

## BSc (Hons) Biology - SC300

### Optional Minor: Chemistry/ Environmental & Aquatic Sciences/ Plant Sciences/ Molecular Biology

#### 1. Objectives

In this post genomic era, the Biological Sciences have acquired a pivotal role than ever before and cover a wide range of subject areas from biology of microorganisms, plants and animals to genetic manipulation. This multi-faceted discipline provides opportunity to students to sample the breadth of the subject. In the second year, a wider choice is introduced within the groups of courses to allow students to explore new areas of the subject and to opt for **any** of the following minor areas in Biology: (i) Environmental & Aquatic Sciences, (ii) Plant Sciences or (iii) Molecular Biology.

This Programme provides an opportunity to acquire a thorough foundation in theory and practice of Biological Sciences with a view to developing both critical ability and practical skills. The recognised degree in Biological Sciences provides opportunity for further studies/research at postgraduate level. Graduates from this Department can seek employment as Education, Scientific, Environmental or Technical Officer, etc. Adequate attention will also be paid towards the personal development of students in acquiring professional competence and a sense of community responsibility.

#### 2. General Entry Requirements

As per General Entry Requirements for admission to the University for undergraduate degrees.

#### 3. Programme Requirements

Credit in five subjects (School Certificate) including Mathematics.  
Pass at GCE 'A' Level in Biology or equivalent.

#### 4. Programme Duration

	<b>Normal</b>	<b>Maximum</b>
Degree:	6 Semesters (i.e. 3 years)	10 Semesters (i.e. 5 years)

#### 5. Credits per Year

Minimum 18, Maximum 48 (including retake modules), subject to regulation 4.

#### 6. Minimum Credits Required for Award of Undergraduate Degree: 100

Breakdown as follows:

	<b>Credits from</b>			
	<b>Core Taught Modules</b>	<b>Project</b>	<b>Electives<sup>a</sup></b>	<b>GEMs<sup>b</sup></b>
Degree	63	10	Minimum 18	9

<sup>a</sup> A minimum of 15 credits to be obtained from either departmental electives **or** electives in one of the following optional minors: Chemistry, Environmental and Aquatic Sciences, Molecular Biology and Plant Sciences.

<sup>b</sup> GEMs: at least 9 credits to be taken within Years 1 and 2.

## 7. Assessment

Each module will be assessed over 100 marks (i.e. expressed as %) with details as follows (unless otherwise specified):

Assessment of a Biology module will be based on a written examination (of 2 and 3-hour duration for modules of 3 credits and 6 credits respectively, as specified) and/or on continuous assessment done during the semester. The continuous assessment will count for 10-30% of the overall percentage mark for the module, except for a programme where the structure makes for other specific provision(s). Continuous assessment may be based on laboratory work, and/or assignments and should include at least 1 class test.

A minimum of at least 30% should be attained in each of continuous assessment and written examination, with an overall total of 40% for a candidate to pass a module.

Modules will carry the weightings of 1, 3 or 5 depending on their status (Introductory, Intermediate or Advanced). Weighting for a particular module is indicated within parentheses in the module code.

Projects will carry 10 credits for degree award. They will be carried out normally in the area of specialisation.

Modules (if any) to be assessed jointly will be indicated to the students prior to the delivery of the modules.

## 8. List of Modules

### A. BIOLOGY CORE MODULES (63 + 10 credits)

Code	Module Name	Hrs/Yr L+P	Credits
CSE 1010e(1)	Introduction to Information Technology	O.E.	3
BIOL 1001Y(1)	Molecular and Cell Biology	75+30	6
BIOL 1002Y(1)	Diversity and Evolution	75+30	6
BIOL 1003Y(1)	Introduction to Environmental Sciences	75+30	6
BIOL 1004Y(1)	Physiology I	37.5+15	3
BIOL 1005Y(1)	Microbiology	37.5+15	3
BIOL 2001Y(3)	Introduction to Bioinformatics	37.5+15	3
BIOL 2002Y(3)	Developmental Biology & Genetics	37.5+15	3
BIOL 2003Y(3)	Parasitic Immunity	37.5+15	3
BIOL 2004Y(3)	Diversity of Organisms (PQ: BIOL 1002Y(1))	75+30	6
BIOL 2005Y(3)	Physiology II	75+30	6
BIOL 2106Y(3)	Ecology & Behaviour	37.5+15	3
BIOL 3000Y(5)	Project/Dissertation	-	10
BIOL 3001Y(5)	Physiology III	75+30	6
BIOL 3002Y(5)	Immunology	37.5+15	3
BIOL 3003Y(5)	Environmental Management	37.5+15	3

