REVIEW OF SIMILAR DIPLOMA PROGRAMS IN THE WORLD

Project title	**New Professional Diploma in Plant Clinic and Phytosanitary Technologies (PRO-DPCP)**
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Work Package	**WP4 – Development of the curriculum**
Task 4.1.	**REVIEW OF SIMILAR DIPLOMA PROGRAMS**
Date	**30/12/2021**
Dissemination level	**Internal**

The plant clinic team at **Suez Canal University** and **Debrecen University** made meetings to implement task of similar diploma programs review.

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GENERAL OVERVIEW OF THE SIMILAR PROGRAMS IN THE WORLD

Advanced Studies in Integrated Crop Management Diploma

Program	Country	Reference
Plant wise program developed by CABI (Centre for Agriculture and Bioscience International)	UK and other countries	https://www.plantwise.org/
Plant Health Project	Spain and other EU countries	https://planthealth.upv.es/
Post Graduate Diploma in Plant Health Management (PGDPHM) National Institute of Plant Health Management.	India	https://niphm.gov.in/
M.Sc. program in plant protection	Hungary	https://apply.stipendiumhungaricum.hu/courses/course/2150-msc-plant-protection
BASIS - Plant Protection Award (PPA)	UK	https://www.lincoln.ac.uk/home/course/833/
Certificate in Crop Protection	UK	https://www.harper-adams.ac.uk/courses/short-course/73/basis--certificate-in-crop-protection
Master in plant health management (MPHM)	USA	https://mphm.osu.edu/
The Doctor of Plant Medicine Degree Program	USA	(www.DPM.ifas.ufl.edu)
Plant health management course	USA	https://online.wsu.edu/online-degrees/agriculture-ms/plant-health-ms/
Master of Plant Protection and Pest Management (MPPPM)	USA	https://ent.uga.edu/graduate/programs-of-study/mpppm.html
Diploma in crop protection program	Kenya	https://www.somo.co.ke/course-diploma-in-crop-protection-at-university-of-nairobi-sm1-575
Master of Agricultural science	Australia	https://my.uq.edu.au/programs-courses/program.html?acad_prog=5200
Sustainable Crop Production: Agronomy for the 21st Century	UK	https://warwick.ac.uk/study/postgraduate/taught/courses-2021/sustainablecropproduction

Plant protection; Controlling Plant Pest and Disease	Australia/UK	https://www.hortcourses.com/courses/plant-protection-91.aspx
Post graduate diploma in plant health management	India	https://niphm.gov.in/

1. Master of Plant Protection and Pest Management (MPPPM)
Collage of Agricultural and environmental sciences,
University of Georgia, USA

The Master of Plant Protection and Pest Management (MPPPM) is a non-thesis professional Master's degree program between the departments of Entomology, Crop and Soil Sciences, and Plant Pathology. The MPPPM program is not a research-oriented degree. There is no thesis requirement in MPPPM, but an IPM-oriented internship is part of the program of study. MPPPM graduates are trained for employment as IPM professionals in the pest control industry, pesticide and fertilizer services, Cooperative Extension, and regulatory agencies.

Aims of this course

- Produce graduates with comprehensive, multidisciplinary training in Integrated Pest Management (IPM) of insect, plant disease, and weed pests of agricultural, commercial, and home commodities.
- Train students to be proficient in solving the types of pest management problems routinely encountered by growers and other agricultural professionals, as well as urban pest control, and to teach IPM using a blend of pest control strategies including pesticides, transgenic crops, cultural operations, and biological control.

Course content

- Weed Science.
- General Entomology.
- Integrated Pest Management.
- Pesticides and Transgenic Crops.
- Diagnosis and Management of Plant Diseases.
- Internship, to provide practical experience, such as with a research scientist, the agrichemical industry, or the Cooperative Extension Service.

Nr.	1
University	**UNIVERSITY OF GEORGIA**
School	**College of Agricultural & Environmental Sciences**
Country	**USA**

Course	**Master of Plant Protection and Pest Management (MPPPM)**
Details	The Master of Plant Protection and Pest Management (MPPPM) is a non-thesis professional Master's degree program between the departments of Entomology, Crop and Soil Sciences, and Plant Pathology. The MPPPM program is not a research-oriented degree. There is no thesis requirement in MPPPM, but an IPM-oriented internship is part of the program of study. **What are the goals of the MPPPM program?** • To produce graduates with comprehensive, multidisciplinary training in Integrated Pest Management (IPM) of insect, plant disease, and weed pests of agricultural, commercial, and home commodities. • To train students to be proficient in solving the types of pest management problems routinely encountered by growers and other agricultural professionals, as well as urban pest control. • To teach IPM using a blend of pest control strategies including pesticides, transgenic crops, cultural operations, and biological control. **What are career opportunities with an MPPPM degree?** MPPPM graduates are trained for employment as IPM professionals in the pest control industry, pesticide and fertilizer services, Cooperative Extension, and regulatory agencies. The MPPPM degree can also be completed as part of the Double Dawgs 4+1 accelerated Masters degree program at the University of Georgia. This opportunity currently exists for undergraduate students in Horticulture or Agriscience and Environmental Systems. Please see the **Double Dawgs** web page or the MPPPM Coordinator for more information. Admission **Specific requirements** To be admitted to the MPPPM program: • applicants must have an undergraduate degree from an accredited institution; • a minimum combined GRE score of 289 in the new grading scale; • a 3.0 grade point average (out of 4.0); and • three letters of reference. Any deviation from these minimum requirements, e.g. allowing significant job skills to compensate for slightly lower than minimum GRE or GPA scores, etc., must be approved by majority vote of the MPPPM Coordinating Committee. Students must include a statement concerning the area of pest management they are interested in. Final decisions on admittance will be made by the MPPPM Coordinating Committee. Each student will have a home department (Crop and Soil Sciences [CRSS], Entomology [ENTO], or Plant Pathology [PATH]) designated at the time of admittance or assignment of the internship home department.

How to apply

In order to begin the admission process, you must go to the **UGA Graduate School website** and look under the "Future Students" tab. Follow the instructions for your particular category, e.g., "Domestic application information."

MPPPM Core Curriculum

Area
Area I *All are required courses:* CRSS 6340/L Weed Science (4)* ENTO 6000/L General Entomology (4)* ENTO/CRSS/PATH 6740 Integrated Pest Management (3) ENTO/CRSS/PATH 6250 Pesticides and Transgenic Crops (3) PATH 6280/L Diagnosis and Management of Plant Diseases (4)* CRSS/ENTO/PATH 6130 Internship (1)
Area II *Select at least one 2- to 4-credit course from each of the three MPPPM depa*
Area III *Electives: Select any UGA graduate course related to pest management in th area of interest. Please check with the Graduate Coordinator for acceptabilit courses not in the three departments, CRSS, ENTO, PATH early in the progra the possibility of electives not counting toward the 33 minimum credits*
Total

* If a student has had the 4000-level equivalent of CRSS 6340 or ENTO 6000, then a substituted course must be selected from the same MPPPM department.

Internships: Since the MPPPM program is a professional degree, an internship is required instead of research for a thesis. The internship is designed to strengthen a student's background in integrated pest management and to provide practical experience, such as with a research scientist, the agrichemical industry, or the Cooperative Extension Service. Prior to the internship, the student will meet with the major professor and discuss aspects such as the general mission of the employer, nature of anticipated work, and goals of the institution related to integrated pest management. These and other types of information will need to be collected during the internship for inclusion in a written report. If possible, the student and major professor should meet 4 to 6 weeks after initiation of employment and evaluate the student's progress. It may be desirable to alter the original goals and to be observant for different integrated pest management principles during the remainder of the internship. Internships should be completed by the first week of the last term in the student's program of study.

Internship report: An internship report is required and should be reasonably concise, substantial in character, and reflective of biological

	principles related to integrated pest management. The report should demonstrate to the MPPPM coordinating committee that the student understands basic and practical implications of integrated pest management and has the ability to: (a) organize information in a clear manner, (b) produce a professionally useful and technically acceptable report (supervisor can verify that privileged information is being used properly), and (c) present material in a well-structured form, written in acceptable English. Details and formatting requirements are outlined in the **MPPPM Handbook** . **Exit Exams:** The MPPPM has a final examination requirement of all students. The purpose of the examination is to measure education capabilities that encompass the entire program of the student. The examination consists of a written or oral exam for each of the program disciplines (Plant Pathology, Entomology, and Weed Science) that is taken after all coursework has been completed and will be administered by members of the MPPPM Coordinating Committee. The exams will cover specific information and general concepts learned during the overall graduate program, including prerequisites, and core courses in Area I. The student must have the internship report approved before scheduling the final exams to complete requirements for graduation. **Advisory Committee:** The MPPPM Coordinating Committee is advisory to students. Each student is assigned a major advisor whose academic credentials conform to Graduate School requirements for faculty advisors, and may be faculty outside of the MPPPM Coordinating Committee members. The major advisor and student will develop a program of study and internship. An internship report by the student needs to be approved by the MPPPM Coordinating Committee prior to taking the final comprehensive exams over the program of study.

2. MSc PROGRAM IN PLANT PROTECTION
Faculty of Georgikon, Pannon University (Keszthely-HUNGARY)

The two-year plant protection MSc programme was designed for those who are keen to master both theoretical and practical plant protection-related skills. For students who have studied various scientific, technical, and business subjects related to agriculture.

Aims of this course

- Training plant protection specialists who can fulfil directional, managing, organizing, consulting, regulating, and marketing tasks, based on their comprehensive theoretical and practical knowledge to prevent losses during crop production.
- Students enrolled in this programme get acquainted with identification methods for biotic stressors (bath versions insects and weeds) and their biology and reproduction.
- Understand the impact and mechanisms of pesticides on the environment and human hygiene. Moreover, apply integrated viewpoints of alternatives of chemical protection.
- Prevention crop losses caused by a vast type of biotic and abiotic stressors by applying a comprehensive integrated plant protection approach.
- Having a solid higher education, graduates will always be attentive to the safety of food, processors, consumers and the environment.

