

FACULTY OF SCIENCE

Introduction

The Faculty of Science started in 1927 and it offers; Bachelor of Science, Master of Science and Doctor of Philosophy programmes mainly in basic sciences. The programmes are conducted in the seven departments of faculty namely; Biochemistry, Botany, Chemistry, Geology, Mathematics, Physics and Zoology.

The Faculty of Science is also serviced by other Faculties/Institutes/Schools such as Economics, Psychology, and Statistics because the Science students offer courses from those faculties/Institutes/Schools In turn the Faculty of Science services the School of Education to teach Chemistry, Mathematics and Physics for the Bachelor of Science with Education Programme; the Institute of Statistics and Applied Economics to teach Mathematics; the Faculty of Medicine to teach Mathematics on the Bachelor of Pharmacy Programme; the Faculties of Veterinary Medicine, and Human Medicine to Biochemistry; the East African School of Librarian and Information Science (EASLIS) to teach Biological and Physical Sciences.

The Faculty offers Applied Science programmes in areas such as Environmental Sciences, Industrial Chemistry, Water Quality Control, Sports Science, Fisheries, Ethnobotany, Mathematical Epidemiology, and Geological Resources Management

Mandate of the Faculty

The mandate of the Faculty of Science is to carry out teaching and research in the basic sciences, namely biochemistry, botany, chemistry, geology, mathematics, physics, zoology and environmental sciences, which are a foundation for the applied sciences. The Faculty also undertakes teaching and research in applied sciences.

The general functions of the Faculty of Sciences are:

- a) To produce graduates for various sectors of scientific and economic development of the nation and the world at large.
- b) To conduct high quality research in

science.

- c) To offer extension services to various centres of human activities.
- d) To offer services to other Faculties/Schools/Institutes by teaching branches of basic science relevant to their disciplines.

The following are the undergraduate and postgraduate awards offered by the Faculty of Science.

Undergraduate Awards

Bachelor of Science
Bachelor of Science Conservation Biology
Bachelor of Science in Geological Resources Management
Bachelor of Science (External)
Bachelor of Science in Industrial Chemistry
Bachelor of Science in Sports Science
Bachelor of Science in Fisheries and Aquaculture
Bachelor of Science in Ethno-botany.

Postgraduate Awards

Postgraduate Diploma in Computer Science
Postgraduate Diploma in Pure and Applied Geology
Master of Science degrees as follows:
Master of Science in Chemistry
Master of Science in Clinical Biochemistry
Master of Science in Botany
Master of Science in Geology
Master of Science in Mathematics
Master of Mathematics
Master of Science in Physics
Master of Science in Zoology
Entomology
Parasitology
Fisheries
Vertebrate Ecology
Doctor of Philosophy (PhD)
Doctor of Science (D.Sc)

UNDERGRADUATE PROGRAMMES

BACHELOR OF SCIENCE

SUBJECT COMBINATION

CODE	COMBINATION		
500	B	C	Z
501	B	G	Z
502	B	Z	PSY
503	B	Z	PE
504	BC	B	Z
505	BC	C	Z
506	C	GL	P
507	C	PSY	P
508	M	G	PSY
509	M	C	PSY
510	M	P	PSY
511	M	E	S
512	M	E	G
513	M	E	PSY
514	M	P	C
515	M	GL	C
516	G	Z	PSY
517	CS	M	P
518	CS	M	C
519	CS	P	C
520	CS	E	S
521	CS	M	E
522	CS	M	G
523	CS	G	GL
524	CS	B	Z
525	CS	C	B
526	M	PSY	S
	M	P	S
	M	C	S
	G	C	CS
	GL	M	CS
	B	Z	GL
	B	BC	GL
	Z	BC	GL
	P	M	GL

	M	B	Z
	M	B	C
	P	E	M
	M	Z	C
	M	B	BC
	M	Z	BC

Key To Subject Abbreviations

B	-	Botany
M	-	Mathematics
Z	-	Zoology
P	-	Physics
C	-	Chemistry
E	-	Economics
PSY	-	Psychology
CS	-	Computer Science
PE	-	Physical Education
S	-	Statistics
BC	-	Biochemistry
G	-	Geography
GL	-	Geology