**B. BIOLOGY ELECTIVES (Not all modules may be on offer)**

BIOL 1006Y(1)	Tools and Techniques in Biology I	15+60	3
BIOL 1007Y(1)	Biostatistics	45+0	3
BIOL 2007Y(3)	Plant Product Applications	37.5+15	3
BIOL 2008Y(3)	Tools And Techniques in Biology II	15+60	3
BIOL 2009Y(3)	Animal Behaviour	37.5+15	3
BIOL 2010Y(3)	Population Ecology	37.5+15	3
BIOL 3004Y(5)	Conservation Biology	37.5+15	3
BIOL 3005Y(5)	Endocrinology	37.5+15	3
BIOL 3006Y(5)	Molecular Biology of the Gene	37.5+15	3

**C. OPTIONAL MINOR ELECTIVES: PLANT SCIENCES (Not all modules may be on offer)**

BIOL 2007Y(3)	Plant Product Applications	37.5+15	3
BIOL 2011Y(3)	Plant Biochemistry	37.5+15	3
BIOL 2012Y(3)	Plant Ecology	37.5+15	3
BIOL 3007Y(5)	Plant Biotechnology	37.5+15	3
BIOL 3008Y(5)	Plant Pathology	37.5+15	3

**D. OPTIONAL MINOR ELECTIVES: ENVIRONMENTAL & AQUATIC SCIENCES  
(Not all modules may be on offer)**

BIOL 2013Y(3)	Environmental Toxicology And Monitoring	75+30	6
BIOL 2014Y(3)	Community Ecology	37.5+15	3
BIOL 3004Y(5)	Conservation Biology	37.5+15	3
BIOL 3009Y(5)	Oceanography & Aquaculture	75+30	6

**E. OPTIONAL MINOR ELECTIVES: MOLECULAR BIOLOGY (Not all modules may be on offer)**

BIOL 2015Y(3)	Structural Biochemistry	37.5+15	3
BIOL 2016Y(3)	Metabolism & Regulation	37.5+15	3
BIOL 3010Y(5)	Cellular & Molecular Parasitology	37.5+15	3
BIOL 3011Y(5)	Genomics	37.5+15	3
BIOL 3012Y(5)	Molecular Evolution	37.5+15	3
BIOL 3013Y(5)	Virology	37.5+15	3
BIOL 3014Y(5)	Bacteriology	37.5+15	3

## 9. Programme Plan - BSc (Hons) Biology

### YEAR 1

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
CSE 1010e(1)	Introduction to IT (First semester)	O.E.	3
BIOL 1001Y(1)	Molecular and Cell Biology	75+30	6
BIOL 1002Y(1)	Diversity and Evolution	75+30	6
BIOL 1003Y(1)	Introduction to Environmental Sciences	75+30	-
BIOL 1004Y(1)	Physiology I	37.5+15	3
BIOL 1005Y(1)	Microbiology	37.5+15	3
<b>ELECTIVES</b>			
BIOL 1006Y(1)	Tools & Techniques in Biology I	15+60	3
BIOL 1007Y(1)	Biostatistics	45+0	3

### YEAR 2

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 2001Y(3)	Introduction to Bioinformatics	37.5+15	3
BIOL 2002Y(3)	Developmental Biology & Genetics	37.5+15	3
BIOL 2003Y(3)	Parasitic Immunity	37.5+15	3
BIOL 2004Y(3)	Diversity of Organisms	75+30	6
BIOL 2005Y(3)	Physiology II	75+30	6
BIOL 2006Y(3)	Ecology and Behaviour	37.5+15	3
<b>ELECTIVES</b>			
BIOL 2007Y(3)	Plants Product Applications	37.5+15	3
BIOL 2008Y(3)	Tools & Techniques in Biology II	15+60	3
BIOL 2009Y(3)	Animal Behaviour	37.5+15	3
BIOL 2010Y(3)	Population Ecology	37.5+15	3

and/or modules to be chosen from any department

Note: Not all electives may be on offer.