Course Content

- Alternative management and rural development
- Applied plant biology, biotechnology, and resistance
- Biological plant protection
- Chemistry of plant protection
- Collection and preparation of insects and plants
- Planning and evaluating of plant protection trials
- Environmental protection and ecotoxicology
- Forecasting and integrated pest management
- General plant pathology and diagnostics
- Herbology
- Summer practice at a plant doctor practitioner
- Human hygiene and first aids
- Informatics and agricultural extension
- Plant protection law and administration, food safety
- Plant protection zoology and ecology
- Plant protectional application technology.
- Plant protectional mycology.
- Integrated pest management, IPM.
- Molecular biology.

- Mycology and fungal toxicology I, II.
- Outlines of plant pathology I, II.
- PCR in microbiology.
- Pest management in eco-farms.
- Crop production.
- Plant protection entomology I, II, III.
- Plant protection in greenhouses.
- Horticulture
- Weed biology
- Weed ecology, weed competition, weed management

Nr.	2
University	University of Pannonia
School	Georgikon Faculty, Keszthely (HUNGARY)
Country	Hungary
Course	**MSc in Plant Protection**
Details	Master course on Plant protection **Degree:** Master in Plant Protection **Education goals:** The aim of the programme is to train specialists of plant protection who are able to fulfil directional, managing, organizing, consulting, regulating and marketing tasks, based on their wide theoretical knowledge. Such experts are able to detect the organisms, which are threatening plants (pathogens, pests, weeds) and they are acquainted with their biology and reproduction, and also with the effects and mechanism of pesticides concerning even the environment and humane hygiene. They can prevent the harms and damages caused by the above-mentioned organisms and they are applying the procedures of ecological and integrated plant protection in order to reduce the pesticide-load of the environment. In their work they are always attentive to the safety of food, processors, consumers and the environment. Having a degree in higher education they are permitted to use restricted chemicals. The further aim is to prepare the interested and inspired students for research work and PhD training in the field of plant protection. **Length of the study programme:** 4 semesters (22 months) **Total credit:** 120 credits **Admission criteria, application requirements:**

	Applicants intending to join a master programme should hold undergraduate degree (B.Sc. or equivalent) in relevant field of science or related area. Degree qualifications are assessed individually in accordance with the diploma (Degree Certificate) and its attachments, or with the Report of Study (Index). Acceptable courses: natural sciences, technical and social sciences, horticultural production, plant protection, crop production, animal husbandry and economics, according to the comparison determined in the law of higher education and the related ministerial decrees. **Language requirements:** Excellent command of English (certificate of language proficiency – TOEFL IBT or IELTS or equivalent) **Procedure for transfer of credits:** requests for transfer of credits will be considered individually based on the BSc degree and course transcript.

3. MSc PROGRAM IN PLANT PROTECTION

Faculty of Agriculture, Food Science and Environment, University of Debrecen (Debrecen-HUNGARY)

1. Title: Plant protection engineer
2. Field of training: agricultural
3. Training cycle: specialized training
4. Training schedule: undergraduate
5. Faculties responsible: Pannon University Faculty of Georgikon (Keszthely-Hungary)
University of Debrecen, Faculty of Agriculture, Food Science and Environmental Management (Debrecen-Hungary)
6. Responsible leaders: Dr. András Takács associate professor,
Dr. habil. László Radócz, associate professor
7. Training time:
- number of semesters: 4 semesters
- number of credits required for the diploma: 120 credits
- total number of contact hours: 1330 hours
8. Period, credit, nature of internship: 4 weeks summer practice, under the supervision of a plant protection specialist
9. Training and output requirements of the course:
The education is based on the fields of agricultural and natural science training. Those with a BSc degree can be admitted to the program:
a. Agricultural engineer BSc
b. Horticultural engineer BSc
c. Conservation engineer BSc
d. Agricultural biotechnologist BSc
e. Environmental engineer BSc
f. Biologist BSc
g. Chemist BSc
h. Chemical engineer BSc
Those with a master degree in the above fields of study may also be admitted.

Competences, knowledge elements, knowledge to be acquired, personal endowments, skills, application of professional qualifications in a specific environment and system of activities to be acquired during the training.

<u>Competences to be acquired</u>
- diagnosis of plant pests and weeds, planning and management of effective control against them,
- performing plant protection management tasks at plant level,
- forecasting of epidemics and gradations, prevention of damage, timely detection of pests,
- phytosanitary analysis,
- quarantine protection,

- development and implementation of environmentally friendly plant protection procedures,
- adaptation and further development of new plant protection methods,
- the use of plant protection products to reduce the pesticide load on the environment,
- implementation of integrated pest management,
- involvement in scientific work in the field of agricultural sciences,
- implementation of research tasks,
- compliance with and enforcement of environmental regulations.

Elements of knowledge, knowledge to be acquired

- knowledge of chemical, ecological, molecular biology, entomology, plant pathology, herbology,
- the administrative, commercial, entrepreneurial, administrative and management skills required for the pursuit of the profession,
- technical and technological knowledge,
- knowledge of plant biotechnology, resistance biology, diagnostics,
- knowledge of the operation of expert advice and decision support systems.

Personal qualities

- problem recognition and solution ability, creativity,
- environmental awareness and responsibility,
- compliance with environmental standards,
- communication knowledge and skills required for engineering and management tasks,
- professional responsibility,
- the need for regular professional training,
- ability to co-operate, to perform managerial duties after obtaining good practice.

Application of professional qualifications in a specific environment, system of activities:

Plant protection engineers are familiar with the regulations and processes related to the cultivation and protection of plants, the production of healthy food and feed and the assurance of their quality; as well as the risks and pests of plant cultivation, the mechanism of action of plant protection products and their compounds used for protection, and their environmental and human relations. Accordingly, they are suitable for dealing with any kind of plant protection problem on a given farm or in the plant protection administration. They are suitable for plant protection consulting, plant protection research and development activities.

Qualifications that are decisive for the qualification and the credit value assigned to these main knowledge areas

The training takes place within the following areas of knowledge:

- I. 14 credits
- II. Plant Pathology knowledge 22 credits
- III. Entomological knowledge 22 credits

- IV. Knowledge of weed biology and weed control 12 credits
- V. Plant protection economics, consulting, legal and administrative knowledge 8 credits
- VI. Plant protection technology knowledge 32 credits

TOTAL: 110 credits

I.	Applied science knowledge	14 credits
II.	Plant pathology knowledge	22 credits
III.	Entomological knowledge	22 credits
IV.	Knowledge of weed biology and weed control	12 credits
V.	Plant protection economics, consulting, legal and administrative knowledge	8 credits
VI.	Plant protection technology knowledge	32 credits
Total:		110 credits

Credit value of the dissertation: 10 credits

10. System for monitoring and evaluating the fulfillment of the requirements (thesis, final exam): As described in the training and output requirements and according to the UNIDEB Study and Examination Regulations.

4. Integrated pest, Weed and Disease Management
Harper Adams University, United Kingdom

This course is designed for field, sales and technical staff, professional consultants, advisers and representatives working in the crop protection industry. It will also be of value to managers of crop protection products and farmers of any large arable concerns. The course is intensive and is appropriate only for candidates who have some prior knowledge or experience of UK Agricultural crop production and protection.

Certificate in Crop Protection training programme runs over **four separate weeks** denoted as four parts.

Aims of this course

As a result of this course, participants will be able to:

- Appreciate the hazards of crop protection chemicals, encourage safety consciousness and be aware of legal obligations.
- Understand equipment and techniques for applying crop protection materials.
- Understand the nature of crop protection chemicals and biological control agents.
- Recognise disease symptoms, evaluate disease problems and be able to advise on the choice of appropriate control measures.
- Recognise pests and pest damage, foresee and forestall pest problems and choose safe and appropriate control measures.
- Recognise weeds and evaluate safe and appropriate control measures.
- Discriminate between crop damage directly induced by environmental factors and damage caused by pests and pathogens and evaluate possible methods which may be adopted for prevention or control.
- Understand the biology of weeds, pests and diseases.
- Understand the principles and concepts of Integrated Crop Management (ICM).
- Advise on the factors involved in, and the problems associated with an IC programme.

Course Content

- Biology and identification of pests, weeds and diseases.
- Biological, chemical and cultural control of pests, weeds and diseases.
- Nutrient deficiency symptoms.
- Agronomy of potatoes, cereals, sugar beet, oilseed rape and grass.
- Crop rotations and soil management.
- Auditing and monitoring.
- Energy and waste management.
- Positive habitat creation and conservation.

Quality and safety in the food chain

Nr.	4
University	Harper Adams University
School	
Country	United Kingdom
Course	INTEGRATED PEST WEED AND DISEASE MANAGEMENT

Details	The continuing production of an abundant supply of safe food produced in an environmentally sustainable manner is a major political issue for national governments and internationally within global commodity markets. Our global population is predicted to reach 9.7 billion by 2050 (United Nations, 2015), which, together with the effects of climate change, will place pressure on the agri-food industry to provide higher yields whilst also minimising land and resource use with the aim of increasing sustainability. Although global estimates vary in magnitude, it is thought approximately 25% of crops are lost to pests and diseases, such as insects, fungi and other plant pathogens (Savary et al., 2019). The UK imports a substantial proportion of its food and an international approach must be taken, that includes both temperate and tropical pest management issues. The Government Office for Science policy document *The Future of Food and Farming* (2011) emphasises the need for global sustainability, that many current systems of food production are unsustainable and that multi-disciplinary solutions are likely to be most appropriate. This approach is reflected in the imminent implementation of the EU Sustainable Use Directive (2009/128/EC). The course will offer students training in techniques to facilitate crop food production, covering a broad range of topics in applied entomology, plant pathology, weed science and nematology. All students receive training in fundamental skills that will enable them to enter either a pest/disease management work environment or a research career in applied entomology, plant pathology or pest management. There is, however, considerable flexibility within the course thus enabling each student to focus on specialist subjects consistent with their interests and future career intentions. Research projects are available in a wide range of subjects covered by the research groups within the Crop and Environment Sciences Department and choices are made in consultation with expert staff. Projects at linked research institutes in the UK and overseas are also available. The course is underpinned by an extensive programme of research at Harper Adams and long-standing collaborations with research institutes and other organisations in the UK and overseas. A distinctive and integral feature of our MSc is the high degree of input from entomologists and plant pathologists in collaborating governmental organisations and commercial biological control companies. This participation takes a variety of forms, including guest lectures, field visits and specific training courses, but may also include providing research projects in their organisations. Examples of collaborating organisations include, CEH Wallingford, Forest Research, Horticultural Development Company, The International Pesticide Application Research Centre, The Natural History Museum London and Rothamsted Research.

