

## ACU Agriculture Degree

1ST QUARTER	2ND QUARTER	3RD QUARTER	Credit Hours
<b>Year 1</b>	<b>Core Curriculum Credit Hours</b>		33
<b>Year 2</b>	<b>Core Curriculum Credit Hours</b>		22
<b>Year 2 - Remaining Major (Non-Core) Credit Hours</b>			
General Chemistry I (3)	General Chemistry II (4)	College Physics I (4)	11
12	10	11	33
Additional Core Curriculum Courses (to be taken in years 3-4): God, Marriage & Family (2); Vocational Evangelism (2); Christian Leadership (2)			6
<b>Year 3</b>			
Agricultural Economics (3)	Agricultural Marketing (2)	Organic Chemistry I (3)	
Statistics for Agriculture (2)	Agroecology (3)	Experimental Design (3)	
Genetics I (3)	Genetics II (3)	Elective / Core (3)	
Elective / Core (3)	Elective / Core (3)	Elective / Core (3)	
11	11	12	34
<b>Year 4</b>			
Crop Physiology (3)	Environmental Chemistry (3)	Senior Project and Thesis (8)	
Farm Management (3)	Elective / Core (3)	Elective / Core (3)	
Elective / Core (3)	Elective / Core (3)		
Elective / Core (3)	Elective / Core (2)		
12	11	11	34
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	Animal Nutrition	2
Animal Science	3	Principles of Animal Health	3
Soil Science	3	Meat Science	2
Crop Production	3	Feeds and Feeding	2
Journal Club	1 (2X)	Soil Management	3
Technical Writing	2	Plant Propagation	3
Science Writing	2	Horticultural Pest Management	3
Bioethics	2	Horticultural Plants	3
Welding	2	Sociology and Extension	3
Principles of Construction	2	Microbiology	3
Farm Machinery	2	Introduction to Mycology	3
Animal Physiology	3	Gourmet Mushrooms	3

### Course Descriptions

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

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## ACU Agriculture Degree Programme Courses and Descriptions

### **AGRI3123 Soil Science** (3 credit hours)

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.

### **AGRI36233 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.

### **AGRI4313 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.

### **AGRI4223 Farm Machinery** (3 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.

### **AGRI4232 Meat Science** (2 credit hours)

Survey of livestock, meat industry, live animal-carcass comparisons, processing techniques, meat inspection and regulations.

### **AGRI4332 Feeds and Feeding** [Animal Track] (2 credit hours)

The evaluation, composition, and values of feedstuffs as they relate to animal nutrient requirements will be considered. The basics of ration formulation and feeding management will be covered for the major livestock species. Two lectures and one three-hour laboratory per week.

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**AGRI4838 Senior Project and Thesis** (8 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.

**AGRO3233 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.

**AGRO4213 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.

**AGRO3593 Crop Production** (3 credit hours)

Grain and forage production in sub-Saharan Africa is investigated using lectures, group projects, field trips, and production and research experiences. The role of grains in world food production is examined, and students are challenged to find solutions to the problems frequently associated with grain production. Students collect and analyse field crop data and explore sustainable crop production methods and systems. The investigation of new and innovative crop production strategies is an important component of the course. Two lectures and one three-hour laboratory per week.

**AGRO4133 Soil Management** (3 credit hours)

An 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. Three lectures per week.

**AGRO4223 Horticultural Plants** [Plant Track] (3 credit hours)

Prerequisite: AGH 133. Basic plant structure and identification of a wide range of horticultural plant materials. Involves identification, adaptation, evaluation and landscape management of trees, shrubs, ground covers, annuals, perennials, vines and fruit and vegetable crops.

**AGRO4533 Plant Propagation** (3 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.

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**AGRO4633 Horticultural Pest Management** (3 credit hours)

This course focuses on the biology and classification of pest organisms, crop tolerance and resistance to pests, population thresholds, and integrated management strategies to minimise crop damage.

**BIOL3351 Journal Club** (1 credit hour)

A weekly seminar for students to read, study and present publications of a predetermined theme. The class critiques and analyses methods for consistency and accuracy from a scientific and biblical perspective. This course is intended to aid scientific thinking and writing in students while reading various scientific publications and journal articles.

**BIOL3532 Experimental Design** (2 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.

**BIOL3613 Genetics I** (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.

**BIOL3623 Genetics II** (3 credit hours)

A continuation of the 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.

**BIOL4181 Agriculture Seminar** (1 credit hour)

A weekly seminar for students to present publications of a predetermined theme, perhaps even pre-selected papers. The class critiques and analyses methods for consistency and accuracy from a scientific and biblical perspective. This course is intended to help scientific thinking and writing in the students.

**BUSI3622 Agricultural Marketing** (2 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.

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**CHEM2113 *General Chemistry I*** (3 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.

**CHEM2123 *General Chemistry II*** (3 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.

**CHEM3633 *Organic Chemistry I*** (3 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.

**CHEM4823 *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.

**ECON3613 *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.

**ENGL3112 *Science Writing*** (2 credit hours)

This course teaches scientists to become more effective writers, using practical examples and exercises. Topics include: principles of good writing, tricks for writing faster and with less anxiety, the format of a scientific manuscript, and issues in publication and peer review. Students from non-science disciplines can benefit from the training provided in the first four weeks (on general principles of effective writing). See <http://online.stanford.edu/course/writing-in-the-sciences>

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**MATH3332 *Biostatistics*** (2 credit hours)

Learn basic concepts of probability and statistical inference, focusing on an intuitive approach to understanding concepts and methodologies. Get an introduction to statistical and critical thinking, including descriptive statistics, probability, sampling distributions, interval estimation, hypothesis testing and regression.

**MATH3613 *Statistics for Agriculture*** (3 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.

**PHIL4552 *Bioethics*** (2 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.

**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.

**VETR2423 *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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**VETR2563 *Principles of Animal Health*** [Animal Track] (3 credit hours)

Animal care and facility sanitation will be discussed, focusing on care, disease prevention, disease detection, animal treatment, pharmacology, and health programs. Three lectures per week.

**VETR3281 *Animal Nutrition*** [Animal Track] (1 credit hour)

A problem-solving approach will be taken to examine the nutrient requirements of animals in different production systems. Methods that can be used to meet those requirements will be evaluated. Ration formulation will be discussed as it relates to the different digestive systems and production requirements.