

Diploma / BSc (Hons) Agriscience and Technology (Part-Time) – A328

1. Objectives

The changing socio-economic pattern of Mauritius and Rodrigues has led to an increasing demand for agricultural produce of good quality. Agricultural production is now increasingly being characterised by the use of modern technology. It is the Government policy and vision for the future to adopt a technology-based approach to render the local agricultural sector more productive, service-oriented, sustainable and competitive whilst responding to the environmental and ethical standards demanded by society.

The further development of agriculture and its related industries is challenging and requires appropriate knowledge, skills and technology concepts to keep pace with the latest technological developments in that sector. This has led to the need for well-trained agricultural scientists who have the technical and practical skills in addition to in-depth knowledge of the science to meet these new challenges facing the Mauritian agriculture.

This programme aims to upgrade knowledge of in-service staff of the various agricultural institutions in Mauritius with a broad spectrum of scientific, technical and managerial skills needed to contribute to the future success of agriculture.

On completion of this programme, the students will have developed knowledge and skills to:

- Explain scientific, economic and business principles, underpinning crop and animal production;
- Demonstrate relevant practical skills in key areas of agricultural production;
- Identify technological problems encountered in current crop and livestock production systems;
- Transfer relevant knowledge, skills and technology concepts to the producers and to support innovation;
- Design, plan and carry out research in the various fields of agriculture;
- Manage agricultural enterprises and identify new ventures in the agricultural sector;
- Support research, extension and other technical services in the agricultural sector.
- Evaluate the wider consequences of agricultural activities and promote sustainable agricultural practices.

After successful completion of Year 3, students wishing to leave the Programme may be awarded the Diploma which would earn them a total of 63 credits.

2. General Entry Requirements

As per General Entry Requirements for admission to the University.

3. Programme Requirements

Two 'A' Level passes including Chemistry **Or** Alternative qualification(s) such as a recognised University Certificate in Agriculture or Agriculture-related field.

This Programme is primarily intended for those in employment but a few seats will be available for those not in employment.

NOTE: Holders of the **Diploma in Agriculture, Diploma in Agriscience and Technology** awarded by the University of Mauritius (or any other alternative qualifications acceptable to the University of Mauritius) may be directly admitted in the fourth year of the programme. They may, however, be required to complete some Year 1, Year 2 and Year 3 modules.

4. Programme Duration

	Normal (Years)	Maximum (Years)
Diploma	3	4
Degree	2	4

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

6. **Minimum Credits required for the Award of the Diploma and Degree:** 63 and 103 respectively.

Breakdown as follows:

	Credits from		
	Core Taught Modules	Project	Total
Diploma	57	6	63
Degree	88	15	103

Students may exit with a **Certificate** after having earned 30 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 except for **Module AGRI 3107Y(5) – Emerging issues in Agriculture, which will carry a weighting of 50% in both exam marks and Continuous Assessment.** Continuous Assessment will be based on laboratory/field works, and/or assignments including on-the-job 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 a 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.

Modules will carry credits in the range of 3 to 6. Diploma Project – AGRI 2003Y(3) will carry 6 credits. Project – AGRI 3000Y(5) will carry 9 credits. Written Examinations for all the AGRI modules will be carried out at the end of the academic year.

Submission Deadlines for Dissertation:

- First Draft: by last week day of February of the Academic Year.
- Final Copy: three copies of the dissertation (2 spiral-bound copies and 1 copy on electronic storage media) by 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 (eg. closure of the University for more than 2 weeks), the Moodle 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 Moodle platform at the beginning of the academic year.