	Examples of collaborating organizations include, CEH Wallingford, Forest Research, Horticultural Development Company, The International Pesticide Application Research Centre, The Natural History Museum London, Rothamsted Research, and Wye Bugs. Having completed the MSc you will be able to identify the underlying causes of major pest and disease problems and recognise economically important insects, plant diseases and weeds. You will also be able to apply integrated pest control methods and oversee their application. The course will focus on the ecological and management principles of pest control and you will learn to evaluate the consequences of pesticide use and application on the biological target. You will also receive training in the evaluation of the economic and environmental costs of integrated approaches to pest control in relation to biological effectiveness. Ultimately, the course will enable students to produce integrated pest and disease management solutions that pay due regard to agricultural, horticultural, social and environmental requirements. In addition, there is considerable flexibility enabling each student to focus on specialist subjects consistent with their interests and future career intentions The research project for the MSc will allow you to test hypotheses relevant to pure and applied entomological research by designing, carrying out, analysing and interpreting experiments or surveys. You will also learn to evaluate and interpret data and draw relevant conclusions from existing pest and disease studies. **Scholarships and funding** The full-time and part-time (two year) courses are eligible for a postgraduate loan. Applicants for the MSc in Integrated Pest Management to start in September 2019, may also apply for the Certis Scholarship. **Block-based study** Modules are delivered in one week (and in a select few modules two week) blocks on campus. You will know in advance which weeks require physical attendance as they'll be scheduled on the timetable. In addition to this, you will be required to allocate time for self-study to complete the assignments associated with each of the modules. Some modules may also include research and/or exam elements, these are also highlighted on the timetable. ***Unfortunately, many universities have closed down or reduced their teaching and research in agriculture and crop science. There is a shortage of expertise in important topics, often in subjects that are closer to the farmer, where UK scientists and agronomists have traditionally played a leading role. Several key subjects are particularly vulnerable, including plant breeding, various aspects of pathology including mycology and virology, whole plant and crop physiology,***

	agricultural entomology, nematology and soil science. There is a danger that valuable skills will be lost as researchers and teachers retire. ***Education information:*** **MSc (180 credits from)** **Research and Information Skills** **Code:** F7034 **Credits:** 15 You will develop your understanding of the key academic skills required to study at postgraduate level within your discipline and professional domain. The module is designed to enhance your ability to assess, evaluate, and reflect reflexively on information and theory. The key value of the module is that it provides some key underpinning skills required in other modules. The module enables you to become familiar with the appropriate research traditions of your discipline and to analyse, and synthesise and articulate these ideas in a manner appropriate to the level of study. You will also be encouraged to develop positive study habits through reflection and peer engagement. • Analyse the implications of divergent research philosophies on the interpretation of information. • Critically assess the dominant research philosophy in their specific discipline or professional area and consider the implications for their future development. • Evaluate the trustworthiness, validity and reliability of published works associated with their discipline. • Synthesise a coherent argument on a topic of significance to their discipline. • Critically examine and assess personal development and peer feedback for the benefit of self-discovery, learning and self-improvement. **Biology and Taxonomy of Insects** Code: C7045 Credits: 15 This module will introduce the biology and systematics of the major insect groups through a series of lectures and laboratory practicals, focussing on life cycles and feeding behaviour, as well as understanding the morphology, taxonomy and diversity of these taxa. It will also highlight the crucial role that taxonomy plays as a foundational science on which other disciplines are based. A brief outline of what is taxonomy, what are species and the tools taxonomists use will also be provided. The practical component will consist of a series of laboratory studies, the use of taxonomic keys, dissections and behavioural studies. • Critically review the taxonomy within key insect groups;

	• Relate the key identification features of different insect groups and summarize their main characteristics; • Employ insect identification keys effectively; • Operate a microscope and be familiar with appropriate lab practices associated with sorting and identifying insects. **Plant Health Management - Principles** Code: C7034 Credits: 15 Some form of crop protection is practised on all modern arable farms, horticultural enterprises and in glasshouses. This module is designed to develop an appreciation of factors that influence occurrence and severity of weed, pest and disease outbreaks, and to enable the student appreciate the importance of lifecycles and other ecological information in the design of appropriate strategies for the management of key weeds, pests and diseases. In so doing the students will develop an awareness of the significance of crop protection problems and an understanding of the principles of conventional and novel approaches to their management. • Predict and forecast example weed, pest and disease problems and evaluate their economic and biological significance; • Relate the biology, epidemiology and population dynamics of key example weed, pest and disease problems to the occurrence and severity of, and management strategy for, their outbreaks; • Critically evaluate the sustainability of example integrated pest management systems; • Evaluate the mode of action of pesticides and how to predict and minimise management problems arising from their use (for instance resistance, resurgence); • Appraise the current and potential future use of technology such as molecular diagnostics, genetic modification and GIS/GPS in crop protection. **Plant Health Management - Practices** Code: C7035 Credits: 15 Some form of crop protection is practised on all modern arable farms, horticultural enterprises and in glasshouses. This module extends the teaching and learning experienced in the module Plant Health Management – Principles to address key annual and perennial crops of Northern Europe. Identification skills will be developed, agricultural importance of weeds, pests and diseases appreciated and pest management practices evaluated. The importance of data analysis from experimental work will be appreciated in the development of crop management practices.

	• Evaluate the use of physical diagnostic characteristics in the identification of example weed, pest and disease problems and evaluate their agricultural/horticultural significance; • Choose appropriate management measures for individual problems and combine them into integrated pest management systems; • Evaluate and synthesise cost effective, environmentally sensitive strategies for the management of example weed, pest and disease problems in annual arable and horticultural cropping systems; • Evaluate and synthesise cost effective, environmentally sensitive strategies for the management of example weed, pest and disease problems in perennial cropping systems, including agricultural grassland. **Commercial and Practical Biological Control** **Code:** C7047 **Credits:** 15 Biological control of pests, diseases and weeds is a lynch-pin of integrated crop management and understanding nature's rules that give stability to plant communities as well as predator prey interactions has to underpin successful integrated pest management strategies. This module looks at the role of herbivores, predators and pathogens in biological control. This module will also introduce the methods of selecting the most suitable biological control agents including predators, parasitoids and entomopathogens, including species fungi, bacteria, virus and nematode. The importance of life tables, functional and numerical responses under different environmental conditions, hosts and host plants will be considered. We discuss issues of mass production and quality control and for biological controls as well as considering the use of indigenous and non-indigenous species for the control of pests within protected and outdoor cropping environments. • Critically explain and evaluate the benefits and limitations in use of biological control within an integrated pest management programme of a range of crops; • Critically explain and evaluate the physical, biological and environmental information that determines the selection of the most appropriate biological control(s); • Critically explain and evaluate how knowledge of life-tables and functional responses of natural enemies are important considerations for successful biological control; • Prepare a scientific report that communicates the complex issues relating to the success of otherwise of the use of biological control(s) effectively.

	Pesticide Technology **Code:** C7055 **Credits:** 15 The behaviour of a plant protection product (pesticide) following its release into the environment determines its biological efficiency and its impact on the environment. This behaviour is the result of a complex series of processes that reflect the chemical, physical and toxicological properties of the chemical/substance/organism and the characteristics of the environment into which it has been released via a range of application technologies. This module will review the processes that influence efficacy, the fate of a product in the environment and the influence that the properties of the product may have on these processes. The regulatory framework that affects plant protection products within the UK will be examined in relation to their authorisation, their safe and effective use within an integrated crop management (IPM) context and their impact on food, water and the environment. • Analyse the physical and chemical properties and toxicological data of active substances/products and select formulations appropriate to the active substance, the biological target and the cropping system and select suitable methods of application; • Analyse the physics of spray droplet formation and their behaviour and quality when produced by different nozzle systems and evaluate formulation, spray quality and application methods to optimise spray capture and biological efficiency and reduce operator, resident/bystander and environmental contamination; • Evaluate the design and function of pesticide application equipment and its control systems; • Analyse the environmental, climatic and soil factors that influence the performance of pesticides and evaluate the impact of these factors on the effectiveness of control in the field and the impact on the environment; • Critically evaluate issues relating to UK legislation in an international context with respect to pesticide approval/authorisation, use within an IPM context, environmental impact and residues in food and water **Research Project** **Code:** R7052 **Credits:** 60 This module will allow postgraduate students to develop high level problem solving and research skills. Students are initially required to identify research concepts and evaluate their significance in the context of the wider literature. Based on this assessment, students are then required to design studies in order to further investigate the problem and

	contribute to the knowledge base. The student, under direction from the supervisor, will take responsibility for the planning, execution and writing up of the project. In addition to supervisory input, the student will also be supported by formal workshops that address aspects of project design, including data analysis and presentation. Intended learning outcomes: • Critically appraise the current state of understanding of a problem by reference to published literature and other appropriate information sources. • Formulate a hypothesis or proposal to advance the current state of knowledge reviewed. • Design an appropriate investigation to test that hypothesis or further the proposal. • Employ appropriate research techniques to collect and analyse information or data. • Interpret, report and present study findings within the context of the existing knowledge base. **Optional modules :** **Fundamentals of Agroecology** **Code:** C7052 **Credits:** 15 Nearly 40% of global land area is classified as agricultural, although this percentage can vary widely between continents and countries. Agricultural land can include cultivated land, permanent pasture to support livestock and permanent crops such as orchards. Many farmed areas also contain other more semi-natural biotopes. Although humans have managed the land for food production for at least 10,000 years, over the last 100 years changes to farming practices have led to increased pressures on farm habitats and organisms that occur there, and natural biotopes are increasingly fragmented as agricultural activities expand around them. This module will introduce the habitats and associated ecology associated with different types of farming systems. It will evaluate some of the specific ecological issues associated with agriculture, together with potential management options for reconciling production of food (and other commodities) with conservation of natural resources under increasing production pressures. Wider socio-economic considerations of food production will also be evaluated. • Critically assess the role on the ecology of agro-ecosystems of regional, temporal, and management variations in agricultural practices;

