

BSc (Hons) Applied Biochemistry (Full-time)

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 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

2 GCE 'A' Levels passes in related approved Science subjects (Mathematics, Chemistry, Physics, Biology or Food Studies)

Preference will be given to candidates holding 'A' levels in Chemistry and Mathematics.

4. Programme Duration

	Normal (Years)	Maximum (Years)
Degree	3	5

5. **Credits per Year:** Minimum 18 credits, Maximum 48 credits subject to Regulation 4.

6. **Minimum Credits Required for Award of Undergraduate Degree: 101**

Breakdown as follows:

	Credits from	
	Core Taught Modules	Project
Degree	92	9

The module Practical Training – AGRI 2000 and the module Scientific Communication Skills & Methods – AGRI 2130 must be completed satisfactorily for the award of the degree.

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. 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. Continuous Assessment will be based on laboratory/field works, and/or assignments, and should include at least 1 class test.

An overall total of 40% for combined continuous assessment and written examination components would be required to pass the module, without minimum thresholds within the individual continuous assessment and written examination.

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 3 to 6. Project – AGRI 3000Y(5) will carry 9 credits. Assessment of the module AGRI 2130 - Scientific Communication Methods & Skills will be based on continuous assessment of students throughout the module and/or submission of a portfolio. The module carries no credits. For satisfactory completion of the module, a minimum of 40% should be attained.

Assessment of practical training will be based on the on-site supervisor's evaluation and the student's portfolio. For satisfactory completion of the practical training, a minimum of 40% should be attained.

Written examinations for AGRI modules will be carried out at the end of Semester I and Semester II.

Submission Deadlines for Dissertation:

- First Draft: by last week day of February of the Academic Year to the project supervisor(s)
- Final Copy: three copies of the dissertation (2 spiral-bound copies and 1 soft copy in a single PDF text file on an electronic storage media) should be submitted to the Faculty/Center Registry not later than the last week day of March of the Academic Year by 4.00 p.m at latest.

8. Academic Teaching in Case of an Emergency

To ensure minimal disruption of normal academic teaching in case of an emergency (e.g. closure of the University for more than 2 weeks), the i.Learn e-Learning Platform of VCILT will be used to deliver Teaching and Learning content. Relevant learning resources will be posted on the Platform. Assignments (if any) will be submitted using the online submission box. Arrangements will be made to register students on the e-Learning platform at the beginning of the academic year.

9. List of Modules

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 1087Y(1)	Chemistry Fundamentals	60+60	6
AGRI 1057Y(1)	Basic Microbiology and Techniques	60+60	6
AGRI 1088Y(1)	Food Biochemistry and Enzymology	30+30	3
AGRI 1077Y(1)	Biotechniques and Analytical Methods	60+60	6
AGRI 1056Y(1)	Introductory Statistics	30+30	3
AGRI 1089Y(1)	Biochemistry Fundamentals	30+30	3
AGRI 1059Y(1)	Plant, Animal and Human Physiology	60+60	6
AGRI 2081Y(3)	Statistical Methods and Computational Biology	60+60	6
AGRI 2008Y(3)	Molecular and Cell Biology	60+60	6
AGRI 2150Y(3)	Immunology and Cell Signalling	45+60	5
AGRI 2151Y(3)	Protein Biochemistry	45+60	5
AGRI 2152Y(3)	Bioreactor and Bioprocess technology	45+30	4
AGRI 2153Y(3)	Introduction to Bio-nanotechnology	30+30	3
AGRI 2154Y(3)	Clinical Biochemistry	45+30	4
AGRI 2000	Practical Training	-	-
AGRI 2130	Scientific Communication Skills & Methods	35+0	-
AGRI 3000Y(5)	Project	-	9
AGRI 3065Y(5)	Genomics and Proteomics	60+60	6
AGRI 3120Y(5)	Applied Food Biochemistry	30+30	3
AGRI 3121Y(5)	Medical Biochemistry	45+30	4
AGRI 3122Y(5)	Pharmacology and Pharmacognosy	45+30	4
AGRI 3123Y(5)	Environmental Biochemistry	45+30	4
AGRI 3068Y(5)	Bioinformatics	45+60	5

Total Number of Credits = 101

AGRI 2000 - Practical Training can be done in either Year 1 or Year 2. AGRI 2130 - Scientific Communication Skills & Methods will be done in Semester 2 in Year 2.

10. Programme Plan - BSc (Hons) Applied Biochemistry

YEAR 1

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 1087Y(1)	Chemistry Fundamentals	60+60	6
AGRI 1057Y(1)	Basic Microbiology and Techniques	60+60	6
AGRI 1088Y(1)	Food Biochemistry and Enzymology	30+30	3
AGRI 1077Y(1)	Biotechniques and Analytical Methods	60+60	6
AGRI 1056Y(1)	Introductory Statistics	30+30	3
AGRI 1089Y(1)	Biochemistry Fundamentals	30+30	3
AGRI 1059Y(3)	Animal, Human and Plant Physiology	60+60	6

Total credits= 33 credits

YEAR 2

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 2081Y(3)	Statistical Methods and Computational Biology	60+60	6
AGRI 2008Y(3)	Molecular and Cell Biology	60+60	6
AGRI 2150Y(3)	Immunology and Cell Signalling	45+60	5
AGRI 2151Y(3)	Protein Biochemistry	45+60	5
AGRI 2152Y(3)	Bioreactors and Bioprocess technology	45+30	4
AGRI 2153Y(3)	Introduction to Bio-nanotechnology	30+30	3
AGRI 2154Y(3)	Clinical Biochemistry	45+30	4
AGRI 2000	Practical Training	-	-
AGRI 2130	Scientific Communication Skills & Methods	35+0	-

AGRI 2000 - Practical Training can be done in either Year 1 or Year 2.

AGRI 2130 - Scientific Communication Skills & Methods will be done in Semester 2 in Year 2.

Total credits = 33 credits

YEAR 3

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 3000Y(5)	Project	-	9
AGRI 3065Y(5)	Genomics and Proteomics	60+60	6
AGRI 3120Y(5)	Applied Food Biochemistry	30+30	3
AGRI 3121Y(5)	Medical Biochemistry	45+30	4
AGRI 3122Y(5)	Pharmacology & Pharmacognosy	45+30	4
AGRI 3123Y(5)	Environmental Biochemistry	45+30	4
AGRI 3068Y(5)	Bioinformatics	45+60	5

Total credits: 35

Total Number of Credits = 101