9. List of Modules

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 1018Y(1)	Agricultural Chemistry and Soil Science	45+60	5
AGRI 1034Y(1)	Animal Production: Principles and Techniques	30+30	3
AGRI 1035Y(1)	Agronomy and Horticultural Crop Production I	45+60	5
AGRI 1074Y(1)	Introductory Agricultural Economics, Management And Extension	60+45	5
AGRI 1071Y(1)	Data Handling and Research Methodology	30+30	3
AGRI 1064Y(1)	Agrometeorology and Climate Change	45+0	3
AGRI 1063Y(1)	Microbiology and Genetics	60+45	5
AGRI 1073Y(1)	Botany and Plant Physiology	60+45	5
AGRI 2088Y(3)	Concepts of Biotechnology	45+45	4
AGRI 2089Y(3)	Pests, Diseases and Weeds Control	45+60	5
AGRI 2092Y(3)	Animal Production and Science I	60+60	6
AGRI 2118Y(3)	Science and Technology of Foods	45+30	4
AGRI 2115Y(3)	Irrigation and Farm Mechanization	45+45	4
AGRI 2003Y(3)	Diploma Project	-	6
AGRI 2112Y(3)	Experimental Designs and Sampling Techniques	30+30	3
AGRI 3003Y(5)	Animal Science and Production II	60+60	6
AGRI 3026Y(5)	Crop Production Technologies	60+45	5
AGRI 3051Y(5)	Postharvest Management and Agricultural Produce Processing	60+30	5
AGRI 3105Y(5)	Agricultural Management, Marketing and Entrepreneurship	60+45	5
AGRI 3106Y(5)	Sustainable Agriculture	45+45	4
AGRI 3107Y(5)	Emerging Issues in Agriculture	45+0	3
AGRI 3000Y(5)	Project	-	9
Total Number of Credits = 103			

10. Programme Plan - Diploma / BSc (Hons) Agriscience and Technology (Part-Time)

YEAR 1

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 1018Y(1)	Agricultural Chemistry and Soil Science	45+60	5
AGRI 1034Y(1)	Animal Production: Principles and Techniques	30+30	3
AGRI 1035Y(1)	Agronomy and Horticultural Crop Production I	45+60	5
AGRI 1074Y(1)	Introductory Agricultural Economics, Management And Extension	60+45	5
AGRI 1071Y(1)	Data Handling and Research Methodology	30+30	3

YEAR 2

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 1064Y(1)	Agrometeorology and Climate Change	45+0	3
AGRI 1063Y(1)	Microbiology and Genetics	60+45	5
AGRI 1073Y(1)	Botany and Plant Physiology	60+45	5
AGRI 2088Y(3)	Concepts of Biotechnology	45+45	4
AGRI 2089Y(3)	Pests, Diseases and Weeds Control	45+60	5

YEAR 3

CORE MODULES

<u>Code</u>	<u>Module Name</u>	<u>Hr / Yr</u>	<u>Credits</u>
		<u>L+P</u>	
AGRI 2092Y(3)	Animal Production and Science I	60+60	6
AGRI 2118Y(3)	Science and Technology of Foods	45+30	4
AGRI 2115Y(3)	Irrigation and Farm Mechanization	45+45	4
AGRI 2003Y(3)	Diploma Project	-	6

YEAR 4

CORE MODULES

AGRI 2112Y(3)	Experimental Designs and Sampling Techniques	30+30	3
AGRI 3003Y(5)	Animal Science and Production II	60+60	6
AGRI 3026Y(5)	Crop Production Technologies	60+45	5
AGRI 3051Y(5)	Postharvest Management and Agricultural Produce Processing	60+30	5

YEAR 5

CORE MODULES

AGRI 3105Y(5)	Agricultural Management, Marketing and Entrepreneurship	60+45	5
AGRI 3106Y(5)	Sustainable Agriculture	45+45	4
AGRI 3107Y(5)	Emerging Issues in Agriculture	45+0	3
AGRI 3000Y(5)	Project	-	9

Total Number of Credits = 103

11. Outline Syllabus

AGRI 1018Y(1) - AGRICULTURAL CHEMISTRY AND SOIL SCIENCE

Agrochemicals, their properties, metabolism, and mode of action. Chemistry of fertilisers: straight, complex, compound mixed, blended fertilisers. Fertiliser solutions. Foliar fertilisers. Manures, municipal sewage, compost.

Chemistry of agrochemicals: organochlorines, organophosphates, carbamates, pyrethroids, dinitrophenols, phthalimides, substituted ureas, triazines, inorganics, botanical pesticides, bio-pesticides. Analysis of pesticides and fertilisers.

Soil as a natural body. Weathering. Factors and processes in soil formation. Physical, physio-chemical, biological and mineralogical properties of soil. Soil profile. Soil air. Water, temperature, soil organic matter and soil organisms. Concepts of soil fertility and land suitability. Soil taxonomy. Soil biology. Soil amendments. Soil pollution. Heavy metals. Polyaromatic hydrocarbons (PAH), persistent organic pollutants (POP) in soils. Soil bioremediation.