### YEAR 3

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 3000Y(5)	Project/Dissertation	-	10
BIOL 3001Y(5)	Physiology III	75+30	6
BIOL 3002Y(5)	Immunology	37.5+15	3
BIOL 3003Y(5)	Environmental Management	37.5+15	3
<b>ELECTIVES</b>			
BIOL 3004Y(5)	Conservation Biology	37.5+15	3
BIOL 3005Y(5)	Endocrinology	37.5+15	3
BIOL 3006Y(5)	Molecular Biology of the Gene	37.5+15	3

and/or modules to be chosen from any other units/departments.

Note: Not all electives may be on offer.

**10. Programme Plan - BSc (Hons) Biology (Optional Minor: Plant Sciences)****YEAR 1**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
CSE 1010e(1)	Introduction to IT (First semester)	O.E.	3
BIOL 1001Y(1)	Molecular and Cell Biology	75+30	6
BIOL 1002Y(1)	Diversity and Evolution	75+30	6
BIOL 1003Y(1)	Introduction to Environmental Sciences	75+30	-
BIOL 1004Y(1)	Physiology I	37.5+15	3
BIOL 1005Y(1)	Microbiology	37.5+15	3
<b>ELECTIVES</b>			
BIOL 1006Y(1)	Tools & Techniques in Biology I	15+60	3
BIOL 1007Y(1)	Biostatistics	45+0	3

**YEAR 2**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 2001Y(3)	Introduction to Bioinformatics	37.5+15	3
BIOL 2002Y(3)	Developmental Biology & Genetics	37.5+15	3
BIOL 2003Y(3)	Parasitic Immunity	37.5+15	3
BIOL 2004Y(3)	Diversity of Organisms	75+30	6
BIOL 2005Y(3)	Physiology II	75+30	6
BIOL 2006Y(3)	Ecology and Behaviour	37.5+15	3
<b>ELECTIVES</b>			
BIOL 2007Y(3)	Plants Product Applications	37.5+15	3
BIOL 2011Y(3)	Plant Biochemistry	37.5+15	3
BIOL 2012Y(3)	Plant Ecology	37.5+15	3

and/or modules to be chosen from any department

Note: Not all electives may be on offer.

**YEAR 3**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 3000Y(5)	Project/Dissertation	-	10
BIOL 3001Y(5)	Physiology III	75+30	6
BIOL 3002Y(5)	Immunology	37.5+15	3
BIOL 3003Y(5)	Environmental Management	37.5+15	3
<b>ELECTIVES</b>			
BIOL 3007Y(5)	Plant Biotechnology	37.5+15	3
BIOL 3008Y(5)	Plant Pathology	37.5+15	3

and/or modules to be chosen from any other units/departments.

Note: Not all electives may be on offer.

**11. Programme Plan - BSc (Hons) Biology (Optional Minor: Environmental & Aquatic Sciences)**

**YEAR 1**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
CSE 1010e(1)	Introduction to IT (First semester)	O.E.	3
BIOL 1001Y(1)	Molecular and Cell Biology	75+30	6
BIOL 1002Y(1)	Diversity and Evolution	75+30	6
BIOL 1003Y(1)	Introduction to Environmental Sciences	75+30	-
BIOL 1004Y(1)	Physiology I	37.5+15	3
BIOL 1005Y(1)	Microbiology	37.5+15	3
<b>ELECTIVES</b>			
BIOL 1006Y(1)	Tools & Techniques in Biology I	15+60	3
BIOL 1007Y(1)	Biostatistics	45+0	3

**YEAR 2**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 2001Y(3)	Introduction to Bioinformatics	37.5+15	3
BIOL 2002Y(3)	Developmental Biology & Genetics	37.5+15	3
BIOL 2003Y(3)	Parasitic Immunity	37.5+15	3
BIOL 2004Y(3)	Diversity of Organisms	75+30	6
BIOL 2005Y(3)	Physiology II	75+30	6
BIOL 2006Y(3)	Ecology and Behaviour	37.5+15	3
<b>ELECTIVES</b>			
BIOL 2013Y(3)	Environmental Toxicology & Monitoring	75+30	6
BIOL 2014Y(3)	Community Ecology	37.5+15	3

and/or modules to be chosen from any department

Note: Not all electives may be on offer.

