.

Biology with Education
Environmental Biology
Experimental Biology

MAJOR

Animal Biology
Plant Biology
Horticulture
Marine Biology
Terrestrial and Freshwater Ecology

MINOR

Animal Biology
Coastal Ecosystems
Plant Biology
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 | | | A pass in one of the following: Preliminary Biology I (BIOL0011) and II (BIOL0012) or CAPE Unit 1 & 2 ('A' level) Biology or equivalent |
| AND | | | 1 | 1 | |
| BIOL1018 | Molecular Biology and Genetics | 3 | | | |
| BIOL1262 | Living Organisms I | 3 | | | A pass in one of the following: Preliminary Biology I (BIOL0011) and II (BIOL0012) or CAPE Unit 1 & 2 ('A' level) Biology or equivalent |
| AND | | | 2 | 1 | |
| BIOL1263 | Living Organisms II | 3 | | | |

LEVELS 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)

| ADVANCED COURSES OFFERED BY THE LIFE SCIENCES DEPARTMENT | | | |
|---|---|--|--|
| | 6 Week Courses | 12 Week Courses | 6 Week Courses |
| Semester 1 Week 1-6 | BOTN2401 Plant Form and Systematics | BIOL2401 Research Skills and Practices in Biology | BIOL2402- Fundamentals of Biometry |
| Semester 1 Week 7-12 | BIOL2406 Eukaryotic Microbiology | | BIOL2407- Biological Evolution |
| Semester 2 Week 1-6 | BIOL2404 Molecular & Population Genetics | BIOL2403 Principles of Ecology | ZOOL2403- Maintenance Systems in Animals |
| Semester 2 Week 7-12 | BOTN2402 Physiology of Plants | | ZOOL2404- Coordination and Control in Animals |

BIOL2408 - Diving for Scientists (Summer). Courses in **bold font** are core to all Life Sciences Programmes, Majors and Minors.

LEVEL 3 COURSES

| A1 <u>Tues/Thurs</u> Mon/Fri | A2 <u>Tues/Thurs</u> Mon/Fri | B1 <u>Friday/</u> Monday | B2 <u>Friday/</u> Monday | C1 Monday | C2 <u>Mon/</u> Fri | EVENINGS Tues/Wed |
|--|--|---|---|---|--|---|
| BOTN3405 Plant Ecophysiology | TBA | ZOOL3406 Immunology | ZOOL3409 Aquaculture | BIOL3407 Oceanography | BIOL3403 The Biology of Soil | AGSL2401 Management of Soils |
| BOTN3402 Plant Breeding | ZOOL3405 Vertebrate Biology | ZOOL3403 Entomology | BOTN3406 Tropical Forest | BIOL3408 Coastal Ecosystems | BOTN3403 Fundamentals of Horticulture | AGSL3001 Irrigation and Drainage |
| ZOOL3407 Human Biology | ZOOL2402 Animal Physiology | BIOL3405 Pest Ecology & Management | BIOL3406 Freshwater Biology | ZOOL3408 Sustainable Use of Marine Fishable Resources | BIOL3404 Virology | AGCP3407 Postharvest Technology |
| BOTN3401 Principles of Plant Biotechnology | BIOL3410 Water Pollution | ZOOL3404 Parasitology | BIOL3400 Issues in Conservation Biology | BIOL3409 Caribbean Coral Reefs | BOTN3404 Economic Botany | AGCP3406 Fruit Crop Production |

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

BSc. BIOLOGY WITH EDUCATION

| | | |
|---|---|--|
| Introductory Courses (Level 1) | A BSc. Biology with Education requires a minimum of twenty-four (24) credits from Level 1, eighteen (18) of which must be FST courses and <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| | <i>MICR1010 - Introductory Microbiology and Molecular Biology 1 and BIOC1020 - Cellular Biochemistry (3 credits) are highly recommended.</i> | |
| Advanced Courses (Level 2) | A BSc. Biology with Education requires a total of sixty-three (63) credits from Level 2 below: | |
| | BIOL2401 | Research skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular and Population Genetics |
| | 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. | |