GENERAL REQUIREMENTS FOR BACHELOR OF SCIENCE

1. Completion of the University's Core Curriculum
2. A major of at least 36 CU, of which 24 must be at advanced level.
3. A minor must consist of a maximum of 24 CU of which 12 CU are at advanced level.
4. A minimum of 54 CU must be taken at Makerere University. At least twenty four (24) of these must be at the advanced level in the major subject.
5. A GPA of at least 2.0. The major programmes may impose a more rigorous requirement for their majors.
6. A minimum of 108 CU, at least 36 of which must be completed at the advanced level.
7. Satisfactory completion of all requirements specified for the degree by the Faculty.

(An advanced course unit is one which is a non-remedial and non-service course.)

Specifics to Choosing Bachelor of Science Degree Programmes

Degree Plan

The degree plan is prepared by the student with the advice sought from the related departments and approved by the Deans of the major and minor programme areas. The degree plan may never supercede requirements in the calendar year. The student is responsible for meeting all requirements as per the Faculty Regulations. Usually, the degree plan is filled in the Dean's Office after achieving 30 SCH.

Declaration of Major

Each Bsc. student must select a major field of study not later than the beginning of the semester in which he/she enrolls for the 54th SCH. The primary purpose of the major is to encourage each student to explore a subject area in considerable depth. This depth study complements the breadth of study promoted by the Core Requirements and, in many cases, by a student's choice of electives. Work in depth, such study also provides a sense of how knowledge grows and is shaped by time and circumstances.

Requirements for the Major

Undergraduate will select a major after achieving 30 CU. All undergraduate major subjects except for certain subjects degree programmes that require application and admission in advance, are open to all students. Students may change their majors at any time upon request; in some fields, though, a late change could easily result in extending the period of undergraduate study.

The Faculty sets the minimum requirements for the major fields of study. These requirements usually allow latitude for tailoring a major programme to a student's specific educational goals. The responsibility for developing a major programme within the requirements lies ultimately with the individual student working in consultation with the major subject Head of Department. If a degree is formally to reflect more than single major subjects, the student must meet the following conditions:

1. The student must satisfy the requirements for each major subject
2. The courses proposed must satisfy the

requirements of one declared major may not overlap with those of the other declared major, unless:

- a) Overlapping courses constitute introductory skills requirements (e.g. introductory mathematics or foreign language), or
 - b) Overlapping course enables the student to meet subject requirements (e.g. for two majors within the school of Humanities and Social Sciences).
3. At the time the student applies to graduate, the programme coordinator of major programmes must be cognizant of the courses the student proposes to satisfy the declared majors and of the limitation of (2) above, and they must attest to the student's having satisfied the pertinent major requirements.

Limits of Credit Units (CU) for majors

In order to achieve the values of study in depth, a well-structured major subject should constitute at least one-third of a student's programme. To ensure the values of breadth, a major should comprise no more than two thirds of a student's programme.

Major requirements in related subjects essential to the structure of a given major should be counted as part of the major programme in applying these guidelines. Major or Faculty requirements designed to provide extra disciplinary breadth should not be counted.

Minors

Specific requirements for minors are listed under degree programmes. All minor subjects consist of a minimum of 18 CU.

Course Load

A normal course load per semester is 18-21 credit units (CU).

A student is considered to be making satisfactory progress towards a degree objective when he or she completes at least 15 CU in each semester and achieves the required GPA in each semester required for his/her classification.

A normal load for a semester is defined as one sixth of the total number of CU required for the degree which the student is working.

Therefore for the Bsc. degree which requires 108 CU, 18 CU is the typical load per semester. The minimum load to maintain full-time status is 18 CU for all students. A student enrolled for 17 or less CU is considered to be part time.

The number of CU a student may enroll in (course load) is regulated by the Dean's office in consultation with the Heads of Departments. In determining this load, the Dean takes into account the quality of scholastic work performed by the student, the types of courses involved, the student's health, and extra-curricular interests and activities.

