

ACU Agriculture Degree

1ST QUARTER	2ND QUARTER	3RD QUARTER	Credit Hours
Year 1	Core Curriculum Credit Hours		33
Year 2	Core Curriculum Credit Hours		22
Year 2 - Remaining Major (Non-Core) Credit Hours			
General Chemistry I (4)	General Chemistry II (4)	College Physics (4)	
Biology (3)			
10	4		14
Additional Core Curriculum Courses (to be taken in years 3-4): God, Marriage & Family (2); Vocational Evangelism (2); Christian Leadership (2)			6
Year 3			
Agricultural Economics (3)	Agroecology (3)	Organic Chemistry (4)	
Statistics for Agriculture (2)	Elective / Core (3)	Experimental Design (3)	
Genetics (3)		Elective / Core (3)	
Agricultural Marketing (3)			
Elective / Core (3)		Elective / Core (3)	
14	9	13	36
Year 4			
Crop Physiology (3)	Environmental Chemistry (3)	Senior Project and Thesis (4)	
Elective / Core (3)	Elective / Core (3)	Farm Management (3)	
Elective / Core (3)	Elective / Core (3)	Elective / Core (3)	
	Elective / Core (2)		
9	11	10	30
Total Core Curriculum Credit Hours (Years 1-4)			61
Total Major Curriculum Credit Hours (Years 1-4)			73
Total Credit Hours			134

* For a listing of Elective courses available in the Agriculture Programme see the following Table.

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Agriculture Programme Electives				
Course Name	Credit Hours		Course Name	Credit Hours
Plant Science	3		Plant Propagation	2
Animal Science	3		Microbiology	3
Bioethics and the Christian Life	3		Introduction to Mycology	3
Gourmet Mushrooms	3			

Course Descriptions

Below are the (1) **Course Identification Numbers**, (2) **Titles**, (3) **Credit Hour Values** and (4) **Course Descriptions**.

ACU Education Degree Programme Courses and Descriptions
<p>AGRI2113 Soil Science (3 credit hours)</p> <p>This introductory course in soil science introduces the student to the study, management, and conservation of soils as natural bodies, as media for plant growth, and as components of the larger ecosystem. This course presents basic concepts of all aspects of soil science including: composition and genesis; physical, chemical, and biological properties; soil water; classification and mapping; soil conservation; management practices; and soil fertility and productivity (soil testing, use of fertilisers and manures, and liming). It introduces the relationships of soil to current concerns such as environmental quality and non-agricultural land use. This course should instil awareness of soil as a basic natural resource, the use or abuse of which has a considerable influence on human society and life in general. The course will conduct an ongoing, integrated discussion of soil-crop yields relationships with emphasis on the soil as a source of mineral nutrients for crops and the role of fertilisers and manure in crop production.</p>

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AGRI3423 Agroecology (3 credit hours)

An introduction to the principles of agricultural ecology with an emphasis on Christian stewardship of God's world. Topics include the development and characteristics of agroecosystems, ecological disturbance and succession, diversity, pest management, nutrient cycling, environmental quality, energy use, climate change, social capital, conservation practices, and global food production. The interaction of agroecosystems with surrounding ecosystems is studied, and the utilisation of ecological principles in agroecosystem design and management are examined. Two lectures and one three-hour laboratory per week.

SCIE4333 Farm Management (3 credit hours)

Christian concepts of stewardship and justice in agriculture, advanced planning techniques, investment analysis, agricultural finance, decision-making under risk and uncertainty, intergenerational transfer of the family business, governmental regulation and promotion of agriculture.

SCIE4434 Senior Project and Thesis (4 credit hours)

An integration of departmental courses, research, and analysis of current topics with emphasis on Christian perspective for persons involved in agriculture. Issues can include government policies, world hunger, the family farm, meat production, and others.

AGRO2013 Plant Science (3 credit hours)

Ecology of crop plants, principles of production, management and seed and plant identification. This course will introduce fundamental concepts of plant biology including photosynthesis, water relations and stress responses. Christian stewardship of land and resources will be emphasised. Laboratory included.

BIOL4713 Crop Physiology (3 credit hours)

A study of the biochemical and biophysical processes of plants. Emphasis is given to plant-soil water and mineral relations, nutrient cycling, photosynthesis and carbon metabolism, and plant growth and development.

AGRO3622 Plant Propagation (2 credit hours)

Theory and practice of plant propagation. Covered topics include the propagation environment, media, propagation by rooting, division, and grafting and the practice of sterile tissue culture.

SCIE3233 Experimental Design (3 credit hours)

This course takes advantage of research articles—old and new—to highlight different approaches for problem solving in biology and, in doing so, develop skills for the critical analysis of the primary literature. The last three weeks of class will be devoted to student presentations on topics related to these landmark papers, providing students the opportunity to hone their public speaking skills.

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BIOL4113 Genetics (3 credit hours)

A study of the principles of heredity with emphasis on inheritance in individuals and populations, chromosomal rearrangements, the chemistry of the gene in DNA structure and replication, transcription, translation, the control of gene expression, mutations and their repair, genetic engineering and epigenetics.