BSc. ENVIRONMENTAL BIOLOGY

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|---|---|--|
| Introductory Courses (Level 1) | A BSc. 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 (Level 2 and 3) | A BSc. Environmental Biology requires a total of sixty-three (63) credits from Level 2 and 3 from below: | |
| | Level 2: 30 credits from below: | |
| | BIOL2401 | Research Skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular and Population Genetics |
| | 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 33 credits from below: | |
| | BIOL3400 | Issues in Conservation Biology |
| | BIOL3406 | Freshwater Biology |
| | BIOL3407 | Oceanography |
| | BIOL3408 | Coastal Ecosystems |
| | BIOL3409 | Caribbean Coral Reefs |
| | BOTN3405 | Plant Ecophysiology |
| | | |
| | | |
| | ZOOL3408 | Sustainable Use of Marine Fishable Resources |
| | ZOOL3409 | Aquaculture |
| | Including 3 credits from: | |
| | BOTN3406 | Tropical Forest Ecology |
| | ZOOL3403 | Entomology |
| <i>Plus one (1) other advanced DLS course, and either BIOL3413 - Biology Project OR BIOL3412 - Internship</i> | | |

BSc. EXPERIMENTAL BIOLOGY

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|---|--|--|
| Introductory Courses (Level 1) | A BSc. 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 BSc. Experimental Biology requires a total of sixty-three (63) credits from Levels 2 and 3 and must include: | |
| | Level 2: 30 credits | |
| | BIOL2401 | Research skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular and Population Genetics |
| | 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 33 credits from the three groups below with a minimum of 3 credits from each group. | |
| | GROUP A | |
| | BIOL3402 | Biology of Fungi (not offered 2017/2018) |
| | 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 Ecophysiology |
| | GROUP C | |
| | ZOOL3403 | Entomology |
| | ZOOL3404 | Parasitology |
| ZOOL3405 | Vertebrate Biology | |
| ZOOL3406 | Immunology | |
| ZOOL3407 | Human Biology | |
| Plus BIOL3413 - Biology Project OR BIOL3412 - Internship | | |

MAJOR IN ANIMAL BIOLOGY

| | | |
|---|--|--|
| 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 (Level 2 and 3) | A major in Animal Biology requires a total of thirty-nine (39) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: minimum of 21 credits from below: | |
| | BIOL2401 | Research Skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular and Population Genetics |
| | BIOL2407 | Biological Evolution |
| | ZOOL2403 | Maintenance Systems in Animals |
| | ZOOL2404 | Coordination and Control in Animals |
| | Level 3: minimum of 15 credits from below: | |
| | 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 |

MAJOR IN PLANT BIOLOGY

| | | |
|---|---|--|
| 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 |
| Advanced Courses (Level 2 and 3) | 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 18 credits from below: | |
| | BIOL2401 | Research Skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular and Population Genetics |
| | BOTN2401 | Plant Form and Systematics |
| | BOTN2402 | Physiology of Plants |
| | Level 3: minimum of 15 credits from below: | |
| | BIOL3403 | The Biology of Soil |
| | BOTN3402 | Introduction to Plant Breeding |
| | BOTN3404 | Economic Botany |
| | BOTN3405 | Plant Ecophysiology |
| | BOTN3406 | Tropical Forest Ecology |
| | And 6 credits from below: | |
| | BIOL3404 | Virology |
| | BIOL3405 | Pest Ecology and Management |
| | BOTN3401 | Principles of Plant Biotechnology |
| | BOTN3403 | Fundamentals of Horticulture |

