

BSc (Hons) Applied Biochemistry (Full-Time)

(A306)

1. Objectives

Biochemistry is central to all areas of the “biological” and “life” sciences. It aims to provide an understanding of every aspect of the structure and function of living things at a molecular level. It is a practical laboratory science that applies the molecular approaches of chemistry to the vast variety of biological systems. Biochemistry encompasses the study of the chemical changes needed for life processes, such as providing energy and building block molecules from our diet, so that we may grow, move and reproduce. It is, therefore, the most important and broadest of the life sciences, spanning a wide range of areas from microbiology to plant and animal sciences. The impact of studies in biochemistry on modern life is enormous. Understanding the pathology of diseases such as diabetes, cancer, heart disease, Alzheimer’s and Parkinson’s is built on research by biochemists. This novel approach is allowing the development of innovative drugs and vaccines. Techniques such as DNA-fingerprinting have revolutionised forensics and crime detection, while DNA-chip technology has fuelled rapid advances in gene research. Biotechnological applications in agriculture and genetically-modified crops offer enhanced resistance to pests and improved yields. Scientists are able to probe the structure and function of specific biomolecules, understand how proteins work in exquisite detail, recognize how metabolic pathways are regulated, decipher the human genome, analyse the expression of genes, identify molecular defects in human diseases amongst others through research advances in the field of biochemistry. In addition, the rapid development of bioinformatics over the last decade, has brought new tools for researchers to use in understanding the molecules of life, and in integrating information into networks and systems. Biochemistry has shaped the new concepts of structural biology and molecular genetics.

This programme will give learners a sound and broad background in applied biochemistry with modules in Food Biochemistry, Environmental Biochemistry as well as Clinical and Medical Biochemistry. It will aim to provide training in the theoretical and practical aspects of biochemistry and its applications. Learners will have several opportunities to familiarise themselves with biochemical methodology and to sample some of its most exciting applications. The modular structure of the programme, with a broad base at the beginning, ample opportunities for specialisation at the end, and the professional placement in the middle, will give learners both breadth and in-depth knowledge. As a versatile and knowledgeable biochemist, learners will have a broad choice of careers upon graduation including opportunities in industry particularly in the biotechnology sector, university, private or state-owned laboratories as well as medical or veterinary schools.

Upon successful completion of this programme, learners will:

- Gain a solid background in core areas of Biochemistry including the structure, function, synthesis, characterization and analysis of biomolecules as well as acquire knowledge on recent advances in molecular biology, molecular cell biology, computational modeling and bioinformatics
- Apply that basic understanding to the study of specific and more advanced topics in pure or applied life science disciplines
- Be equipped with the up-to-date skills required for immediate practice and ability to use their knowledge to the practical solutions of real existing problems
- Gain an understanding of the basic mechanisms inherent to living systems
- Acquire skills for laboratory procedures and techniques, that will enable them to go for more specialist training later in their career
- Gain hands-on experience in a number of the practical methods and techniques used in biological investigations
- Develop skills in the application and interpretation of a range of appropriate experimental techniques.
- Develop biologically and statistically sound research skills
- Develop independent learning abilities
- Develop the ability to comprehend, analyse and critique published information in biology.
- Develop the ability to formulate hypotheses and problem questions
- Develop the ability to use integrated approaches to problem solving.

- Apply their knowledge and understanding in order to initiate and carry out an extended piece of work or project.

2. General Entry Requirements

In accordance with General Entry Requirements for Admission to the University for Undergraduate Degrees.

3. Programme Requirements

SC: Credit in Mathematics, Biology and Chemistry

3 GCE 'A' Levels passes in related approved Science subjects (Mathematics, Chemistry, Physics, Biology)

4. Programme Duration

	Normal (Years)	Maximum (Years)
Degree	3	5

5. **Credits per Year:** Minimum 6 credits, Maximum 48 credits subject to Regulation 6.

6. **Minimum Credits Required for Award of Undergraduate Degree: 99**

Breakdown as follows:

	Credits from	
	Core Taught Modules	Project
Degree	90	9

Students may exit with a:

- Certificate after having earned 30 credits in core modules.
- Diploma after having earned 60 credits in core modules.

7. Assessment

Each module will be assessed over 100 marks (i.e. expressed as %) with details as follows (unless otherwise specified). Assessment will be based on a Written Examination of 2-3 hour duration, carrying a weighting of 70%, and Continuous Assessment carrying 30% of total marks for AGRI modules (unless otherwise specified). Written examinations for AGRI modules will be carried out at the end of Semester I or Semester II. Continuous Assessment will be based on laboratory/field works, and/or assignments, and should include at least 1 class test.

Modules from other Faculties/Departments/Centres will carry weighting in the Written Examination and the Continuous Assessment as specified by the Faculties/Departments/Centres concerned.

An overall total of 40% for combined Continuous Assessment and Written Examination components would be required to pass the modules, without minimum thresholds within the individual Continuous Assessment and Written Examination.

All students should keep a portfolio of all coursework for their respective Programme of studies and same should be made available upon request, to the Faculty/Centre Examination Office. In case students fail to submit the Portfolio to the External Examiners through the Faculty/Centre Examination Office, a penalty of 10% on all Continuous Assessment marks obtained shall apply.

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.

Each module will carry credits in the range of 1 to 6. Project – AGRI3000Y(5) will carry 9 credits.

Assessment of the module AGRI 1153(1) - Effective Scientific Communication: Principles and Practice I will be based on the submission of a portfolio. For the part on WEB 2.0 tools, participation in all discussion forum on the MOODLE platform and demonstration of the use of the tools (e.g. creation of a blog) should be shown. Assessment of the module AGRI 2279(1) - Scientific Communication: Principles and Practice II, will be based on the submission of a Portfolio.

