

## **MSc Crop Science (Specialisation:Plant Protection) - A500 (Under Review)**

### **1. Objectives**

The programme aims to promote the professional development of graduates in the field of crop science, with emphasis on plant protection. On completion of the programme, learners will be able to apply the principles, techniques and practices in the field of plant protection. Learners will also develop the capability to work as independent researchers and technical managers in crop-related organisations.

**On completion of this programme, learners will be able to:**

- integrate knowledge acquired across functional areas and disciplines in crop science, including plant protection;
- apply the principles related to crops, soils, and environment to solve emerging crop production and quality problems;
- diagnose pest/ disease/ weed attack and identify the causative organisms;
- recommend appropriate pest/ disease/ weed management methods;
- apply the principles of sustainability to the protection of field crops and in postharvest/ storage conditions;
- apply the principles of pest and disease forecasting and prediction;
- demonstrate skills in written and oral communication and critical analysis of scientific reports and data;
- prepare their continuing professional development plan towards lifelong learning.

### **2. General Entry Requirements**

Successful completion of an undergraduate degree with

- at least a Second Class or 50%, whichever is applicable or
- a GPA not less than 2.5 out of 4 or equivalent, from a recognised higher education institution

**OR** alternative qualifications acceptable to the University of Mauritius

### **3. Programme Requirements**

A Degree in Agricultural Sciences or any related fields.

### **4. General and Programme Requirements – Special Cases**

The following may be deemed to have satisfied the General and Programme requirements for admission:

- (i) Applicants who do not satisfy any of the requirements as per Regulations 2 and 3 above but submit satisfactory evidence of having passed examinations, which are deemed by the Senate to be equivalent to any of those listed.
- (ii) Applicants, who do not satisfy any of the requirements as per Regulations 2 and 3 above but who in the opinion of Senate, submit satisfactory evidence of the capacity and attainments requisite to enable them to pursue the programme proposed.

## 5. Programme Duration

|                            | Normal [Year(s)] | Maximum [Years] |
|----------------------------|------------------|-----------------|
| Master's Degree (FT):      | 1                | 2               |
| Master's Degree (PT):      | 2                | 4               |
| Postgraduate Diploma (FT): | 1                | 2               |
| Postgraduate Diploma (PT): | 2                | 4               |

## 6. Credits per Year: Minimum 12 credits subject to Regulation 5.

## 7. Minimum Credits Required for the Award of

Master's Degree: 36

Postgraduate Diploma: 24

Breakdown as follows:

|                         | Core           | Specialisation |           |
|-------------------------|----------------|----------------|-----------|
|                         | Taught Modules | Taught Modules | Project   |
| <b>Master's Degree:</b> | 13 credits     | 14 credits     | 9 credits |

## 8. Assessment

Each module will carry 100 marks and will be assessed as follows (unless otherwise specified):

Assessment will be based on written examination of 3-hour duration for all modules, carrying a weighting of 70%, and continuous assessment carrying 30% of total marks. Continuous assessment will be based on case studies; site visits, practical classes, student-led seminars, and literature-based research and/or assignments, and should include at least 1 class test.

For a student to pass a module, a minimum of 30% should be attained in both the Continuous Assessment and Written Examination, with an overall total of a minimum of 40% in that module.

There will be a compulsory class test for the module taught over a semester at the end of the semester of the given academic year. Written examinations for all the modules, whether taught over one semester or one academic year, will be carried out at the end of the year.

Each module will carry credits in the range of 3 to 5. Project will carry 9 credits.

Assessment of the 'Scientific Communication' module will be based on continuous assessment of students throughout the module and/or submission of a portfolio. For satisfactory completion of the module, a minimum of 40% should be attained.

**Submission Deadlines** for Dissertation:

- First Draft: End of July in the Final year.
- Final Copy: Last working day of August in the Final year.

**9. Important Note**

The rules as stipulated in this Programme Structure and Outline Syllabus will replace all other rules and regulations.