Laboratory courses include at least two hours of laboratory time per week CU earned. Independent study course includes content and requirements equivalent to a regular organized course, but meeting times are to be arranged by the lecturer and the student. (Internship credit may be earned at the rate of 150 hours of work in the field per 3 CU earned).

Satisfactory Standing

Undergraduate students are considered in satisfactory standing if their GPA is not less than 2.0.

Academic Probation

Undergraduate students are placed on academic probation if the GPA falls between

1.5 and 2.0. This probationary status serves as a warning to students that their performance is below the level required. Such students may take a maximum of 15 CU per semester. The return to satisfactory standing at the end of the next academic semester requires a GPA of at least 2.0.

Unsatisfactory Standing

Undergraduate students are considered to be in unsatisfactory standing if the GPA is less than 1.5. Students in this category must obtain special permission of the Faculty Board before they can re-enroll.

Honour Rolls

A student who completes a semester schedule of at least 15 CU with no grade lower than "A" will be included on the vice-chancellor's Honour Roll. A student who completes a semester schedule of at least 15 CU with a minimum grade point average of 4.0 – 4.39 and no grade lower than C will be included on the Dean's List. To be eligible for the Deans list rolls a student cannot have semester grades of "I" or "WF."

Classification of Bachelor of science Degree

The classification of the Bachelor of Science Degree will be done in conformity to the approved semester systems awards.

GENERAL INFORMATION ABOUT THE DEPARTMENTS IN THE FACULTY OF SCIENCE

DEPARTMENT OF BIOCHEMISTRY

Biochemistry in the Faculty of Science

The department Biochemistry was set up in 1977.

First of all Biochemistry is the study of the molecular basis of life which includes the discovery of the structure of DNA, the elucidation of the flow of information from gene to protein, the determination of the three-dimensional structures and mechanism of action of many protein molecules, the unravelling of central metabolic pathways and energy conservation mechanisms, and the development of recombinant DNA technology.

Secondly, it is now known that common molecular patterns and principles underlie the diverse expressions of life. Organisms as different as bacteria and human beings use the same building blocks to construct macromolecules. The flow of genetic information from DNA to RNA to protein is essentially the same in all organisms. ATP, the universal currency of energy in biological systems, is generated in similar ways by all forms of life.

Third, biochemistry is profoundly influencing medicine. The molecular mechanisms of many diseases such as sickle-cell anaemia and numerous inborn errors of metabolism have been elucidated. Assays of enzyme activity

are indispensable in clinical diagnosis. DNA probes are important in the diagnosis of genetic disorders, infectious diseases and cancers. Recombinant DNA technology is being used to produce valuable proteins like insulin, and is also important in agriculture.

Fourth, the rapid development of powerful biochemical concepts and techniques in recent years has enabled investigators to tackle some of the most challenging and fundamental problems in biology and medicine.

At Makerere University, biochemistry as an undergraduate degree subject has also developed with the rapid growth in knowledge and activity. Attempts are made to remain abreast with developments in biochemistry giving students training that is practical and relevant to the needs of the country.

General Aims and Objectives

The general aims and objectives of undergraduate training in biochemistry in this department can be summarised as:

1. Equipping the student with a basic understanding of biochemistry;
2. Training biochemists that think independently but work collaboratively with the colleagues in the advancement of biochemical knowledge;
3. Providing students with the skills of identifying and solving problems relevant to the needs of the country;
4. Encouraging students to identify community concerns which are related to biochemistry
5. Giving the students the necessary practical training to achieve the above aims.

Programme Structure

The course was arranged in such a way that the introductory and metabolic aspects that are central to biochemistry are dealt with in the first two semesters. The core courses in the second and third years cover more specialised aspects of biochemistry.

The load is lower in the first two semesters to allow for other subjects that the student is interested in taking or “exploring”. The time can also be used to cover the Faculty’s core curriculum and any other remedial courses.

The total credit units (CU) of the core courses for the Biochemistry major are 59. A student majoring in biochemistry will undergo an eight weeks industrial training at the end of second year and also he/she has to take at least two electives in the third year.