AGRI 1034Y(1) - ANIMAL PRODUCTION: PRINCIPLES AND TECHNIQUES

Fundamentals of animal management and production: nutrition; feeds and feeding; reproduction and breeding; animal welfare and health; housing and equipment; animal-environment interactions.

Introduction to farm animal industries, breeds of animal, their products and by-products: matching production of quality and safe food with protection and care of the environment.

Fundamental skills of animal husbandry: rationing; weighing and tagging; usage of preventive and diagnostic equipment; evaluation of body condition score; use and development of performance records. Evaluation of animal behaviour. Animal housing evaluation.

AGRI 1035Y(1) - AGRONOMY AND HORTICULTURAL CROP PRODUCTION I

Principles of field crop agronomy. Crop-environment interactions. Cropping systems. Crop propagation. Plant Nutrition. Nutrient deficiency symptoms and their corrections. Nutrient requirements and fertiliser recommendations for specific crops / cropping systems.

Applied crop physiology. Husbandry and production of economically important horticultural crops. Field operations and techniques in crop production. Organic production systems.

AGRI 1074Y(1) - INTRODUCTORY AGRICULTURAL ECONOMICS, MANAGEMENT AND EXTENSION

Agricultural economics: demand and supply; principles of production economics; Neoclassical Theory of Farm Production; Management Concepts and Framework of Management. Farm and Agribusiness Planning. Risk and Uncertainty in Agriculture. Agricultural and food policies. Structure and organisation of local agricultural institutions. Regional Trade. Introduction to agricultural extension. Agricultural extension: principles, programmes and management; Participatory Research Approach and Farming Systems Research.

AGRI 1071Y(1) - DATA HANDLING AND RESEARCH METHODOLOGY

Introducing statistics. Levels of measurements. Collection, organisation and presentation of numerical data. Averages and measures of variation and skewness. Probability distributions. Point and interval estimation. Hypothesis testing. Analysis of categorical data. Correlation and Regression Analysis. Introduction to research methodology. Elements of scientific and technical writing. Data entry and analysis using EXCEL and MINITAB.

AGRI 1064Y(1) – AGROMETEOROLOGY AND CLIMATE CHANGE

Economic significance and importance of weather. Radiation and surface energy balance: earth's atmosphere; atmospheric energy; atmospheric moisture and precipitation; atmospheric motion. Soil and its heat balance. Topoclimate and mesoclimate, representative observation, and their dependence on topography. Agrometeorology management at microscale and topocscale.

Global climatic change and variability and its effect on agriculture: weather hazards affecting agricultural output. Weather patterns over Mauritius. Use of weather data in agriculture. Basic instrumentation in agrometeorology. Seminar-based learning. Problem-solving and case studies on climate change mitigation and adaptation.

AGRI 1063Y(1) – MICROBIOLOGY AND GENETICS

Microbiology diversity, structure, functions and economic significance. Microbial physiology. Growth and Survival. Control of microorganisms. Basic procedures and techniques in microbiological analysis.

Mendelian Inheritance. Linkage and chromosome mapping. Sex linked and extra-nuclear inheritance. Quantitative and population genetics. Objectives of plant breeding. Selection techniques. Breeding of

selected crops. Legislative framework. Methods of crop improvement. Genetic variation and manipulation of variability.

AGRI 1073Y(1) - BOTANY AND PLANT PHYSIOLOGY

Classification, identification, morphology, ecology and uses of economically important crops. Plant Biodiversity. Environmental influences on crop growth and development. Vegetative and reproductive growth. Plant water relationships. Plant growth substances. Growth kinetics. Plant growth analysis. Yield determination and crop productivity. Seed physiology. Light and plant development: photomorphogenesis and photoperiodism. Source-sink relationship. Photosynthate partitioning in relation to yield. Senescence. Water and plant mineral uptake. Problem-solving and case-studies. Stress physiology.