	• Critically assess the importance of biotic interactions and ecosystem functioning for healthy farmland and for farm management decisions; • Critically evaluate the importance of ecological intensification of global production systems relation to other (eg socio-economic, legislative) factors; • Critically evaluate the future opportunities and challenges for managers of agro-ecosystems; • Identify and communicate strategies for enhancing more ecological approaches to agriculture whilst also meeting production needs. **Principles and Practices of Crop Production** **Code:** C7056 **Credits:** 15 Crop production is a core business for many agricultural holdings world-wide. For students planning to be involved in crop production this module aims to provide an understanding of the scientific principles and their application in commercial crop management. Appropriate selection of crop type and variety and monitoring crop growth and plant health is a key skill required for the sustainable management of inputs to optimise crop yields. The module will encourage students to develop these skills by actively participating in the monitoring of crops on the university farm for which they will synthesize their own management strategies. • Critically evaluate the physical, biological, and economic factors influencing the choice of field crop species and variety; • Apply the principles of crop establishment, growth and development to the design of management strategies for crops; • Synthesise and critically appraise management strategies to optimise yield and quality in crop production with due regard to market constraints and the environment; • Discuss, in a live cropping situation, how scientific principles and technologies can be applied to in-crop situations to optimise returns within best management practices. **Insect Physiology and Behaviour** **Code:** C7053 **Credits:** 15 Insect physiology and behaviour are fundamental topics at the heart of entomology, providing knowledge on how insects function as well as how they interact with their environment. The complex anatomical and physiological systems governing all aspects of insect life will be explored throughout the module and we will use leading-edge research to bring behavioural context to whole organism examples. This module builds upon content covered in previous modules (e.g. Insect Diversity and Evolution) to reinforce key concepts such as adaptation. The

	Insect Physiology and Behaviour module is suitable for both work-based learners (studying on a part-time basis) and full-time students. • Critically explain and evaluate the function of different insect organs and physiological systems as well as their interactions within insects; • Relate key insect physiological functions to observed behavioural patterns; • Critically explain and evaluate the use of a range of laboratory equipment and techniques used to study insect physiology and behaviour; • Prepare a scientific report based on a practical exercise. **Experimental Design and Analysis** **Code:** C7041 **Credits:** 15 This module will develop the ability to design data collection and to perform statistical analysis to a modern standard in scientific disciplines spanning ecology, agriculture, and environmental science. Students will develop the ability to match evidence generated by statistical analysis to research objectives, and to deal with different common data types (e.g. continuous, count, proportion, binary). This module is aimed to impart key skills important for MSc and PhD research and for students considering careers in research, or for roles involving data analysis, evidence interpretation or statistical numeracy in any way. Intended Learning Outcomes: 1. Design data collection and, sampling, and demonstrate justification of sample size. 2. Construct scientific hypotheses and choose amongst a range of appropriate statistical methods in a null hypothesis testing framework. 3. Perform repeatable statistical analysis using a software package demonstrating a range of methods. 4. Demonstrate problem solving in data handling and assumption testing for a range of typical statistical analysis methods. 5. Interpret and report the results of statistical analysis, and present results in an appropriate format for a range of experimental designs. This module is taught online for the week scheduled, with the opportunity of in-person support close to the assignment submission.

5. Master of Pest Management
Simon Fraser University Vancouver, CANADA

Nr.	5
University	Simon Fraser University, VANCOUVER
School	-
Country	Canada
Course	Master of Pest management
Details	Pest problems offer opportunities for research on the biological processes involving organisms that cause damage to crops and structures or threaten human health. The master of pest management (MPM) program at SFU allows students to access these opportunities in the management and research of pests and furthermore, directly apply this knowledge. This research-based master of pest management (MPM) program is distinct from an MSc program because of its strongly applied context and its interaction with practitioners and producers. **Admission Requirements:** Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. **Program Requirements:** This program consists of required courses, elective courses, and a thesis for a minimum of 34 units. Students must complete all of BISC 601 - Agriculture, Horticulture and Urban Pest Management (2) BISC 602 - Forest Pest Management (2) BISC 844 - Biological Controls (3) BISC 847 - Pest Management in Practice (3) and two of* BISC 838 - Population Dynamics and Demography (3) BISC 841 - Plant diseases and plant biotechnology (3) BISC 852 - Ecological and Molecular Interactions between Insect Vectors and Parasites (3) BISC 884 - Special Topics in Pest Ecology and Management (3) and a thesis BISC 849 - Master of Pest Management Thesis (18) The thesis is based on original research with relevance to pest management. See Graduate General Regulation 1.10 for more information on the examination of the thesis. *One of these courses can be substituted by STAT 603 - Quantitative Analysis of Research Studies (5) Alternatively, an 800-level elective course (three units) may be substituted, subject to approval by the MPM Director. **Program Length:** Students are expected to complete the program requirements in nine terms.

	Other Information: Supervisory Committee A supervisor is appointed prior to admission. The supervisory committee consists of, at minimum, the supervisor and one additional regular biology faculty member. In exceptional cases, a faculty member from another Simon Fraser University department may be substituted for the Department of Biological Sciences faculty member. Additional supervisory committee members from other institutions may be appointed upon submission of research credentials and approval by the departmental graduate studies committee. **Annual Progress Report:** Students submit a report of their progress every year, and will maintain satisfactory progress toward degree completion to remain in the program. Students receive an annual report form from the graduate secretary every year in the term in which they started, and are expected to complete and return it within six weeks. They will have a committee meeting each year, and a brief summary of this meeting will be included in the report. Also included should be a description of the work/courses completed since the last report (or since starting their program if this is the first time), student progress evaluation forms by each of the supervisory committee members, and a copy of the student's unofficial transcript. Academic Requirements within the Graduate General Regulations All graduate students must satisfy the academic requirements that are specified in the Graduate General Regulations, as well as the specific requirements for the program in which they are enrolled.

6. MSc specialization in Plant Pathology and Entomology

Wageningen University, NETHERLANDS

Nr.	6
University	**Wageningen University**
School	-
Country	Netherlands
Course	**MSc specialization in Plant pathology and Entomolgy**
Details	The investments made in crop production need to be protected from losses due to biotic stress. Integrated pest management provides such protection by integrating genetic plant resistance, cultural practices and biological control. This specialization investigates the population ecology of insects, nematodes and weeds and epidemiology of fungi and viruses, including mechanisms of transmission. Knowledge of plant-insect, plant-pathogen and crop-weed relationships establishes the basis for applied research programmes on integrated pest management, disease agents and weeds. **Courses:** Courses of the specialization Plant Pathology and Entomology are listed in the online Study Handbook. **Thesis:** Students in this specialization can do their MSc thesis at five different Chair Groups within Wageningen University. Visit their website to find out more about their research and possible thesis subjects. Plant Sciences can be defined as an application area of biology (including molecular and cell biology, genetics, physiology and ecology of plants). The domain of Plant Sciences is linked with a professional sector that is of great importance to the world economy. It deals with the production of healthy food and sustainable bioresources, global food security, and the development of smart solutions to reduce the influence of climate change on crop production. The full domain as described above forms the basis of the MSc programme Plant Sciences. The MSc-programme focuses on the basic principles and disciplines of plant sciences as well as the integration of these disciplines to provide healthy plants in a safe environment for food purposes and the production of bioresources. The programme not only covers the technological aspects of crop production, greenhouse horticulture, plant breeding and the interactions between plants, biotic and a-biotic factors, but in addition deals with the essential environmental, quality, health and socio-economic aspects. Students specialize in one of the specific areas within Plant Sciences to deepen their insight, develop skills and understanding and apply their knowledge in an integrated approach of scientific questions. **Learning Outcomes:** After successful completion of this MSc programme graduates are expected to be able to: - explain and exemplify theories, methods and techniques that are relevant to the selected specialization, and stay informed about recent developments in their field of specialization as well as related fields;

	- apply knowledge of the physical, chemical and physiological aspects of crop growth and production, and of modelling and simulation to analyse yield constraints and develop appropriate crop management practices to sustain, and, where possible, improve food production (Specialization A - Crop Science); - apply the knowledge of (environmental) plant physiology, crop ecology and post-harvest physiology in order to analyse plant growth in a protected environment, and develop technological approaches to optimize yield, control abiotic and biotic factors and improve post-harvest quality (Specialization B - Greenhouse Horticulture); - apply the knowledge of soil quality, crop growth, nutrient dynamics, ecology and bio-interactions to analyse interactions between agriculture and the biotic and a-biotic environment, for conservation of (agro-) biodiversity and to improve the sustainability of agricultural land use (production of food and bioresources) (Specialization C - Natural Resources Management); - apply the knowledge of classical, molecular, population and quantitative genetics, plant physiology, statistics, genomics and bioinformatics to design, develop and select varieties with improved yield, disease resistance, quality characteristics and suitability for sustainable plant production systems (Specialization D - Plant Breeding and Genetic Resources); - apply the knowledge of plant-insect, plant-pathogen and crop-weed relationships, both at ecological and molecular level to analyse and design strategies for integrated pest management by integrating genetic plant resistance, cultural practices and biological control (Specialization E - Plant Pathology and Entomology); - apply the knowledge of plant physiology and development, breeding and biotechnology for biomass production to design novel biobased concepts, products or processes in an international context; - independently select and apply suitable laboratory techniques, analytical measurements, surveys, mathematical and statistical methods for the collection, processing and analysis of experimental data in plant science; - independently resolve a scientific problem in plant sciences into research questions and develop a scientifically relevant research plan in which problem definition, hypothesis, experimental set-up and data analysis are described in relation to relevant literature; - independently perform scientific experiments and analyse and interpret experimental data, in order to develop or design a novel solution, system, model or product; - translate research data and scientific knowledge in the field of specialization into relevant solutions to complex problems; - select relevant scientific literature to critically analyse current concepts, theories, techniques and debates as a basis for defining research questions and testing hypotheses in order to draw conclusions and develop recommendations;