Summary of the Biochemistry Major Programme

All courses in italics and bolded are electives

Year I: Semester I		
Course Code	Course	CU
BCH1101	Physical Biochemistry	2
BCH1102	Biomolecules: Structure and Function	4
BCH1201	Tissue Structure and Function	2
BCH1202	Metabolism and Metabolic Regulation	5
BCH2101	Principles and Applications of Biochemical Methods	4
BCH2102	Cell Biology	3
BCH2103	Endocrinology	3
BCH2201	Microbial Biochemistry	4
BCH2202	Advanced Enzymology	2
BCH2203	Molecular Biology	4
BCH2204	Industrial Training	5
BCH3101	Food Science and Nutrition	3
BCH3102	Advanced Immunology and Immunochemistry	3
BCH3103	Advanced Molecular Biology and Biotechnology	4
BCH3104	Animal Nutrition (Elective)	2
BOT3101	Plant Biochemistry (Elective)	3
BCH3201	Industrial Biochemistry	3
BCH3202	Research Project	5
BCH3203	Clinical Biochemistry and Disease Processes	3
BCH3204	Comparative Biochemistry (Elective)	2
BCH3205	Pharmacology and Toxicology (Elective)	2

A student taking Biochemistry as a major is required to do at least two electives in the third year in addition to the core courses.

The Minor Programme in Biochemistry

All courses in italics and bolded are electives.

Year I: Semester I		
Course Code	Course	CU
BCH1101	Physical Biochemistry	2
BCH1102	Biomolecules: Structure and Function	4
BCH1201	Tissue Structure and Function	2
BCH1202	Metabolism and Metabolic Regulation	5
BCH2102	Cell Biology	3
BCH2101	Principles and Applications of Biochemical Methods	4
BCH2103	Endocrinology	3
BCH2203	Molecular Biology	4
BCH2201	Microbial Biochemistry	4
BCH2202	Advanced Enzymology	2

BCH3101	Food Science and Nutrition	3
BCH3102	Advanced Immunology and Immunochemistry	3
BCH3103	Advanced Molecular Biology and Biotechnology	4
BCH3104	Animal Nutrition	2
BCH3203	Clinical Biochemistry and Disease Processes	3
BCH3204	Comparative Biochemistry	2

The student also has to pass all core courses and **at least four courses as electives** to complete the requirements for the minor.

The minimum total credit units for the minor programme in Biochemistry is 32

DEPARTMENT OF BOTANY

Introduction

Uganda has an economy with a strong agrarian bias whereby the main sources of income are; plants and plant products. The study of plants from different aspects has an important place in the educational set up of the country. The forest wealth of Uganda is very considerable and the Botanist plays an important role in its study and conservation.

The Department of Botany offers undergraduate and postgraduate courses in Botany leading to the award of Bachelor of Science., Master of Science and Doctor of Philosophy degrees. The department also has an experimental garden with a green house. The Botanical garden has a large range of living plants which are indispensable in teaching.

BOTANY COURSES

(taken with other Science subjects)

Major Programme

Year I: Semester I		
Course Code	Course	CU
BOT 1101	Flowering plant growth and development	2
BOT 1102	Plant form, structure & classification of lower and higher plants	3

BOT 1103	Introductory Microbiology	2
	Sub Total	7
Semester II		
BOT 1201	Elementary Genetics	2
BOT 1202	Basic Ecology	3
BOT 1203	Introduction to plant function	2
	Sub Total	7
NB. New change is the combination of former courses BOT 102 (2 CU) and BOT 103 (2 CU) into one course BOT 1102 – (3 CU).		
Year II: Semester I		
BOT 2101	Plant taxonomy, diversity and Evolution (Dicots)	3
BOT 2102	Plant taxonomy, diversity and evolution (Monocots)	3
BOT 2103	Plant taxonomy, diversity and evolution (Algae)	
BOT 2104	Taxonomy and Diversity of Fungi	3
	Sub Total	12
Semester II		
BOT 2201	Basic Bacteriology and Virology	3
BOT 2202	Plant Physiology	3
BOT 2203	Biostatistics	3
BOT 2204	Introductory Crop Improvement and Plant Genetic Resources	3
	Sub Total	12
Recess Term		
BOT 2205	Field Attachment	5