**10. List of modules**

| <u>Code</u>   | <u>Module Name</u>   | <u>Hr/Yr</u><br><u>L+P</u> | <u>Credits</u> |
|---------------|--|----------------------------|----------------|
| AGRI xxxx (1) | Experimentation and Computing Techniques   | 30+ 45                     | 3              |
| AGRI xxxx (1) | Applied Crop Physiology & Principles of Crop Production                                    | 45+ 45                     | 4              |
| AGRI xxxx (1) | Soil Fertility, Plant Water Relations & Irrigation   | 30+ 45                     | 3              |
| AGRI xxxx (1) | Economics & Management Applied to Crop Production Systems and Postharvest Technology (PHT) | 30+ 30                     | 3              |
| AGRI 3100 (1) | Scientific Communication   | 20+ 0                      | 0              |
| AGRI xxxx (1) | Advanced Pest Management   | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Disease Management  | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Weed & Pesticide Management   | 45+ 45                     | 4              |
| AGRI 6000 (1) | Project  | -                          | 9              |

Total no. of credits : **36**

## 11. Programme Plan

### Full-Time:

| YEAR 1        |  |                            |                |
|---------------|--|----------------------------|----------------|
| <u>Code</u>   | <u>Module Name</u>   | <u>Hr/Yr</u><br><u>L+P</u> | <u>Credits</u> |
| AGRI xxxx (1) | Experimentation and Computing Techniques   | 30+ 45                     | 3              |
| AGRI xxxx (1) | Applied Crop Physiology & Principles of Crop Production                                    | 45+ 45                     | 4              |
| AGRI xxxx (1) | Soil Fertility, Plant Water Relations & Irrigation   | 30+ 45                     | 3              |
| AGRI xxxx (1) | Economics & Management Applied to Crop Production Systems and Postharvest Technology (PHT) | 30+ 30                     | 3              |
| AGRI 3100 (1) | Scientific Communication   | 20+ 0                      | 0              |
| AGRI xxxx (1) | Advanced Pest Management   | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Disease Management  | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Weed & Pesticide Management   | 45+ 45                     | 4              |
| AGRI 6000 (1) | Project  | -                          | 9              |

Total no. of credits : **36**

### Part-Time:

| YEAR 1        |  |                            |                |
|---------------|--|----------------------------|----------------|
| <u>Code</u>   | <u>Module</u>  | <u>Hr/Yr</u><br><u>L+P</u> | <u>Credits</u> |
| AGRI xxxx (1) | Experimentation and Computing Techniques   | 30+45                      | 3              |
| AGRI xxxx (1) | Applied Crop Physiology & Principles of Crop Production                                    | 45+ 45                     | 4              |
| AGRI xxxx (1) | Soil Fertility, Plant Water Relations & Irrigation   | 30+ 45                     | 3              |
| AGRI xxxx (1) | Economics & Management Applied to Crop Production Systems and Postharvest Technology (PHT) | 30+ 30                     | 3              |
| AGRI 3100 (1) | Scientific Communication   | 20+ 0                      | 0              |
| YEAR 2        |  |                            |                |
| <u>Code</u>   | <u>Module</u>  | <u>Hr/Yr</u><br><u>L+P</u> | <u>Credits</u> |
| AGRI xxxx (1) | Advanced Pest Management   | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Disease Management  | 60+ 30                     | 5              |
| AGRI xxxx (1) | Advanced Weed & Pesticide Management   | 45+ 45                     | 4              |
| AGRI 6000 (1) | Project  | -                          | 9              |

Total no. of credits : **36**

## **12. Outline Syllabus**

### **CORE MODULES**

#### **AGRI XXXX (1) - EXPERIMENTATION AND COMPUTING TECHNIQUES**

Elements of research methodology. The research process. Review of basic statistical methods. Regression models and analysis. Design and analysis of experiments. Sampling techniques. Questionnaire development, design and administration. Data entry and analysis using MINITAB and SPSS. Introduction to multivariate analysis. Communicating with statistics: Interpretation and reporting results of statistical analysis. Fundamentals of crop modelling.

#### **AGRI XXXX (1) - APPLIED CROP PHYSIOLOGY & PRINCIPLES OF CROP PRODUCTION**

Economic significance and importance of weather; Introduction to agro-meteorology: The earth's atmosphere; Atmospheric energy; Atmospheric moisture and precipitation; Atmospheric motion. Global climatic change and variability and its effect on agriculture. Weather patterns over Mauritius.

Seed physiology: dormancy and germination. Environmental influences on crop growth and development. Plant water relations. Water and plant mineral uptake. Plant growth regulators in crop production. Physiology of reproductive growth and development: photoperiodism and vernalisation. Plant growth analysis. Source-sink relationship. Photosynthate partitioning in relation to yield. Modification of yield potential by chemical and cultural means. Adaptation of crop plants to stress factors.

Plant nutrition. Essential plant nutrients: forms, functions, deficiency symptoms and their correction. Nutrient requirements and fertiliser recommendations for specific crops/cropping systems. Principles of agronomy. Crop-environment interactions. Crop geometry and competition. New advances in cropping systems. Crop propagation, including micropropagation. Principles of olericulture. Pomology: principles and techniques. Orchardard techniques and practices. Pruning and training techniques. Field sanitation and hygiene. Good agricultural practices. Traceability.