AGRI 2088Y(3) - CONCEPTS OF BIOTECHNOLOGY

Structure and functions of cells and organelles; biological membranes; Enzymes; Proteins; Nucleic acids and protein synthesis; molecular genetics; Concept and basis of biotechnology; Cell and tissue culture technology; Crop improvement through the application of new techniques; Transgenic animals; Animal embryo transfer and associated techniques Genetic improvement of crops for introduction of new genes: applications and potential risks; Risk assessment.

AGRI 2089Y(3) - PESTS, DISEASES AND WEEDS CONTROL

Taxonomy, systematic, biology, ecology and economic importance of pests, plant pathogens and weeds affecting crops. Control and management of pests, diseases and weeds of crop plants. Concept and principles of IPM. Biological, physical, chemical, cultural, biology-based, genetic, biotechnological and legal methods of pest control. Botanical pesticides and biopesticides. Pest-resistant transgenic crops (GMOs). Economics of crop protection.

Quarantine for plant health and biological control agents; pest-free areas; Sanitary & phytosanitary issues; the SPS Agreement of the WTO; Pest risk assessment, surveillance and mitigation; Phytosanitary inspection, quarantine treatments and disposal of plants/produce; Standards, certification and legislation. Climate change and crop protection. GIS and Remote Sensing for crop protection.

AGRI 2092Y(3) - ANIMAL PRODUCTION AND SCIENCE I

Aspects of physiological processes in growth and development, digestion, reproduction, lactation, egg laying. Meat science: carcass composition and quality, pre and post mortem muscle metabolism. Key concepts in thermal balances in farm animals. Livestock and climate change: impacts on grasslands, biodiversity, health.

Digestive physiology and metabolism of end products of digestion. Factors regulating feed intake. Feed evaluation. Feeding standards and their applications. Feed formulation: manual and computerised procedures. Legislative framework for feed manufacture.

Basic principles of qualitative and quantitative genetics. Main selection methods and genetic responses. Concepts of correlated selection response, heterosis and crossbreeding system.

Natural and acquired immunity. Disease causing agents. Major pests and diseases of farm animals and their control. Veterinary Public health and food borne and zoonotic diseases. Disease surveillance and animal health schemes.

AGRI 2118Y(3) - SCIENCE AND TECHNOLOGY OF FOODS

Classification, chemical structure and properties and nutritional value of food commodities. Primary sensory attributes of foods and perception of food quality. Methods for Proximate analysis of foods.

Microbial food spoilage. Useful micro-organisms. Incidence and causes of major food borne microbial diseases. Types of nutrients and their role in the human body. Healthy eating guidelines sustainable diet.

Food safety concept from farm to table. Post harvest losses and Postharvest loss reduction technology. Processing of foods of plant and animal origin.

AGRI 2115Y(3) - IRRIGATION AND FARM MECHANIZATION

Basic engineering science relevant to agriculture, soil and water.

Soil-water-plant relationships. Soil water movement: Infiltration. Evapotranspiration. Crop water requirements and irrigation scheduling. Irrigation Methods: surface, overhead and subsurface Irrigation. Measurement of Irrigation Water. Water Conservation and Rainwater Harvesting.

Agricultural machinery: tractors, tillage implements, mechanical planters and harvesters, rotovators, pesticide sprayers, and fertilizer applicators. Tractor Technology. Farm structures and buildings. Farm roads. Handling and disposal of farm wastes. Soil erosion, conservation and management.

AGRI 2003Y(3) – DIPLOMA PROJECT

Every student will be allocated a research topic and the research work will be carried out under supervision. The student will have to submit a dissertation at the end of Year 3. Students should demonstrate good practice in using skills and knowledge acquired and follow guidelines as laid down by the Faculty of Agriculture.

AGRI 2112Y(3) - EXPERIMENTAL DESIGNS AND SAMPLING TECHNIQUES

Design and analysis of experiments. Analysis of variance. Completely randomized design, Randomized block design, Latin square design. Factorial treatment structure. Non-parametric methods. Data entry, analysis and interpretation using EXCEL and MINITAB. Qualitative and quantitative research. Sampling methods. Questionnaire development, design and administration. Data coding and processing using SPSS.