	- communicate in professional English with specialists and non-specialists about research and solutions to problems related to the field of specialization, both verbally (in presentations and debates) and in writing; - experience the institutional, entrepreneurial and professional reality of a potential junior academic working environment and determine a personal professional perspective; - co-operate in a multi-disciplinary intercultural team in different team roles, including the role of team leader to plan, perform and manage project-based work; - analyse and evaluate the socio-economic, ethical and environmental aspects of research in the field of specialization and integrate these in academic work in an intercultural context; - reflect on personal knowledge, skills, attitudes and performance, both individually and by giving and receiving feedback, and design and plan a personal learning path. **Specializations:** - Crop Science - Greenhouse Horticulture - Natural Resource Management - Plant Breeding and Genetic Resources - Plant Pathology and Entomology Practical information Type of Programme Master Credits 120 ECTS Language of Instruction English CROHO code of the programme 66835 M Plant Sciences Website programme www.wur.eu/mps 2.5 Spec. E - Plant Pathology and Entomology72 All components listed below 2.5.1 Restricted Optionals (1) in Spec. E Mandatory Choose courses from this cluster if these or equivalent courses have not been part of your BSc-programme. 0 Fundamentals Plant Pathology & Entomology (PHP21303)3 Year 1, Period 1 Morning 2nd half of period Plant Biotechnology (GEN20806)6 Year 1, Period 2 Morning

	2.5.2 Restricted Optional (2) in Spec. E Restricted choice Choose 6 credits from this cluster. Ecological Aspects of Bio-interactions (ENT30306)6 Year 1, Period 1 Afternoon Molecular Aspects of Bio-interactions (PHP30806)6 Year 1, Period 2 Afternoon Biological Interactions in Soils (SBL32806)6 Year 1, Period 2 Afternoon 2.5.3 Thesis Tracks in Spec. E Choose one Thesis Track. One of the components listed below 2.5.3.1 Thesis Track CSA42 2.5.3.2 Thesis Track ENT42 2.5.3.3 Thesis Track NEM42 2.5.3.4 Thesis Track PHP42 2.5.3.5 Thesis Track PPH42 2.5.3.6 Thesis Track VIR42 2.5.4 Internship or Research practice Spec. E Restricted choice Choose one internship or research practice. MSc Internship Crop and Weed Ecology (CSA70424)24 Year 1/2 MSc Research Practice Crop and Weed Eco. (CSA79324)24 Year 1/2 MSc Internship Entomology (ENT70424)24 Year 1/2 MSc Research Practice ENT (ENT79324)24 Year 1/2 MSc Internship Nematology (NEM70424)24 Year 1/2 MSc Research Practice NEM (NEM79324)24 Year 1/2 MSc Internship Plant Breeding (PBR70424)24 Year 1/2 MSc Research Practice PRB (PBR79324)24 Year 1/2 MSc Internship Phytopathology (PHP70424)24 Year 1/2 MSc Research Practice PHP (PHP79324)24 Year 1/2 MSc Internship Plant Physiology (PPH70424)24 Year 1/2 MSc Research Practice PPH (PPH79324)24

	Year 1/2 MSc Internship Virology (VIR70424)24 Year 1/2 MSc Research Practice VIR (VIR79324)24 Year 1/2 3 Electives **Minor or electives** Where appropriate, as a student you choose an individual minor and/or elective courses to complete your MSc programme up to (at least) 120 credits.

7. Master of Pest Management Lincoln University, NEW ZEALAND

Nr.	7
University	Lincoln University
School	-
Country	New Zealand
Course	Master of Pest Management
Details	New Zealand's native ecosystem is facing a host of challenges from invasive pests. There's an urgent need for experts to help strengthen our biosecurity systems and achieve the goal of predator-free by 2050, using effective but socially acceptable management strategies. This programme gives the opportunity to grow your impact in either plant or vertebrate pest management. Gain advanced in-depth knowledge and practical training that focuses on predator eradication and biosecurity. Graduate with a specialist focus, along with a network of potential employers (through the research placement course) gained during study. • Seed the knowledge of how to design and implement environmentally sustainable and socially acceptable management programmes in response to specific pest problems. • Learn how to monitor the outcomes of pest management strategies, measuring impacts and pinpointing any developing physiological and behavioural resistance to control tools. • Grow your advanced understanding of existing pest control solutions along with their accepted limitations. • Gain in-dept understanding of adaptive management, and learn how to effectively share new research findings so they influence current practice. • Work alongside industry or gain a valuable placement in a relevant organisation.

	Career opportunities: As a graduate of Lincoln University's Master of Pest Management, you'll be well positioned for a role in the primary production sector, with a government organization involved with pest control and border safety, or as an agricultural consultant advising on pest control and plant protection **Programme Structure: Master of Pest Management - Plant Pest Management Compulsory courses:** ECOL 608 Research Methods in Ecology 20 credits ERST 606 Advanced Geographic Information Systems A 20 credits PLPT 611Integrated Plant Protection 20 credits **Choose a minimum of one of the following courses:** • ECOL 631 - Animal Behaviour20 credits • PLPT 613 - Plant Pathology20 credits • PLSC 611A - Plant and Crop Physiology20 credits **Choose a minimum of two of the following courses:** • ECOL 609 - Conservation Biology20 credits • ENTO 612 - Advanced Entomology20 credits • ERST 607 - Advanced Geographic Information Systems B20 credits

8. Plant Health Management MSc course Washington State University, USA

WSU's Master of Science in Agriculture (MSAG) program, offered entirely online, is designed for agricultural professionals, practitioners, and educators who wish to gain knowledge and skills and boost their careers. The program's flexible, fully-online format is ideal for working professionals who want to achieve their academic and career goals with continuing with their careers.

Aims of this course

- Provide students with a solid core curriculum in agricultural science focusing on valuable practical knowledge and skills for agricultural professionals.
- Graduates will be uniquely qualified to meet the increasing demand for managers who understand science and research as well as business and industry economics, as student will take combination of science and business courses.
- fully qualified student to manage commercial-scale agricultural or horticultural operations, including farms, greenhouses, landscapes and parks.
- Student will also be able to diagnose and address problems associated with plant pathogens, insects and weeds, as well as environmental factors, including soil, that impact plant health.

Course content

Agriculture core content (6 credits)

- Research and Extension in Agriculture.
- Statistical Methods in Research.

Plant Health Courses (9 credits)

- Biology and Control of Plant Diseases.
- Soil Fertility Management.
- Pesticides and the Environment.
- Agricultural Chemical Technology for Crop Protection & Production.
- Weed Management.

Management Courses (6 credits)

- Economics of Agricultural Decision Making.
- Management of Organizations.
- Supervision and Leadership.
- Project Management.
- Bioethics.

Supporting Coursework (6 credits)

- Ecological and Integrated Pest Management.
- Soil Fertility.

Research Credits (4 credits)

Nr.	8
University	Washington State University
School	-
Country	USA
Course	MASTER OF SCIENCE IN AGRICULTURE – PLANT HEALTH MANAGEMENT
Details	WSU's Master of Science in Agriculture degree, Plant Health Management option combines WSU's world-renowned plant science graduate programs with business course in organizational management. The result is a high-quality MS degree to help advance your career. You will be qualified to manage commercial-scale agricultural or horticultural operations and address problems with plant pathogens, insects, and weeds, as well as environmental factors that affect plant health. You will be equipped to serve in decision-making roles and have essential skills for maximizing plant health using modern, scientifically sound methods. A thesis is optional. Students can instead choose between a capstone project, or an internship with an employer or industry partner. Regional students have a unique opportunity to network with allied area employers, and augment their education with face-to-face learning at WSU's four research and extension centers. Admission Requirements: Applicants must meet the minimum admission requirements of the WSU Graduate School. These requirements include a bachelor's degree with an undergraduate grade point average of at least 3.0 on a 4.0 scale. A Bachelor's of Science degree in a related area, such as agriculture, plant science, biology, entomology, plant pathology or horticulture is preferred. Without this relevant background, students may be required to complete 6 to 9 semester credits of prerequisite courses at the beginning of their degree program, and these courses may or may not be counted toward the degree program requirements. **Student Learning Outcomes:** All graduates will be able to: Meet an expanding demand for plant health management specialists to promote food security and food safety on a global scale, the PHM option is designed to provide students with a foundational understanding of the essential components of plant protection through courses in the plant health management core, as well as a basic understanding of market aspects of the business through courses in the management core.

	PROGRAM OF STUDY—*30 SEMESTER CREDITS* **All courses are available online** The degree requires 30 credits minimum (26 graded credits, and 4 research credits) Master's of Agriculture Core Courses 6 credits AGRI 587, Research and Extension in Agriculture (3 credits) STAT 412, Statistical Methods in Research I (3 credits) Plant Health Courses 9 credits minimum PL_P 501, Biology and Control of Plant Diseases (3 credits) SOIL_SCI 547, Soil Fertility Management (3 credits) IPM 552, Pesticides and the Environment (3 credits) ENTOM 555, Agricultural Chemical Technology for Crop Protection & Production (3 credits) CROP_SCI 512, Weed Management (2 credits) Management Courses 6 credits minimum With prior approval of Program Director, other applicable management courses may be considered. ECONS 505, Economics of Agricultural Decision Making (3 credits) E_M 501, Management of Organizations (3 credits) E_M 522, Supervision and Leadership (3 credits) E_M 564, Project Management (3 credits) PHIL 530, Bioethics (2 credits) Supporting Coursework 0-6 credits ENTOM 351, Ecological and Integrated Pest Management (3 credits) SOIL_SCI 441, Soil Fertility (3 credits) Research Credits 4 credits minimum AGRI 702, Master's Special Problems, Directed Study, and/or Examination. A minimum of four credits are required; you must be enrolled in 2 credits of 702 in the term of your final exam. Project and examination requirements are explained in detail in the MSAG Student Handbook.