**YEAR 3**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 3000Y(5)	Project/Dissertation	-	10
BIOL 3001Y(5)	Physiology III	75+30	6
BIOL 3002Y(5)	Immunology	37.5+15	3
BIOL 3003Y(5)	Environmental Management	37.5+15	3
<b>ELECTIVES</b>			
BIOL 3004Y(5)	Conservation Biology	37.5+15	3
BIOL 3009Y(5)	Oceanography	75+30	6

and/or modules to be chosen from any other units/departments.

Note: Not all electives may be on offer.

**12. Programme Plan – BSc (Hons) Biology (Optional Minor: Molecular Biology)**

**YEAR 1**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
CSE 1010e(1)	Introduction to IT (First semester)	O.E.	3
BIOL 1001Y(1)	Molecular and Cell Biology	75+30	6
BIOL 1002Y(1)	Diversity and Evolution	75+30	6
BIOL 1003Y(1)	Introduction to Environmental Sciences	75+30	-
BIOL 1004Y(1)	Physiology I	37.5+15	3
BIOL 1005Y(1)	Microbiology	37.5+15	3
<b>ELECTIVES</b>			
BIOL 1006Y(1)	Tools & Techniques in Biology I	15+60	3
BIOL 1007Y(1)	Biostatistics	45+0	3

**YEAR 2**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 2001Y(3)	Introduction to Bioinformatics	37.5+15	3
BIOL 2002Y(3)	Developmental Biology & Genetics	37.5+15	3
BIOL 2003Y(3)	Parasitic Immunity	37.5+15	3
BIOL 2004Y(3)	Diversity of Organisms	75+30	6
BIOL 2005Y(3)	Physiology II	75+30	6
BIOL 2006Y(3)	Ecology and Behaviour	37.5+15	3
<b>ELECTIVES</b>			
BIOL 2015Y(3)	Structural Biochemistry	37.5+15	3
BIOL 2016Y(3)	Metabolism & Regulation	37.5+15	3

and/or modules to be chosen from any department

Note: Not all electives may be on offer.

**YEAR 3**

<b>Code</b>	<b>Module Name</b>	<b>Hrs/Yr L+P</b>	<b>Credits</b>
<b>CORE</b>			
BIOL 3000Y(5)	Project/Dissertation	-	10
BIOL 3001Y(5)	Physiology III	75+30	6
BIOL 3002Y(5)	Immunology	37.5+15	3
BIOL 3003Y(5)	Environmental Management	37.5+15	3
<b>ELECTIVES</b>			
BIOL 3010Y(5)	Cell & Molecular Parasitology	37.5+15	3
BIOL 3011Y(5)	Genomics	37.5+15	3
BIOL 3012Y(5)	Molecular Evolution	37.5+15	3
BIOL 3013Y(5)	Virology	37.5+15	3
BIOL 3014Y(5)	Bacteriology	37.5+15	3

and/or modules to be chosen from any other units/departments.

Note: Not all electives may be on offer.

### 13. Outline Syllabus

#### **PQ: Pre-requirement**

*(must follow module & sit for exams)*

#### **PR: Pre-requisite**

*(must attain a minimum of grade E or G)*

#### **A: BIOLOGY CORE MODULES**

##### **CSE 1010e(1) - INTRODUCTION TO IT**

IT and Computers; Stepping in the Computer; Input and Output Devices; Secondary Storage; Programming; Systems Software; Applications Software; Systems Development; Computer Networks; The Internet; Computer Security; Software Utilities; Issues and Trends in IT.

##### **BIOL 1001Y(1) - MOLECULAR AND CELL BIOLOGY**

This module will introduce basic concepts of cell biology, biochemistry and genetics. Special attention will be given to cell organelles, cell membrane, cell cycles, biomolecules, enzyme kinetics and metabolic pathways. The strategy and experiments leading to the understanding of the structure and function of the genetic material will be discussed.

