Bachelor of Science in Biochemistry and Molecular Biology

Biochemistry is a subject in life sciences whose objective entails understanding the Molecular Basis of life in plants and animals. It is a multi-disciplinary subject that focuses on structure and function of molecules as well as their interplay to create the phenomenon of life. The subject particularly looks at how molecular interplay is translated into basic metabolism, energy transduction, defense and physical responses for purposes of growth and development.

The Molecular basis of the ongoing struggle between higher organisms and disease is aptly captured in subjects like Medical Biochemistry, Biochemistry of parasites and tumors as well as Cell and Molecular Immunology. Strategies designed to control disease and enhance food security are adequately addressed in the areas of pharmacology Molecular biology and biotechnology. These areas of specialization form part of recent advances in biochemistry and are covered in this programme.

The degree programme will be offered in collaboration with Biological and Physical Science departments. The students will acquire practical and theoretical understanding of basic metabolism, Molecular Biology and Biotechnology. Other areas included in the programme are cell and Molecular Immunology, Industrial and Nutritional Biochemistry, Biochemical Pharmacology and Medical Biochemistry. These courses are designed to expose students to a wider perspective in Applied Biochemistry.

COURSE OBJECTIVES

1. To impart analytical knowledge in Biochemistry and Molecular Biology to the students.
2. To equip students with practical skills in the areas of Biochemistry and Molecular Biology.
3. To equip students with knowledge in relevant and recent advances in Applied Biochemistry and Molecular Biology.

COURSE JUSTIFICATION

Like other developing countries Kenya needs to develop its scientific base in order to find effective and logically relevant solutions to problems of health, food security, industrial development and environmental protection. Biochemistry therefore remains an essential discipline and continues to play a catalytic role.

Resultant from this Biochemistry has advanced to include areas of Molecular Biology and Biotechnology in addition to Medical Biochemistry, Industrial and Nutritional Biochemistry, Biochemical Pharmacology and Cell and Molecular Immunology. All these are presently playing a significant role in provision of alternative sources of food and medicine.

Students graduating from this programme will be absorbed in local and international research institutions involved in multi-disciplinary life sciences research. Some develop careers in production, quality assurance and technical sales in food, beverages and pharmaceutical sectors. Cosmetics industries, hospital diagnostics and environmental health protection departments continue to show interest in graduates of this programme suggesting improved confidence on graduates of this programme by the country's economic sector.

Regulations for the Degree of Bachelor of Science in Biochemistry and Molecular Biology

1.0 Entry Requirements

Students wishing to study Biochemistry and Molecular Biology must satisfy the minimum University requirements and Faculty/School entry requirements. A student to be admitted must satisfy any of the following minimum requirements;

Either

1.1 must have passed Biology or Biological Sciences and Chemistry in KCSE at a minimum grade of C+. In addition a student must have passed Maths

or Physics / Physical Science with a minimum grade of C. A student who has not attained the said grade in Maths or Physics or Physical Science must undertake and pass the respective bridging course in an institution recognized by the university senate in order to be considered for the degree programme.

or

1.2 have a minimum of 2 principal passes in biology and chemistry subjects in Kenya Advanced Certificate of Education (KACE) or its equivalent,

or

1.3 have a diploma in relevant science subjects and with at least a credit pass from an Institution recognized by the University Senate,

or

1.4 have a diploma in applied Sciences with at least a credit pass in relevant science subjects from an Institution recognized by the University Senate,

or

1.5 have any other qualifications accepted by the University Senate as equivalent to 1.1 to 1.4. Students who hold any of the qualifications 1.2, 1.3 and 1.4 above may at the discretion of the Faculty/School be admitted directly to the second year of the course in which case they may complete their course in a minimum of three academic years and a maximum of five academic years.

1.6 Admission is subject to availability of facilities.

2.0 Course Structure

2.1 In each year a student will be required to take twelve (12) core units. In addition each student will be required to take three (3) University units and one (1) Faculty/School unit in the first year and one (1) University unit in the fourth year of study.

2.2 A student who takes additional unit(s) will have the grade(s) indicated in the transcript but will not count towards classification of the degree.

2.3 Biochemistry will offer the following programme for students joining Biochemistry and Molecular Biology. 2:2:1:1-Students will take units from the department of Biochemistry and from one of the sister departments in first and second year, and take purely biochemistry units in third and fourth year.

Unless otherwise stated each course is one unit.

Course Distribution

First Year

Code	**Unit Title**
First Semester	
HRD 2101	Communication Skills
HBB 2100	Structure of Biomolecules
HBB 2104	The Cell and its External Environment
HBB 2105	Plant Biochemistry I
SCH 2100	Atomic Structure
SCH 2102	Physical Chemistry I
SMA 2104	Mathematics for Sciences
SZL 2111	HIV/AIDS
HRD 2102	Development Studies and Social Ethics
HBB 2101	Proteins and Enzymes I
HBB 2102	Medical Physiology
HBB 2103	Basic Metabolism I
HBB 2106	Biochemistry of Microorganisms I
HBB 2107	Biomembranes and Organelles
SCH 2101	Chemical Bonding & Structure
SCH 2103	Organic Chemistry I

Second Year

ICS 2240	Introduction to Computer and Data Processing
HBB 2200	Basic Metabolism II
HBB 2202	Biochemical Techniques and Instrumentation I

HBB 2205	Cell and Molecular Biology
SCH 2200	Comparative Study of S and P Block Elements
SCH 2201	Physical Chemistry II
ICS 2241	Introduction to Programming
HBB 2208	Biochemistry of Microorganisms II
HBB 2220	Plant Biochemistry II
SCH 2202	Organic Chemistry II
SCH 2203	Nuclear Chemistry and Radiochemistry
SMA 2250	Maths for Biologists

Third Year

Code	**Unit Title**
First Semester	
Core Units	
HBB 2301	Basic Metabolism III
HBB 2302	Biochemical Techniques and Instrumentation II
HBB 2304	Protein and Enzymes II
HBB 2307	Biostatistics and Research Methodology
HBB 2323	Principles of Genetic Engineering I
HBB 2303	Biochemical Endocrinology
HBB 2317	Principles of Biotechnology
HBB 2331	Biosafety and Bioethics in Biotechnology
HBB 2305	Medical Biochemistry I
HBB 2306	Cell and Molecular Immunology I
HBB 2321	Plant Biochemistry III
HBB 2322	Biochemical Pharmacology I
HBB 2324	Medical Parasitology I
HBB 2326	Biochemistry of Special Organs
HBB 2327	Pharmacognosy

Fourth Year

First Semester

Core Units

HRD 2401	Entrepreneurship Skills
HBB 2400	Metabolic Regulation and Integrated Metabolism in Mammalian Tissues
HBB 2401	Biochemical Techniques and Instrumentation III
HBB 2432	Industrial Biochemistry
HBB 2406	Research Project (2 Units)
HBB 2407	Nutritional Biochemistry
HBB 2423	Biochemical Pharmacology II
HBB 2424	Medical Biochemistry II
HBB 2428	Environmental Biochemistry