MAJOR IN HORTICULTURE

| | | |
|---|--|--|
| 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 (Level 2 and 3) | A major in Horticulture requires a total of forty-two (42) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: minimum of 21 credits which <u>must</u> include: | |
| | AGSL2401 | Management of Soil |
| | BIOL2401 | Research Skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2404 | Molecular & Population Genetics |
| | BOTN2401 | Plant Form and Systematics |
| | BOTN2402 | Physiology of Plants |
| | Level 3: minimum of 17 credits from below: | |
| | AGBU3008 | Internship (4 credits; Summer) |
| | AGBU3012 | Research Project (4 credits) |
| | AGCP3406 | Fruit Crop Production |
| | AGCP3407 | Post-harvest Technology |
| | AGLS3001 | Irrigation and Drainage Technology |
| | And 6 credits from below: | |
| | BIOL3405 | Pest Ecology and Management |
| | BOTN3402 | Introduction to Plant Breeding |
| | BOTN3403 | Fundamentals of Horticulture |

MAJOR IN MARINE BIOLOGY

| | | |
|---|--|--|
| 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 (Level 2 and 3) | A major in Marine Biology requires a total of thirty-nine (39) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: minimum of 21 credits from below: | |
| | BIOL2401 | Research Skills and Practices in Biology |
| | BIOL2402 | Fundamentals of Biometry |
| | BIOL2403 | Principles of Ecology |
| | BIOL2406 | Eukaryotic Microorganisms |
| | BOTN2401 | Plant Form and Systematics |
| | ZOOL2403 | Maintenance Systems in Animals |
| | ZOOL2404 | Coordination and Control in Animals |
| | Level 3: minimum of 15 credits from below: | |
| | BIOL3407 | Oceanography |
| | BIOL3408 | Coastal Ecosystems |
| | BIOL3409 | Caribbean Coral Reefs |
| | ZOOL3408 | Sustainable Use of Marine Fishable Resources |
| | ZOOL3409 | Aquaculture |
| | And 3 credits from below: | |
| | BIOL3410 | Water Pollution Biology |
| | ZOOL3405 | Vertebrate Biology |
| | The following companion courses are strongly recommended: | |
| | BIOL2408 | Diving for Scientists (Summer) |
| BIOL3413 | Biology Project | |
| BIOL3412 | Internship | |

MAJOR IN TERRESTRIAL AND FRESHWATER ECOLOGY

| | | |
|---|---|--|
| 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 <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| Advanced Courses (Level 2 and 3) | A major in Marine Biology requires a total of thirty-nine (39) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: minimum of 21 credits from below : | |
| | 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: minimum of 12 credits from below: | |
| | BIOL3400 | Issues in Conservation Biology |
| | BIOL3406 | Freshwater Biology |
| | BIOL3410 | Water Pollution Biology |
| | BOTN3406 | Tropical Forest Ecology |
| | | |
| | And 3 credits from below: | |
| | BIOL3403 | The Biology of Soil |
| | BIOL3405 | Pest Ecology and Management |
| BOTN3405 | Plant Ecophysiology | |

MINOR IN ANIMAL BIOLOGY

| | | |
|---|---|-------------------------------------|
| 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 <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| Advanced Courses (Level 2 and 3) | A minor in Animal Biology requires a total of fifteen (15) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: 6 credits which must include: | |
| | ZOOL2403 | Maintenance Systems in Animals |
| | ZOOL2404 | Coordination and Control in Animals |
| | Level 3: 9 credits from below: | |
| | | |
| | ZOOL2402 | Animal Physiology |
| | ZOOL3403 | Entomology |
| | ZOOL3404 | Parasitology |
| | ZOOL3405 | Vertebrate Biology |
| ZOOL3406 | Immunology | |

MINOR IN COASTAL ECOSYSTEMS

| | | |
|---|---|--------------------------------|
| 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 <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| Advanced Courses (Level 1 and 2) | A minor in Coastal Ecosystems requires a total of eighteen (18) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: 9 credits which must include: | |
| | BIOL2403 | Principles of Ecology |
| | BIOL2406 | Eukaryotic Microorganisms |
| | BOTN2402 | Physiology of Plants |
| | Level 3: 9 credits which must include: | |
| | BIOL3408 | Coastal Ecosystems |
| | BIOL3409 | Caribbean Coral Reefs |
| | BOTN3405 | Plant Ecophysiology |