##### **BIOL 1002Y(1) - DIVERSITY AND EVOLUTION**

This module will explore the evidence for evolution and mechanisms of natural selection. The principles of classical and modern taxonomy will be investigated using examples from microbes, plants and animals. An overview of different phyla of animals and divisions of non vascular plants with emphasis on morphology, identifications, life histories, interrelationships and classification will also be given.

##### **BIOL 1003Y(1) - INTRODUCTION TO ENVIRONMENTAL SCIENCES**

This module covers the key concepts and principles that govern how nature works, ultimate global environmental problems, their causes and possible solutions, emphasizing on resource use, pollution and environmental impacts, the current world views on the environment.

##### **BIOL 1004Y(1) - PHYSIOLOGY I**

This module introduces the concepts and principles that provide a basis for the understanding of plant and animal physiology. In animal physiology, stress is laid on the functional strategies that have evolved within the bounds of chemical and physical possibility while in plant physiology topics covered include Mineral Nutrition in Plants, Plant-Water Relations, The Movement of Water and Solutes in Plants.

##### **BIOL 1005Y(1) - MICROBIOLOGY**

This module includes a historical perspective of Microbiology and provides a fundamental understanding of the microbial world.

##### **BIOL 2001Y(3) - INTRODUCTION TO BIOINFORMATICS**

This module will focus on the strategies and methods used to derive information from the analysis of genomes, genes and proteins. The relationship among sequence, structure and function will be addressed.

##### **BIOL 2002Y(3) - DEVELOPMENTAL BIOLOGY & GENETICS**

Selected developmental processes are presented from a comparative perspective in “model” organisms of importance in research and teaching. Emphasis is on the generation of pattern and form at the cellular and molecular levels, the mechanisms by which these changes are coordinated to produce tissues and organs and finally to generate complete animal form.

##### **BIOL 2003Y(3) - PARASITIC IMMUNITY**

This module provides students with a unique opportunity to study all aspects of pathogenesis of some medically important metazoan parasites with the central focus on host-parasite specificity/interactions. It incorporates topics like basic biology and life cycle of selected platyhelminthes and nemathelminthes, zoonotic infection, evasion of host immune responses, innate immunity, antigen processing and presentation, amongst others.

**BIOL 2004Y(3) - DIVERSITY OF ORGANISMS (PQ: BIOL 1002Y(1))**

This module is a continuation of BIOL 1002Y(1). It will include a comparative survey of vascular plants with emphasis on their morphology, anatomy, classification and phylogeny. The module will also focus on body plan, functional and comparative anatomy, and life history strategies with examples from representative animal phyla.

**BIOL 2005Y(3) - PHYSIOLOGY II**

This module deals with various aspects of plant bioenergetics and biochemistry and provides an overview of the vertebrate anatomical organisation. Topics in the plant component include energy conservation in photosynthesis, photosynthetic electron transport and carbon assimilation and metabolism. The animal physiology component focuses on the understanding of how individual cells, tissues and organs are coordinated and integrated to different physiological functions of the organisms and life support systems such as the cardiovascular, respiratory, alimentary and urinary systems.

**BIOL 2106Y(3) - ECOLOGY & BEHAVIOUR**

This module covers intra- and inter-specific competition, predation, parasitism, symbiosis, mutualism and other interactions between organisms and their environment. Other topics include exploitation of resources, aggression, territorial behaviour, sexual selection and reproductive strategies, parental care and investment, mating systems, cooperation and conflict.

**BIOL 3000Y(5) - PROJECT/DISSERTATION**

The undergraduate research project is based on an approved topic.

**BIOL 3001Y(5) - PHYSIOLOGY III**

This module completes the module BIOL 2005Y(3). It deals with different aspects of plant growth and development and the understanding of the mechanisms that operate in the animal kingdom at a higher level. Topics on the plant section include phytohormones and growth regulators, tropism, photoperiodism, nastic movements, photomorphogenesis and seed dormancy and germination.

The part on animal physiology focuses on life cycle, control and regulatory systems. Reproduction and development, the nervous system, the endocrine and musculoskeletal systems are discussed in depth.

**BIOL 3002Y(5) - IMMUNOLOGY**

This module will focus on some mechanisms involving antibody and cell mediated responses, the Major Histocompatibility Complex, complement activation, inflammation, hypersensitivity reactions, autoimmunity, amongst others.