The modules: AGRI 1153(1) - Effective Scientific Communication: Principles and Practice I and AGRI 2279(1) – Effective Scientific Communication: Principles and Practice II, will carry 2 credits and 1 credit, respectively. Assessment of the module WCS 2200(3) – Writing Case Studies, will be based on the write up and submission of a Case Study and Oral presentation.

Submission Deadlines for Dissertation

- First Draft: by last week day of February of the Academic Year.
- Final Copy – not later than the last week day of March of the Academic Year:
- Three copies of the dissertation (two spiral-bound copies, printed on both sides in black and white and one soft copy in a single PDF text file on electronic storage media) should be submitted to the Faculty/Centre Registry.
- In addition a soft copy of the dissertation (main body i.e. Introduction up to the last Chapter) should be uploaded on the Turnitin Platform, as a single PDF file in the appropriate class/assignment provided by the Project Supervisor by **3.00 pm**. In case a student is allocated a part-time Supervisor, the class is to be created by the Programme/Project Coordinator.
- All the above should be submitted not later than the last working day (i.e. excluding Saturdays, Sundays and Public Holidays) of March of the academic year by **4.00 pm** at latest, unless specified otherwise in the Programme of studies.
- Failure to submit the Project/Dissertation through the Turnitin Platform will result in the dissertation of the student, whether the bound copy or the soft copy, being unreceivable.

8. List of Core Modules

Code	Module Name	Hr / Yr	Credits
		L+P	
AGRI 10113(1)	Fundamentals of Chemistry	30+30	3
AGRI 10114Y(1)	Microbiology	60+40	5
AGRI 10115(1)	Food Biochemistry I and Enzymology	30+30	3
AGRI 1077Y(1)	Biotechniques	30+30	3
AGRI 1056Y(1)	Introductory Statistics	30+30	3
AGRI 10116(1)	Fundamentals of Biochemistry	30+30	3
AGRI 1059Y(1)	Animal, Human and Plant Physiology	60+60	6
AGRI 10117(1)	Cell Biology	30+30	3
AGRI 1153(1)	Effective Scientific Communication: Principles and Practice I	30 +0	2
AGRI 20115(3)	Bio-statistical Methods	30+30	3
AGRI 20116Y(3)	Biochemistry and Cell Signalling	60+60	6
AGRI 2152Y(3)	Bioreactor and Bioprocess Technology	45+30	4
AGRI 2153Y(3)	Introduction to Bio-Nanotechnology	30+30	3
AGRI 20117Y(3)	Analytical Methods	45+30	4
AGRI 20118Y(3)	Clinical and Medical Biochemistry	60 + 60	6
AGRI 2019Y(3)	Molecular Biology	30 + 30	3
AGRI 2279(1)	Effective Scientific Communication: Principles and Practice II	15+0	1
WCS 2200(3)	Writing Case Studies	9+36	3
AGRI 2000	Practical Training	-	-
AGRI 3000Y(5)	Project	-	9
AGRI 30113Y(5)	Genomics and Proteomics	60+45	5
AGRI 30114Y(5)	Food Biochemistry II and Food Biotechnology	60+60	6
AGRI 3122Y(5)	Pharmacology and Pharmacognosy	45+30	4

AGRI 30115Y(5)	Environmental Biochemistry	60+45	5
AGRI 30116Y(5)	Bioinformatics Computing and Applications	60+60	6
Total Number of Credits = 99			

AGRI 2000 - Practical Training at the end of Year 2.

9. Programme Plan - BSc (Hons) Applied Biochemistry

YEAR 1

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		L+P	
AGRI 10113(1)	Fundamentals of Chemistry	30+30	3
AGRI 10114Y(1)	Microbiology	60+40	5
AGRI 10115(1)	Food Biochemistry I and Enzymology	30+30	3
AGRI 1077Y(1)	Biotechniques	30+30	3
AGRI 1056Y(1)	Introductory Statistics	30+30	3
AGRI 10116(1)	Fundamentals of Biochemistry	30+30	3
AGRI 1059Y(1)	Animal, Human and Plant Physiology	60+60	6
AGRI 10117(1)	Cell Biology	30+30	3
AGRI 1153(1)	Effective Scientific Communication: Principles and Practice I	30 +0	2

Total credits= 31 credits

YEAR 2

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		L+P	
AGRI 20115(3)	Bio-Statistical Methods	30+30	3
AGRI 20116Y(3)	Biochemistry and Cell Signalling	60+60	6
AGRI 2152Y(3)	Bioreactor and Bioprocess Technology	45+30	4
AGRI 2153Y(3)	Introduction to Bio-Nanotechnology	30+30	3
AGRI 20117Y(3)	Analytical Methods	45+30	4
AGRI 20118Y(3)	Clinical and Medical Biochemistry	60 + 60	6
AGRI 2019Y(3)	Molecular Biology	30+30	3
AGRI 2279(1)	Effective Scientific Communication: Principles and Practice II	15+1	1
WCS 2200(3)	Writing Case Studies	9+36	3
AGRI 2000	Practical Training	-	-

AGRI 2000 - Practical Training can be done at the end of Year 2.

Total credits = 33 credits

YEAR 3

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		L+P	
AGRI 3000Y(5)	Project	-	9
AGRI 30113Y(5)	Genomics and Proteomics	60+45	5

AGRI 30114Y(5)	Food Biochemistry II & Food Biotechnology	60+60	6
AGRI 3122Y(5)	Pharmacology and Pharmacognosy	45+30	4
AGRI 30115Y(5)	Environmental Biochemistry	60+45	5
AGRI 30116Y(5)	Bioinformatics computing and applications	60+60	6

Total credits: 35

Total Number of Credits = 99