9. CROP PROTECTION MSc

University of Göttingen, GERMANY

Nr.	9
University	**University of Göttingen**
School	-
Country	Germany
Course	Crop Protection (MSc)
Details	Degree: Master of Science in Crop Protection Teaching language: English Languages: All courses are held in English. Programme duration: 4 semesters Beginning: Winter semester Application deadline: 1 March for applicants from non-EU countries 1 July for applicants from EU countries Tuition fees per semester in EUR: None Description/content: The two-year MSc programme in Crop Protection is an international study programme, which was established in 2010 at the University of Göttingen. All courses are held in English. Crop health management and crop protection are key elements for safeguarding and improving crop productivity and resource efficiency in a world with a heavily rising demand for plant products. This programme provides knowledge on major tools in crop health management for crops cultivated in the temperate and warmer climates. In addition, students are offered a broad range of modules in other relevant fields of the crop sciences, particularly plant breeding, plant nutrition and agronomy. The Master's programme is a job- and research-oriented programme and follows an interdisciplinary approach focused on crop protection. Graduate students learn about the basic and applied aspects of research in a broad range of disciplines, including plant pathology, nematology, entomology, virology, weed science, pesticide use, legislation and registration, toxicology, molecular phytopathology, mycotoxin research, plant nutrition and plant breeding. Further courses focus on students' capability for interdisciplinary research, improvement of oral presentation and scientific writing. As part of the compulsory curriculum, students carry out a six-week internship in selected professional or institutional sectors of crop protection, i.e agrochemical industries, research or consulting institutions, federal regulatory authorities, or breeding companies. As a result, students will acquire specific and broad knowledge and

	capabilities in the crop sciences with an emphasis on one of its most dynamic fields, on a regional and global scale. They will develop their social and working skills and learn to apprehend systems by using interdisciplinary approaches. The Master's programme in Crop Protection opens attractive perspectives for an international career in crop health management. Graduates very successfully applied for PhD positions worldwide or directly started their careers in companies, research institutions, and advisory services in Germany or in their home countries.

10.

11. MSc in Crop Protection, Jalan University, Kuala Lumpur, MALAYSIA

Nr.	10
University	Universiti Malaya
School	Jalan Universiti, Kuala Lumpur
Country	Malaysia
Course	MSC in Crop Protection
Details	Master of Science in Crop Protection is aimed to produce knowledgeable graduates in crop protection field through quality education for the nation and humanity. The education objectives of this programme include: • Graduates can apply knowledge in the field of crop protection • Graduates can use technical skills to solve problems in crop protection through appropriate scientific methods. • Graduates can provide services in the field of crop protection to the community and industry. Faculty of Science ***Study options: Full Time (42 credit hours)*** Tuition fees: RM18,750.00 (3,31,448) per year *Price shown is for indicative purposes, please check with institution Start date: Expected March 2022. Venue: **Universiti Malaya,** Jalan Universiti, KUALA LUMPUR, Wilayah Persekutuan Kuala Lumpur, 50603, Malaysia ***Entry requirements: For international students*** Applicants must have a Bachelor's Degree with Honours CGPA 3.0 and above or equivalent in the relevant field. Applicants with a Bachelor's Degree of CGPA 2.7 to 2.99 may be considered if they meet at least one of the following criteria: A. Having relevant work experience; or B. Produce publications in related fields; or C. is a recipient of a scholarship; or D. is a graduate of the University Malaya; or E. is a government servant

	Applicants with a Bachelor's Degree of CGPA 2.5 to 2.69 may be considered if they meet at least two of the criteria in (1) (A) to (E) above Candidates are required to have TOEFL results at least 550; 80 (IBT) or IELTS at least Band 5.5. **Course Structure:** TOTAL: 42 CREDITS **1. Programme Core Courses (29 CREDITS)** ***Course Name/Credits:*** Research Methodology in Crop Protection 3, Research Project 5, Applied Weed Science 3, Applied Entomology 3, Tropical Crop Disease 3, Pesticide Management and Application 3, Industrial Crops 3, Horticultural Crops 3, Tropical Crop Management 3 **2. Programme Elective Courses (9 CREDITS)** ***Course Name/Credits:*** Crop Biosafety and Biosecurity 3, Molecular Techniques in Crop Protection 3, Pest Management in Organic Farming 3, Current Technologies in Crop Protection 3, Ethics in Crop Protection 3 **3. Industrial Attachment (4 CREDITS)** ***Course Name/Credits:*** Industrial Attachment 4

12. Plant Protection and Phytosanitary Control MSc, University of Life Sciences, Lublin, POLAND

Nr.	11
University	University of Life Sciences, Lublin
School	Horticulture and Landscape Architecture
Country	Poland
Course	Plant Protection and Phytosanitary Control, MSc
Details	• **Faculty:** Horticulture and Landscape Architecture • **Type of studies:** second-cycle (full time) studies/Master's (Engineer's) degree • **Duration:** 3 semesters • **Diploma:** recognized within European Union Plant protection is a very important and, at the same time, difficult element of plant production. **This field of study provides extended knowledge in the area of:** monitoring pathogens and pests in agricultural, horticultural and forest crops, plant resistance to environmental factors, crop protection against weeds and weather phenomena, pesticide ecotoxicology, sustainable plant protection. Students learn methods and techniques of plant protection, including non-chemical and chemical methods to control harmful organisms in accordance with the principles of integrated pest management (IPM).

	The graduate acquires skills to identify pathogens, pests and symptoms of non-infectious plant diseases using various diagnostic tools. **Student gains the ability to** choose methods of reducing pests in crops and the human environment, learns the binding legal regulations in the field of plant protection and organization of phytosanitary control, has knowledge of running business, rules and techniques of advisor work and obtaining **European Union funds** for projects in agriculture. Knowledge and **practical skills gained during the studies allow the graduates to** take up an interesting job and to embody their own passions and interests. **The graduate will be prepared to work in:** • state offices related to the control of plant products (border points for plant inspections in the country and in the European Union countries, (e.g. State Plant Protection Inspection), • analytical laboratories, • agricultural advisory centres, • companies dealing with the protection of urban greenery, • scientific units, and also will be able to: • run his own business (plant production and distribution of plant protection products), • work as a consultant and advisor for plant protection in garden centres.

13. MSc in Plant Protection, Allahabad Agricultural Institute, INDIA

Nr.	12
University	Allahabad Agricultural Institute
School	-
Country	India
Course	M.Sc. Plant Protection
Details	Degree M.Sc - Master of Science Major Plant Protection Duration 2 Years Type PG Eligibility B.Sc or Equivalent

14. MSc in Plant Protection, Shivaji University, Kolhapur, INDIA

<table>
<tr><td>Nr.</td><td>13</td></tr>
<tr><td>University</td><td>Shivaji University, Kolhapur</td></tr>
<tr><td>School</td><td>-</td></tr>
<tr><td>Country</td><td>India</td></tr>
<tr><td>Course</td><td>M.Sc. Plant Protection</td></tr>
<tr><td>Details</td><td>M.Sc. Plant Protection or Master of Science in Plant Protection is a postgraduate Agriculture Science and Technology course. The course unifies the subject areas that deal with the cause, development and spread of damage to crops, the development and application of efficient preventative and curative measures to fight damage as well as their effects on environment and society. Students can learn about the basic and applied aspects of research of a broad range of disciplines including plant pathology, nematology, entomology, virology, weed science, pesticide use, legislation and toxicology, molecular phytopathology, mycotoxin research, plant nutrition, plant breeding and plant biotechnology. Students will be able to select and combine suitable technologies to solve the problems of crop protection and increase crop production efficiency.
M.Sc. Plant Protection Eligibility
• Aspiring students should have completed a Bachelor of Science degree in relevant field or other related fields from an accredited higher learning institution with minimum 50% marks.
M.Sc. Plant Protection Syllabus: Syllabus of Plant Protection as prescribed by various Universities and Colleges.
<table>
<tr><th>Sr. No.</th><th>Subjects of Study</th></tr>
<tr><td>1</td><td>Applied Entomology</td></tr>
<tr><td>2</td><td>Biology, Ecology and Epidemiology of Pests</td></tr>
<tr><td>3</td><td>Compulsory Research Project</td></tr>
<tr><td>4</td><td>Current Issues in Crop Protection</td></tr>
<tr><td>5</td><td>Elective Courses</td></tr>
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<tr><td>8</td><td>Principles of Crop Protection</td></tr>
<tr><td>9</td><td>Principles of Crop Protection</td></tr>
<tr><td>10</td><td>Principles of Pest Management</td></tr>
<tr><td>11</td><td>Weed Science</td></tr>
<tr><td>12</td><td>Research Project</td></tr>
</table>
M.Sc. Plant Protection Colleges:</td></tr>
</table>

	• Chaudhary Charan Singh Haryana Agricultural University, Hisar • Shivaji University, Kolhapur • Aligarh Muslim University - AMU, Aligarh • Visva Bharati University, Birbhum **M.Sc. Plant Protection Course Suit**

15. MSc Post graduate diploma in plant health management
National Institute of Plant Health Management, INDIA

Aims of this course

- Develop a highly committed and competent cadre of agricultural professionals to promote environmentally sustainable plant health and biosecurity management.

The course **completion takes one year**.

Course content

- Biocontrol Input Production Management.
- Biosecurity Incursion Management.
- Pesticide Management.
- Vertebrate and Structural Pest Management.
- Plant Health Engineering.
- Field visits for enhancing observational skills.
- Agro-ecosystem based analysis through Farmers Field Schools (FFS).

16. MSc in Crop Protection
University of Nairobi, KENYA

This diploma course is designed for staff in the private sector, government and non-governmental organizations in the agricultural industry: agricultural extension workers, farm managers and field technologists, staff in agricultural/education institutions, staff engaged in crop protection research, pesticide delivery service. The diploma course completion takes **2 years full-time**.