AGRI 3003Y(5) - ANIMAL SCIENCE AND PRODUCTION II

Principles of managing animals in typical production systems for biological and economic sustainability: poultry (meat, eggs, other avian species); pigs; rabbits; deer; goats and sheep; beef and dairy cows. Introduction to exotic animal species. Food chain management from primary production to consumer use. Management of disease risks. Trends and current issues related to production and consumption of animal products: meeting the needs of a global market and public concerns.

Principles and their applications in the efficient and profitable production of poultry meat and eggs, and pig meat. Nutrition, housing and equipment, prevention and control of diseases, environment care and waste management. Factors affecting carcass quality. Welfare considerations.

AGRI 3026Y(5) - CROP PRODUCTION TECHNOLOGIES

Mechanised vegetable crop production. Plant characteristics for mechanised crop production. Soil conditioning for vegetable production. Seed priming and enhancement. Fluid drilling. Direct sowing for crop establishment. Plug production. Mechanical transplanting. Plastic mulching in horticulture. New trends in vegetable crop production. Good agricultural practices in crop production. Tissue Culture technologies for crop improvement. Fruit production technologies.

Cropping and production of high value horticultural crops in plastic tunnels, shade houses and greenhouses. Types of structures for protected cultivation and their characteristics. Greenhouse design and site considerations. Greenhouses and their operation.

Plant culture in hydroponics. Plant nutrition in Soilless Culture. Hydroponics media. Hydroponics systems. Cropping and production of selected vegetables, fruits and ornamentals in soilless culture systems: water culture systems and substrate culture systems. Hydroponics waste management. Aeroponics.

AGRI 3051Y(5) - POSTHARVEST MANAGEMENT AND AGRICULTURAL PRODUCE PROCESSING

Climacteric and non-climacteric produce. Post-harvest physiology. Post-harvest crop losses and their reduction. Packaging. Quality and safety of fresh horticultural products. Minimal processing of horticultural products. Processing of fruits, vegetables, milk, egg, meat, poultry and seafood products.

AGRI 3105Y(5) - AGRICULTURAL MANAGEMENT, MARKETING AND ENTREPRENEURSHIP

Business principles applied to a farm enterprise/agroindustry. Agricultural management: framework of farm management. Farm Planning Techniques: Budgeting and Linear programming. Strategic decision-making in agribusiness. Managing human resources. Business control. Analysis of farming results. Project planning and investment decisions. Agricultural marketing: marketing functions; marketing channels and costs. Marketing strategies for an agribusiness.

The entrepreneurial attitude: generation of business ideas and innovation; opportunities for setting up an agribusiness. Types of business organisations. Business strategy in agribusiness firms. Public and private sector support in Mauritius. Agribusiness Finance. Setting up an agribusiness unit and development of a business plan. Clustering. Business Incubators. Case studies of agribusinesses at national, regional and international levels.

AGRI 3106Y(5) - SUSTAINABLE AGRICULTURE

Farming systems for sustainable crop production. Integrated crop management. Introduction to Good Agricultural Practices. Principles and components of EUREP GAP/ GLOBAL GAP and its applications. Biodiversity and Sustainable Agriculture. Sustainable development issues. Economics of sustainable agriculture.

Sustainable Crop Protection measures. Biological control of Pests and Diseases. Sustainable Soil Management. BioFertilisers and Soil amendments. Composting. Nutrient Dynamics. Integrated Nutrient Management.

Concept, principles and practices of sustainable animal production. Good Agricultural Practices. Low External Input animal production and integrated systems. Holistic Management of Pasture. Livestock waste management. Issues in animal health and welfare of livestock farming. Faunal biodiversity: animal genetic conservation and use.

AGRI 3107Y(5) - EMERGING ISSUES IN AGRICULTURE

Reviews on current research and development in Agriculture. The module will comprise of a series of student seminars, presentations and case studies on defined research topics in priority and emerging areas in agricultural research and development (e.g mushroom cultivation, aquaculture, apiculture, biotechnology, biosafety etc). Assignments may address the process of value-chain analysis and innovation, as well as systems analysis of the agricultural sector.

AGRI 3000Y(5) - PROJECT

Every student will be allocated a research topic. The research work will be carried out under academic supervision. The student is required to investigate a topic/problem, plan and execute the research work as well as present and discuss the results. Students should demonstrate good practice in using skills and knowledge acquired during the programme and follow dissertation guidelines as laid down by the Faculty of Agriculture.