BUSI3013 Agricultural Marketing (3 credit hours)

Fundamentals of agricultural marketing management and planning (input and output). Study the institutional differences between agricultural and nonagricultural marketing environments. Outline essential marketing functions of buying, selling, transportation, storage, financing, standardisation, pricing and risk bearing. Topics include setting marketing goals, government price institutions, contract and futures markets, and marketing under risk and uncertainty.

BIOL2113 Biology (3 Credit Hours)

This course introduces the principles and concepts of biology. Emphasis is on biological morphology, cell structure and function, metabolism and energy transformation, genetics, understanding and critiquing the basic tenets of naturalistic evolution, classification of organisms, and other related topics.

CHEM2114 General Chemistry I (4 credit hours)

A study of the foundations of chemistry including: stoichiometry; atomic structure; chemical periodicity; covalent and ionic bonding; inorganic nomenclature; chemical reactions including aqueous precipitation, acid-base and redox; basic thermodynamics in physical and chemical matter changes; electronic structure; molecular structure and polarity; gas laws.

CHEM2224 General Chemistry II (4 credit hours)

A study of chemical topics including: behaviour and properties of liquids, colligative properties of solutions; and properties of solids; kinetics; equilibrium; acids, bases, and other aqueous equilibria; entropy and free energy in chemical reactions; electrochemistry; nuclear chemistry; introductory organic and biochemistry.

PHYS2134 College Physics I (4 credit hours)

Introduces students to classical mechanics. This course has a hands-on focus, and approaches mechanics through take-home experiments. Topics include: kinematics, Newton's laws of motion, universal gravitation, statics, conservation laws, energy, work, momentum, and special relativity. The second half of this overview course is an introduction to electromagnetism and electrostatics. Topics include: electric charge, Coulomb's law, electric structure of matter, conductors and dielectrics, concepts of electrostatic field and potential, electrostatic energy, electric currents, magnetic fields, Ampere's law, magnetic materials, time-varying fields, Faraday's law of induction, basic electric circuits, electromagnetic waves, and Maxwell's equations. The course has an experimental focus, and includes several experiments that are intended to illustrate the concepts being studied.

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CHEM3334 Organic Chemistry (4 credit hours)

A study of alkanes, alkenes, and alkynes, including nomenclature; optical activity; stereochemistry; substitution and elimination reactions; and ring systems. Includes the nomenclature and reactions of alcohols, ethers, epoxides, ketones, aldehydes, esters and acids, aromatic systems; and numerous name reactions in synthesis.

CHEM4423 Environmental Chemistry (3 credit hours)

This course presents selected topics in the chemistry of the environment including air, water and soil. Subjects to be discussed include photochemical smog, gaseous and particulate contamination, equilibrium, biodegradability of chemicals, hazardous waste, toxicology and Green Chemistry. In addition, students will learn sampling procedures for a range of chemical and environmental systems and analytical testing methods. There are two one-hour lectures per week and one three-hour laboratory each week.

ECON3013 Agricultural Economics (3 credit hours)

Introductory course on the basic principles of agricultural economics. Production economics, principles of supply and demand, resource economics, world food situation, marketing of agricultural products, and agricultural public policy.

MATH3112 Statistics for Agriculture (2 credit hours)

Statistical techniques used in design and analysis of experiments in agriculture and natural resources management. T-tests, analysis of variance, mean separation, regression and correlation, experimental design and analysis, interpretation of research results, analysis and interpretation of survey information.

PHIL3233 Bioethics (3 credit hours)

Christian principles of bioethics, with an emphasis on personhood and the sanctity of human life. Students will engage with ethical theory, case studies, and media to gain familiarity with foundational bioethical concepts and important topics including ability/disability, the "obesity crisis," reproduction, race, and research ethics. Students will learn to use ethical concepts and normative theory to analyse and evaluate real-life cases, understand, articulate and defend philosophically and ethically sound positions, engage critically and respectfully with opposing views, and to recognise the moral residue that is often an unavoidable aspect of resolutions to complex bioethical problems.

BIOL3223 Animal Science (3 credit hours)

This foundational course in Animal Science will examine General Zoology of the animal kingdom, specifically related to agriculturally relevant animals. Comparative physiology of digestive, endocrine, and reproductive systems in animals will also be studied. The course will include a general examination of principles of nutrition, genetics, growth and development, including behaviour, food processing and safety of animals. Current issues in animal agriculture including biosecurity, animal welfare, and safeguards for animal and human health.

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BIOL3733 *Microbiology*

The course is intended to cover basic principles of microbiology and provide an introduction to the diversity, physiology, morphology, genetics, ecology, applications and pathogenicity of microbes.

BIOL3833 *Introduction to Mycology*

Mycology is the branch of biology concerned with the study of fungi, including their genetic and biochemical properties, their taxonomy and their use to humans as a source for tinder, medicine, food, and entheogens, as well as their dangers, such as toxicity or infection.

BIOL3933 *Gourmet Mushrooms*

This course is for those who may want to specialize in mushroom farming or who may simply want to grow mushrooms for their own pleasure. Mushroom farming is a product that is yet to have bigger platform in the agriculture industry in Zambia.