Aims of this course

- This diploma course aims to train manpower in all aspects of crop protection as identification of pests, diseases and available management strategies.

Course content

- Introduction to Microbiology.
- Math, Biometry and Computer use.
- Introduction to Agriculture and Principles of Crop Production.
- Introduction to Plant Pathology.
- Introduction to Agricultural Entomology.
- Weeds and their Management.
- Pest and Disease Management.
- Application of Biotechnology in Crop Protection.
- Entrepreneurship in Agriculture.
- Diagnostics of Crop Diseases, Arthropod Pests and Weeds.
- Environmental Health, Phytosanitary Regulations and Standards.
- Communication Skills and Seminars.
- Special Project (2 course unit equivalent).

Nr.	15
University	University of Nairobi
School	**Upper Kabete Campus**
Country	Kenya
Course	M. Sc. Crop Protection
Details	**4.0 COURSE STRUCTURE AND DURATION** The programme will be offered as full time, part time and through Open and Distance Learning (ODL) for students who cannot attend regular University programmes. **4.1 Full-Time** 4.1.1 The degree program shall consist of coursework, examinations and thesis. 4.1.2 The course shall cover a minimum of 4 semesters and a maximum of 6 semesters and each semester will be 15 weeks. 4.1.3 Each candidate will be required to take and pass all courses. 4.1.4 Each candidate will be required to undertake a research project leading to an examinable thesis. The choice of the thesis research topic shall be made in consultation with the department and the academic supervisor. 4.1.5 Each course unit shall have 45 hours covered in one semester. **4.2. Part time** As in 4.1 above in addition to the following: 4.2.1 The course shall cover a minimum of 4 semesters and a maximum of 8 semesters and each semester will be 15 weeks.

	4.2.2 A student shall be required to take a minimum of two and a maximum of four courses in one semester. **4.3. Open and Distance e-Learning** The mode of delivery of the Masters programme will be through open and distance learning modes involving largely home and/ or office-based media: 4.3.1 Written self instructional study modules issued at registration time i. Study course materials like booklets ii. Relevant literature iii. Interactive devices and self tests 4.3.2 Mediated technical learning materials for example:- i. Audio visual ii. e-learning materials 4.3.3 Limited face-to-face sessions to provide overview of the course at commencement of semester, mid semester and revision period before examinations. 4.3.4 Support study centers at the University of Nairobi i. Access to information through computers at the University of Nairobi. ii. Use of libraries at the University of Nairobi. 4.3.6 Orientation (immediately after registration): i. Orientation in ODL delivery. ii. Study, reading and computer skills. iii. Time management and techniques of handling assignments. iv. Mentorship, guidance and counseling. v. Emphasis is on satellite centers that serve as a link between the University and the student in the following manner: registration, collecting reading materials, collecting results and programmes, examination information, posting timetable and holding meetings. 4.3.7 Duration and the course load of the programmes. The Open and Distance Learning programme will run for a minimum of 4 semesters of 15 weeks each and a maximum of 8 semesters of 15 weeks each. There will be three semesters per academic year. Therefore, the minimum calendar years for completion of the programme shall be 2 years and a maximum of 4 years. The minimum course load per semester will be 2 course units studied through the 15 weeks. Each course unit in the programme has a loading of a minimum of 45 hours. The thesis shall be equivalent to 8 course units.

17. MSc in Crop Science, University of Zimbabwe, Harare, ZIMBABWE

Nr.	16
University	University of Zimbabwe, Harare
Course	MSc Crop Protection and Post-Harvest Technology
Degree:	Master of Science of Crop Protection
Program Language:	English
Admission Semester:	Spring (February)Fall (September)
Start Date:	February 2022
Program Duration:	2-3 Years semesters
Educational organisation:	University of Zimbabwe
Study abroad:	Opportunity available especially for thesis semester.
Internships:	No internship
Form of assessment:	US Grade
ECTS credits:	Each course in the program (Electives & Prerequisites) commands a certain amount of credit points.
Program objectives:	Crop Protection

18. Sustainable Crop Production MSc: Agronomy for the 21st Century Warwick University, ENGLAND

Sustainable Crop Production: Agronomy for the 21st Century program provides the knowledge and practical skills in crop management and improvement. The applicants will gain a combination of practical expertise and academic understanding to develop key skills. Also, applicants will learn about the latest advances in plant pathology, pest management and soil health. The **Duration is 1 year (Full-time) or 2 years (part-time).**

Aims of this course

- Understanding of how crops are grown and the factors affecting crop production.
- Giving the applicants the knowledge to identify and understand the causes of crop disorders and make decisions on appropriate management/control measures.
- Giving them transferable skills including team working, communicating with peers and sector specialists, organizing, planning and oral presentation.
- learning the applicants research skills including scientific report writing, conducting surveys, problem solving, data analysis and project work.

Course content

Obligatory courses

- Crop Physiology and Production,
- Advances in Crop Protection,
- Soil, Sustainability and the Environment.
- Project/Work Placement/Dissertation.
- Climate Change.
- Organic and Low Input Systems.
- Cereal, Oilseed and Root Crop Agronomy.
- Introduction to BASIS.
- Plant Breeding and Trial Design for Registration.

Optional courses

- Biodiversity, Conservation and Ecosystem Service.
- Biological Invasions in Changing Environments.
- Microbiomics and Metagenomics.
- Challenges in Global Food Security.
- Marketing Management.
- Business Strategy.

* Optional courses lists are subject to change each year to keep the student learning experience current and up-to-date.

Plant protection; Controlling Plant Pest and Disease
ACS distance education

This course is all about experiential learning -not just reading, but you are given all sorts of practical and research tasks that will build your knowledge and contacts (networking) within the industry, by seeing and doing things in the "real world"

Flexible 100-hour course for gardeners, farmers, horticulturists, or anyone concerned with plant health management

Aims of this course

- know how to control pest and disease problems on all types of plants.
- Learn from experts in identifying and controlling pest and disease on plants.
- Distinguish between broad groups of plant problems, including: Fungi, Insects, Mites, Viruses, Bacteria, Nematodes, Nutritional disorders, Temperature levels, Moisture levels.

Course content

- Introduction: scientific names, terms, diagnosing problems.
- Control Techniques: biological and chemical techniques, alternative methods
- Chemicals: characteristics of chemicals
- Identifying Diseases: symptoms, fungi and viruses and other pathogens
- Disease Control: life cycle of fungi
- Insect Classification: biology and insect classification
- Insect Control: how to control pests
- Non-Insect Pests: nematodes, snails, centipedes, etc.
- Chemical Weed Control: weed identification
- Non-chemical Weed Control: natural control methods

19. Integrated Pest Management MSc, Imperial College, London, UNITED KINGDOM

Nr.	18
University	Imperial College London
School	-
Country	UK
Course	Integrated Pest Management
Details	The course is part of the Crop Protection Suite; provides specialised training in environmental and pest management.

20. MSc in Crop Protection and Plant Biotechnology, University of Kelaniya, SRI LANKA

Nr.	19
University	University of Kelaniya
School	Department of Botany
Country	Sri Lanka

Course	MSc in Crop Protection and Plant Biotechnology
Details	**Master of Science in Crop Protection and Plant Biotechnology** is a full-time modular course proposed to be conducted by the Department of Botany of the University of Kelaniya. This program has been designed to provide in-depth knowledge and appropriate skills in the field of crop protection and application of molecular biological and biotechnological tools for the quality improvement of crops. In addition to gaining knowledge and skills in molecular biology, plant biotechnology and crop protection, students will also have an opportunity to follow a business administration and entrepreneurship component to aid broadening of employability levels and expanding entrepreneurship opportunities in the fields of crop protection, agribusiness, and crop biotechnology. The course is enriched with professional development workshops. **Aim of the Programme:** It is aimed to give an opportunity for the professionals of the fields of agribusiness, customs, food quality assurance, quarantine, food processing industries, pest and vector control and technical officers in the university/industry to improve their knowledge in modern biotechnological concepts, familiarize with the techniques and tools used in molecular biology, disease diagnosis and management and plant quality improvement. It also provides a stepping stone for the higher educational degrees. **Objectives of the Programme:** develop human resource with necessary knowledge and skills on crop protection, disease diagnosis, molecular biological techniques and plant biotechnology for quality improvement, • promote awareness of the modern biotechnological strategies for quality improvement and crop protection among decision makers and managers, • prepare applied plant pathologists and geneticists for translational research and for the development of the country, • encourage large scale entrepreneurs to use modern technology effectively for crop improvement and disease management, and • bridge the gap for entering advanced research degrees. **Teaching methods and evaluation of criteria**

	Teaching methods: Lectures, laboratory sessions, computer assisted learning **Evaluation of criteria:** Continuous assessment, Assignments End of course unit written examination **Programme Type**: Onsite Kurzus link : https://fgs.kln.ac.lk/images/ProgramDetails/CPPBT/CPPBT.pdf

21. Doctor of Plant Medicine MSc, University of Florida, USA

Education and training needed to produce general practitioner plant doctors, that is, scientists who can diagnose and provide control or management recommendations about as many as possible of the biotic and abiotic diseases and injuries affecting plants. It is this kind of education and training that we offer to those studying for the professional doctorate degree in Plant Medicine in the "Doctor of Plant Medicine" (DPM) program of the **University of Florida.**

To get excellent efficiency in using natural resources, countries worldwide provide training programs to improve the sustainability of the available resources to meet consumer's demand and globalization. The rapid increase in the trade and goods movements make the continuous evolution of phytosanitary agriculture imperative. To maintain healthy agricultural products, several training programs have been designed to provide excellent training opportunities for agriculture specialists. This report describes several programs (MSc and short/long term diploma) worldwide that provide knowledge, training, and extension programs to help farmers cope with the modern and appropriate agricultural practices to produce healthy agricultural products. Moreover, several public and private institutions have established plant clinics to provide extensions for a healthier crop. The table below shows some of the existing programs that practice modern phytosanitary approaches.