MINOR IN PLANT BIOLOGY

| | | |
|---|--|----------------------------------|
| 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 <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| Advanced Courses (Level 1 and 2) | A minor in Plant Biology requires a total of fifteen (15) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: 9 credits which <u>must</u> include: | |
| | BIOL2403 | Principles of Ecology |
| | BOTN2401 | Plant Forms and Systematics |
| | BOTN2402 | Physiology of Plants |
| | Level 3: 6 credits from below: | |
| | BOTN3401 | Principle of Plant Biotechnology |
| | BOTN3402 | Introduction to Plant Breeding |
| | BOTN3403 | Fundamentals of Horticulture |
| | BOTN3404 | Economic Botany |
| BOTN3405 | Plant Ecophysiology | |

MINOR IN TERRESTRIAL AND FRESHWATER ECOLOGY

| | | |
|---|---|--------------------------------|
| 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 <u>must</u> include: | |
| | BIOL1017 | Cell Biology |
| | BIOL1018 | Molecular Biology and Genetics |
| | BIOL1262 | Living Organisms I |
| | BIOL1263 | Living Organisms II |
| Advanced Courses (Level 2 and 3) | A minor in in Terrestrial and Freshwater Ecology requires a total of fifteen (15) credits from Level 2 and 3 and <u>must</u> include: | |
| | Level 2: 6 credits which <u>must</u> include: | |
| | BIOL2403 | Principles of Ecology |
| | BIOL2407 | Biological Evolution |
| | Level 3: 9 credits from below: | |
| | 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:

- 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).
- Biological techniques.
- Mendelian Genetics; Mutation; Genetic Engineering; Natural Selection; Variation; Mechanisms of Speciation; Taxonomy; Variety of life (bacteria, protists, fungi, plants and animals).

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

BIOL0012

PRELIMINARY BIOLOGY II

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

Pre-requisite:

CSEC Biology **OR** equivalent.

Course Content:

- Systems in Angiosperms (Anatomy and Physiology): Structure of roots, stems, leaves; Transpiration; Translocation; Photosynthesis.
- Metabolism: Energy and Energetics; Cellular respiration
- Systems in Mammals (Anatomy and Physiology): Nutrition and Digestion, Circulation, Respiration, Coordination and Control, Excretion and Osmoregulation; Movement and Support; Reproduction.

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

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**

(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%

BIOL2401**RESEARCH SKILLS AND PRACTICES IN BIOLOGY**

(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:

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% |
| • MCQ In-course Test (1 hour) | 20% |
| • Literature Review | 6% |
| • Oral Presentation and poster | 8% |
| • Laboratory Reports | 10% |
| • Tutorial Exercises | 6% |

BIOL2402

FUNDAMENTALS OF BIOMETRY

(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:

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)

This course may require participation in weekend field trips

Pre-requisites:

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

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%

BIOL2404

MOLECULAR & POPULATION GENETICS

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

Pre-requisites:

BIOL1017 - Cell Biology, BIOL1018 - Molecular Biology and Genetics,

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

Course Content:

The molecular and physical basis of inheritance; The genomes of viruses, bacteria, and higher organisms; The structure, expression, regulation, recombination, mapping, modification and manipulation (cloning) of genes; Embryonic development; The measurement and transmission of genetic variation (genes/alleles, genotypes) through time and space leading to speciation in plant and animal populations.

Evaluation:

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

BIOL2406

EUKARYOTIC MICROBIOLOGY

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

Pre-requisites:

(BIOL1017 - Cell Biology **and** BIOL1018 - Molecular Biology & Genetics **and** BIOL1262 - Living Organisms II **and** BIOL1263 - Living Organisms II) **OR** (BIOC1020 - Cellular Biochemistry **and** BIOC1021 - Practical Biochemistry 1 **and** 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, Parabasilids, Euglenoids, Alveolates, Stramenopiles; The Algae: Cyanophyta; Glaucophyta; Rhodophyta; Chlorophyta, Streptophyte algae; The Fungi & fungal-like microorganisms; Reproduction in the protists and fungi; Ecology, economic importance and 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:

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

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.