**BIOL 3003Y(5) - ENVIRONMENTAL MANAGEMENT**

The module aims to provide a deep understanding of the principles and concepts as well as the tools and techniques of environmental management for sound sustainable development: Environmental change; Environmental monitoring and evaluation; Sustainable development and environmental indicators; Ecosystem Approach (EA); Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA); Environmental Management Systems (EMS); Integrated Coastal Zone Management (ICZM): resources, activities, management issues, tools and techniques of management.

**B: BIOLOGY ELECTIVES (Not all modules may be on offer)****BIOL 1006Y(1) - TOOLS AND TECHNIQUES IN BIOLOGY I**

In order to complement some of the core modules, this module aims at providing a comprehensive appraisal of laboratory and field techniques and their potential uses in biological sciences. Emphasis is laid on the use of standard procedures and good laboratory practice.

**BIOL 1007Y(1) - BIostatISTICS**

Topics relevant to biology are introduced. These include statistical methods and their applications in biology. Contingency tables; probit analysis and some non-parametric tests will be discussed amongst others.

**BIOL 2007Y(3) - PLANT PRODUCT APPLICATIONS**

This module deals with the application of botanical knowledge to the well being of mankind. It aims at presenting a comprehensive account dealing with plants of economic importance. Emphasis will be laid on the primary and secondary metabolites with reference to their exploitation in biotechnology.

**BIOL 2008Y(3) - TOOLS AND TECHNIQUES IN BIOLOGY II**

In order to complement some of the core modules, this module aims at providing a comprehensive appraisal of laboratory techniques and their potential uses in biological sciences. Emphasis is laid on the use of standard procedures and good laboratory practice.

**BIOL 2009Y(3) - ANIMAL BEHAVIOUR**

This module overviews the foundations of animal behaviour. Topics will include evolution and social behaviour; mechanisms underlying behaviour, animal perception, biological time-keeping, learning behaviour, communication and understanding complex behaviour

**BIOL 2010Y(3) - POPULATION ECOLOGY**

This module includes the structure and dynamics of population systems, population demography, metapopulation structure, life-tables, competition, predation, dispersal, population stability and pest outbreaks. The theory of Population Viability Analyses (PVA) will be covered and examples of its application discussed.

**BIOL 3004Y(5) - CONSERVATION BIOLOGY**

This module will first focus on the value of biodiversity and explore species extinction and review the current threats to both global and local biodiversity. The various strategies to conserve biodiversity will then be presented and discussed with ample reference to actual case studies. Aspects of restoration ecology will be covered. The module will end on international conventions and national legislation on biodiversity conservation.

**BIOL 3005Y(5) - ENDOCRINOLOGY**

The module establishes basic concepts and will focus on major components including anatomical aspect of major endocrine glands and evolution of the endocrine system. The module will cover the general organization of the vertebrate endocrine system, some aspects of endocrine and neuroendocrine system amongst others.

**BIOL 3006Y(5) - MOLECULAR BIOLOGY OF THE GENE**

This module builds on concepts covered in genetics and cell biology with a view to understand the functioning of the gene at the molecular level. Original papers on selected topics will be discussed.

**C: OPTIONAL MINOR ELECTIVES: PLANT SCIENCES (Not all modules may be on offer)****BIOL 2007Y(3) - PLANT PRODUCT APPLICATIONS**

This module deals with the application of botanical knowledge to the well being of mankind. It aims at presenting a comprehensive account dealing with plants of economic importance. Emphasis will be laid on the primary and secondary metabolites with reference to their exploitation in biotechnology.

**BIOL 2011Y(3) - PLANT BIOCHEMISTRY**

This module covers topics in structural biochemistry with special emphasis on plant molecules and their metabolism.

**BIOL 2012Y(3) - PLANT ECOLOGY**

This module will cover topics such as the why and how of seed dispersal, the ecology of seed dormancy and soil seed banks, environmental influences on germination, intra- and inter-specific competition in plants, herbivory and keystone herbivores, plant defences, nutritional symbiosis in plants, pollination and importance of pollinators, relation between vegetation and climate and the ecology of invasive plants.