#### **AGRI XXXX (1) - SOIL FERTILITY, PLANT WATER RELATIONS & IRRIGATION**

General concepts of soil fertility: factors affecting soil fertility; techniques of evaluating soil fertility; plant tissue analyses; Approaches to managing and maintaining soil fertility: composting, organic manures, soil amendments, types of fertilizers, fertiliser formulation, methods of fertiliser application and management; biological management of soil fertility and rhizosphere effect. Nutrient budgeting.

Concepts of water potential and movement in soil – plant – atmosphere continuum; water budgets; effects and measurement of water in soil and plants, research techniques in studies on soil plant water relations and their applications. Irrigation planning and design; management of irrigation water; control and management of salts in irrigation; agronomic and socio-economic factors in irrigation management; evaluating irrigation systems; use of industrial and urban effluent for irrigation; and fertigation technology.

#### **AGRI XXXX (1) - ECONOMICS & MANAGEMENT APPLIED TO CROP PRODUCTION SYSTEMS & PHT**

Economic principles applied to crop production systems at the macroeconomic level; production efficiency at the farm level; measuring economic performance of farms. Project management and impact assessment; current issues and challenges (social, ecological, energy and food security) facing industrial agriculture. Community Supported Agriculture.

Agricultural marketing fundamentals; sustainable niche marketing; supply chain management. International trade and related issues. Management fundamentals applied to sustainable agriculture and PHT; application of agricultural extension principles and technology transfer models. Setting up agribusinesses; Business plans; Entrepreneurship.

### **AGRI 3100 - SCIENTIFIC COMMUNICATION**

Avenues of communication in science. Scientific and technical writing. Oral and poster presentations. Ethics of scientific publishing.

The dissertation guidelines. Planning and managing the dissertation writing up process – effective literature search and review, introduction, methodology, results, discussion, conclusions, referencing rules and plagiarism.

### **SPECIALISATION MODULES**

#### **AGRI XXXX (1) - ADVANCED PEST MANAGEMENT**

Modern taxonomy and systematics of pest species. Insect-host plant relationships. Semiochemicals and allelochemicals. Metabolomics and phenomics in relation to pest damage and pest management. Modern techniques of pest management. Biological control. Botanical pesticides and biopesticides. Integrated Pest and Vector Management. Pest-resistant conventional and transgenic crops (GMOs). Economics of pest control. Economic injury thresholds. Crop loss assessment. Pest surveillance and forecasting.

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

#### **AGRI XXXX (1) - ADVANCED DISEASE MANAGEMENT**

Classification and epidemiology of plant pathogens. Plant-microbe interactions. Plant disease diagnosis. : conventional techniques and molecular methods. Integrated Disease Management. Economics of disease control. Crop loss assessment. Classic and modern disease control methods. Plant resistance. Resistance types and factors. Disease forecasting. Plant quarantine. Seed certification. Seed pathology.

Climate change effects on plant disease incidence and intensity. Application of GIS and Remote Sensing to disease diagnosis and monitoring.

#### **AGRI XXXX (1) - ADVANCED WEED & PESTICIDE MANAGEMENT**

Biology and ecology of weeds. Weed physiology and reproduction. Weeds of local importance. Weed–crop interactions. Weed–environment interactions. Weed control in selected crops. Weed Allelopathy. Integrated Weed Management. Economics of weed control. Biological control of weeds using insects. Resistance factors. Crop loss assessment. Climate change effects. Application of GIS and Remote Sensing to weed diagnosis and monitoring.

Types, forms, formulations, constituents, and chemistry of pesticides : Insecticides, herbicides, fungicides, rodenticides, avicides, nematocides, bactericides. Biological pesticides. Botanical pesticides. Microbial pesticides. Environmental effects of pesticides. Pesticides and health. Role of pesticides in IPM. Pesticide application techniques. Pesticide safety, transport, and disposal. Pesticide laws, and regulations.

Novel pesticides.

#### **AGRI 6000 (1) - DISSERTATION**

The dissertation provides an opportunity for the students to undertake and contribute to a piece of original research work, in an area related to plant protection. The students are required to design an experiment (or investigation, survey or other means) to test a hypothesis or proposition, to plan and execute the research work, to evaluate the outcomes and draw valid conclusions.

The research work is carried out individually, under guided supervision. To support the dissertation work, the Faculty has prepared a document on: *Dissertation Guidelines for MSc Degree*.