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, BIOL1262 - Living Organisms II **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, BIOL1262 - Living Organisms II **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%

SUMMER SCHOOL ONLY

BIOL2408

DIVING FOR SCIENTISTS

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

This course may require participation in weekend field trips

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.

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-requisite:

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-requisite:

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.

AGCP3405**LANDSCAPE AND TURFGRASS PRODUCTION**

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

Pre-requisite:

BOTN2402 - Physiology of Plants.

Course Content:

Introduction to Landscape and Turfgrass production; Landscape and Turfgrass Identification and uses; Turfgrass ecology and biology Landscape and turf establishment and renovation; Turf pest management (weeds, insects, diseases); Evaluating Opportunities in the Landscaping and Turfgrass Industries; Licensing laws and regulations pertaining to landscape contracting and maintenance; Environmental issues: water usage and pollution issues.

Evaluation:

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

AGCP3406**FRUIT CROP PRODUCTION**

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

Pre-requisites:

BOTN2401 - Plant Forms and Systematics **AND** BOTN2402 - Physiology of Plants.

Course Content:

Classification of tropical fruit crops; Introduction to the status of fruit crop industry with specific reference to tropical/sub-tropical crops; The role of fruits in human nutrition; The scientific principles of fruit crop growth and yield development; Production principles and technologies used in commercial fruit crop enterprises; Evaluation of the commercial potential of minor fruits; Current issues and research needs of tropical fruit crops in Jamaica;

Evaluation:

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

AGCP3407**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%

AGSL3001**IRRIGATION AND DRAINAGE TECHNOLOGY**

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

Prerequisite:

AGCP2001 - Principles of Crop Genetics.

Course Content:

Soil water potential and measurements; Saturated /unsaturated water movement; Water movement to roots; evaporation, evapotranspiration and consumptive use. Sources of water; methods of water application; Design, installation, operation and evaluation of irrigation systems; Pumps and pumping for irrigation and drainage; Drainage principles; types of drains; planning, design and installation of drainages systems; Legal and administrative aspects of irrigation and drainage.

Evaluation:

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

BIOL3400**ISSUES IN CONSERVATION BIOLOGY**

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

This course may require participation in weekend field trips

Pre-requisites:

BIOL2403 - Principles of Ecology **AND** BIOL2407 - Biological Evolution.

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 15%
(Submission of PBL responses)
- In-course Test 15%

BIOL3402

BIOLOGY OF THE FUNGI

(3 Credits) (Level 3) (Semester)

Pre-requisite:

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 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 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-requisite:

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 5%
(Submission of PBL responses)
 - 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)

This course may require participation in weekend field trips

Pre-requisite:

BIOL2403 - Principles of Ecology.

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)

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

Pre-requisite:

BIOL2403 - Principles of Ecology.

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

(3 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 for 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) (Semesters 1, 2, 3, 4)

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 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-requisite:

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)

This course may require participation in weekend field trips

Pre-requisite:

BIOL2403 - Principle of Ecology.

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% |

ZOOL3403**ENTOMOLOGY**

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

This course may require participation in weekend field trips

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).

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%

ZOOL 3405

VERTEBRATE BIOLOGY

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

This course may require participation in weekend field trips

Pre-requisites:

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

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 modelling & 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; 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 DBML, St. Ann, management of invasives, lionfish behaviour and distribution studies; Visit to the 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 5% 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 (written 40 %; oral 10 %) 50 %

A 3D rendered figure of a woman in a white dress, holding a large trophy and a smaller award. The figure is semi-transparent, allowing the text to be seen through it.

Awards, Prizes

&

Bursaries

- **The Don Skelding's 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 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 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**.