Nr.	20
University	University of Florida
School	-
Country	USA
Course	Doctor of Plant Medicine
Details	DPM students must complete coursework from multiple departments in order to demonstrate competency each of the program disciplines. Competency area courses may be transferred from other institutions or other approved substitutions may occur with the approval of a student's committee and the DPM Director. The credit distribution is as follows: **Coursework Area** **Credits** Plant, Soil, and Weed Science 18, Entomology and Nematology 18, Plant Pathology 16 Additional Core Courses 18-19 Electives 13-15 DPM Internships 15-16 **A full list of course offerings available to DPM students can be found in the DPM Student Graduate Handbook.** **The following courses were specifically designed with the DPM Program in mind and information for the courses can be found at the Entomology Department website:** **The following courses and internships are available only to DPM students:** • Integrated Plant Medicine: ALS 6925 • Plant Medicine Program Seminar: ALS 6931 • Scouting and Survey Methods for Plant Health Professionals: ENY 6934

	• Internship in Plant Pest Risk Assessment and Managment: ALS 6943 **The following courses were designed for DPM students as a component of the Plant Pest Risk Assessment and Management Certificate, but are available to other students.** • Colloquium of Plant Pests of Regulatory Significance: ALS 6921 • Principles of Plant Pest Risk Assessment and Management: ALS 6942 **The following core internships are offered in an intensive group learning environment, and were originally developed for DPM students:** • Insect Diagnostics: ENY 6942 • Nematode Diagnostics: NEM 6942 **The following core internship is offered through the UF Plant Disease Clinic in Gainesville, Florida following completion of core plant pathology courses:** • Professional Internship in the Plant Disease Clinic: PLP 6942 **For syllabus information for the above course, go to the UF Plant Pathology Department Course and Syllabi Page.** In order to further understand the DPM curriculum, prospective students should review the latest DPM handbook.

22. Master in Plant Health Management (MPHM)
Ohio State University, USA

The Master in Plant Health Management is a Professional Science Master's program that integrates both academic and professional training for careers in plant health management, geared towards students and working professionals who wish to develop plant health expertise for advancement or a career change.
Students can enroll either **full-time (1.5-2-year completion time) or part-time (2-3 years).**

Aims of this course

- Understand the adverse effects of pathogens, insects and other pests influencing plant health.
- Learn how to synthesize information to study and assess a plant health management issue;

- Learn how to evaluate plant health management strategies in agricultural, urban, and natural ecosystems using current informational resources.

Course content

Students can select from a broad selection of courses from 7 academic units covering topics in:

- Plant disease management.
- Integrated pest management.
- Statistics.
- Soil science.
- Weed science.
- Extension education and leadership, agribusiness and more.
- Experiential learning in plant disease diagnosis, hands-on fields, and laboratory courses.

23. Master of Plant Protection
University of Queensland, AUSTRALIA

For **two years of full-time** studies, students will select from nearly 40 courses, including those within one of three specialized fields – Agronomy, Horticulture or **Plant Protection** – allowing them to tailor their studies to suit their interests and career goals.

Aims of this course

- Gain graduates knowledge in multidisciplinary agricultural science to be able to start their career as Agricultural scientist, Agricultural consultant, Extension and inspection officer or/and Plant protection adviser.

Course content

- Plant physiology

- Water & Land Resource Management.
- Principles of Weed Science.
- Horticulture Production.
- Soil & Growth Media Management.
- Plant Physiology.
- Molecular Diagnostics in Plant Protection.
- Plant Microbe & Insect Interactions.
- Biosecurity Plant Pests: Invertebrates.
- Plant Pathology.
- Terrestrial Arthropods.
- Principles of Weed Science.
- Plant Protection.
- Principles of Integrated Plant Protection.
- Agribusiness Marketing.
- Food Safety & Quality Management.
- Principles of Food Preservation.
- Design & Analysis of Experiments.
- Agribusiness Value Chain Management.

24. Centre for Agriculture and Bioscience International (CABI)

Agriculture and Bioscience International (CABI) is one of the leading non-profit organizations that aim to improve people's lives and welfare by reducing agricultural losses. Their approaches include providing information and applying scientific expertise to solve problems in agriculture and the environment. CABI provides the smallholder farmers with information, skills, and tools. That could reach many farmers in the CABI's 50 member countries through scientific staff based in a global network of centres. CABI's services includes providing books, eBooks, tools, apps, education, and training. CABI provides a Master of Advanced Studies and Diploma of Advanced Studies in Integrated Crop Management to help professionals and specialists from crop or environmental management. Crop Pest Management is a 15-hour self-study from which students can gain a comprehensive and practical introduction to managing plant problems. Additionally, they help students correctly diagnose pests, diseases, and their symptoms in the field through a self-study course in Crop Pest Diagnosis. Also, they have an online resource that provide excellent literature to help researchers and facilitate their research work in the field of agriculture and the environment.

CABI has variety of programs to solve agricultural problems; **Plantwise** is a promising program that helps farmers to solve many problems facing their crops. **Plantwise** aims to

improving farmers' yields and incomes while reducing the use of toxic pesticides. Plantwise has set up a sustainable network of over 4,500 plant clinics in 34 countries around the world. Plant clinics help farmers struggling with plant pests and diseases whereas plant doctors could provide diagnoses and management advice for any problem and any crop. Plantwise also provides training for over 11,500 plant doctors and connects them with knowledge resources such as the Plantwise Knowledge Bank and national research centres who can provide local diagnostic support.

25.Plant Health Project

Plant Health project provides a **joint master's degree** in plant health. This program is under the umbrella of the **Erasmus mundus** program. This program is designed to equip students with cutting edge and up-to-date education and qualifying them to cope with challenges in current and future plant health issues. The plant Health master's degree is jointly provided by a consortium of 4 universities in 4 different European countries (France, Germany, Spain, and Italy). These universities are highly experienced in teaching courses on general and specific issues of integrated pest management (IPM). The Plant Health program provides students access to the best research-based teaching program on sustainable plant health management in Europe. This program offers young professionals the basic and advanced aspects of plant health management in different ecosystems. Eventually, both students and scholars will experience various production systems and the available environmental-friendly means of crop protection.

Aims of this course

On completion the Master Degree, graduates will be able to:

- Diagnose and identify plant health problems and analyse their causes.
- Suggest eco-friendly, economically, and socially acceptable solution.
- Link farmers to the research outcomes.
- Apply research methods, instruments, and tools appropriately.

Course Content

Student takes their courses in two different countries (One year in each country). In the first year (M1), all students receive a common education to provide them the basic knowledge.

- Crop science.
- Crop protection.
- Population biology.
- Molecular biology.
- Statistics

In the second year (M2), the students must choose another country to pursue their studies. According to their interest as shown below:

Universities	**Specialization**
French Universities (Montpellier SupAgro / Agrocampus Ouest / AgroParis Tech) (Franc)	Tropical horticulture and temperate vegetable crops
University of Göttingen (Germany)	Temperate crops, arable crops and crops for energy
Universitat Politècnica de València (Spain)	Mediterranean crops in orchards and greenhouses
University of Padova (Italy)	Temperate fruit crops, and ornamental plants and landscape

BASIS - Plant Protection Award (PPA)
University of Lincoln, England.

Aims of this course

- The Plant Protection Award Course is designed for candidates who already hold the first level BASIS Certificate and forms part of the qualification group leading to the BASIS Diploma in Agronomy.
- The focus is on the role of pesticides within integrated pest management systems and provides an update on legislation and environmental issues.

The **course is delivered over four days**, plus one day for the examination

Course Content

- Pesticide use in the context of developing EU and UK farming policy.
- Integrated pest management.
- Pesticide modes of action and formulations.
- Environmental protection. Dealing with pesticide resistance.

Plant Clinics

Several plant Clinic has been established around the world (table below) to help farmers with the plant problems. This plant clinics usually provides plant and insect identification, diagnosis of disease, insect, weed and chemical injury on field crops, nematode assays, and help with nutrient related problems, as well as recommendations involving these diagnoses. Many techniques such as microscopic examinations, laboratory culturing, virus assays, and nematode assays are used to diagnose the plant problems. Specialties from different scientific departments (plant pathology, crop sciences, horticulture weed, science, entomology pesticides and soil departments) are consulted for a better solution for the samples submitted to the plant clinics.

- The services provided by most of the plant clinics are:
  - Plant and insect identification.
  - Diagnosis of plant disease, insect, weed and chemical injury on field crops.
  - Nematode assays
  - Soil analysis
  - Pesticide analysis and recommendation for the proper use
  - Help with nutrient related problems, as well as recommendations involving these diagnoses.
  - Provide newsletters and information about the problems of fruit, vegetables, field crops, and gardens.
  - Digital sample submission for plant diseases, weed, and insect problems.

Organisation	Country	Reference
University of Illinois Plant Clinic	USA	https://web.extension.illinois.edu/plantclinic/
University of Florida extension program	USA	IFAS Diagnostics - University of Florida, Institute of Food and Agricultural Sciences - UF/IFAS (ufl.edu)
Plant diagnostic clinic university of Missouri	USA	https://extension.missouri.edu/programs/plant-diagnostic-clinic
Plant disease clinic of Penn state University	USA	Plant Disease Clinic — Department of Plant Pathology and Environmental Microbiology (psu.edu)
Plant Protection Clinic, University of Rhode Island	USA	Plant Protection Clinic (uri.edu)

Plant Disease Clinic, University of Minnesota	USA	Plant Disease Clinic | (umn.edu)
Oregon State University Plant clinic	USA	https://bpp.oregonstate.edu/plant-clinic
University of Delaware PLANT DIAGNOSTIC CLINIC	USA	UD Plant Diagnostic Clinic | Cooperative Extension | University of Delaware (udel.edu)
Plant Clinic, University of Maryland	USA	https://extension.umd.edu/mg/locations/plant-clinics
Plant health solutions	UK	https://www.planthealth.co.uk/index.php
Fera	UK	https://www.fera.co.uk/
VNUA Plant Clinic of Agriculture	Vietnam	https://eng.vnua.edu.vn/news-and-events/inauguration-ceremony-of-vnua-plant-clinic-of-agriculture-48781