**BIOL 3007Y(5) - PLANT BIOTECHNOLOGY**

A module dealing with techniques used in modern plant biotechnology and how this technology is used to modify and improve economically important plant species. Topics covered include tissue culture, clonal propagation, genetic manipulation of plants, genetics engineering in higher plants and production of commercially useful compounds amongst others.

**BIOL 3008Y(5) - PLANT PATHOLOGY**

A study of the microorganisms and the environmental factors that cause disease in plants; the mechanisms by which these factors induce disease in plants; the methods of disease prevention and control.

**D: OPTIONAL MINOR ELECTIVES: ENVIRONMENTAL & AQUATIC SCIENCES (Not all modules may be on offer)****BIOL 2013Y(3) - ENVIRONMENTAL TOXICOLOGY AND MONITORING**

The toxicology component of this module deals with the main goals of ecotoxicology, major classes of toxic substances, toxicity testing, the concept of uptake and bioaccumulation, effects of toxicants at various levels of organization in the environment, marine ecotoxicology, environmental risk assessment, and disaster response.

The environmental monitoring component focuses on types, purposes and essentials of monitoring programs, strategies for air, water, soil & vegetation monitoring, use of environmental standards and indicators, monitoring environmental progress, case studies.

**BIOL 2014Y(3) - COMMUNITY ECOLOGY**

This module will start with simple species interactions and then explore community structure covering topics like importance values, biodiversity and ecosystem functions, ecotones and landscapes. Aspects of applied community ecology will be covered such as habitat destruction and the extinction debt, keystone effects and global change and resulting species interactions and distribution.

**BIOL 3004Y(5) - CONSERVATION BIOLOGY**

This module will first focus on the value of biodiversity and explore species extinction and review the current threats to both global and local biodiversity. The various strategies to conserve biodiversity will then be presented and discussed with ample reference to actual case studies. Aspects of restoration ecology will be covered. The module will end on international conventions and national legislation on biodiversity conservation.

**BIOL 3009Y(5) - OCEANOGRAPHY & AQUACULTURE**

Provides the fundamentals of how the ocean works as a physico-chemical system intimately connected with climate and emphasises on the organism-environment interrelationships. Intertidal ecology, coastal ecosystems, natural marine/aquatic resources (including fisheries) and problems related to their exploitation. The law of the sea.

**E: OPTIONAL MINOR ELECTIVES: MOLECULAR BIOLOGY (Not all modules may be on offer)****BIOL 2015Y(3) - STRUCTURAL BIOCHEMISTRY**

This module will lay emphasis on biomolecules including carbohydrates, amino acids, proteins, lipids and nucleic acids and will overview the main secondary metabolite classes. Structure-function relationships will be stressed.

**BIOL 2016Y(3) - METABOLISM & REGULATION**

This module will deal with concepts of conformation and dynamics with particular reference to enzyme kinetics and biochemical regulation processes. Emphasis will be laid on reactions occurring during catabolism and anabolism. Topics including carbohydrate metabolism, lipid metabolism, amino acid metabolism and nucleic acid metabolism will be considered.

**BIOL 3010Y(5) - CELLULAR & MOLECULAR PARASITOLOGY (PQ: BIOL 1001Y(1) & BIOL 2003Y(3))**

This module will provide the transition from classical parasitology of veterinary and medical importance to modern parasite biology. Salient topics will offer in-depth studies of the most active areas of research in medical parasitology at cellular and molecular levels.

**BIOL 3011Y(5) - GENOMICS**

The global organisation, expression, regulation and evolution of genes will be considered. Special emphasis will be placed on tools available to study genomes.

**BIOL 3012Y(5) - MOLECULAR EVOLUTION**

This module will address the processes of evolution at the molecular level. The major modern concepts in evolution will be covered.

**BIOL 3013Y(5) - VIROLOGY**

The major emphasis of this module will be on the basic mechanisms by which viruses infect or transform cells. The techniques and tools utilized in the study of viruses will be considered.

**BIOL 3014Y(5) - BACTERIOLOGY**

Basic and current concepts in bacteriology will be introduced. The symbiotic and parasitic associations, which some bacteria maintain with their hosts, will be examined. The relevance of bacteria in the environment will be covered.