



Suez Canal University
Faculty of Agriculture

Professional Diploma in Plant Clinic and "
"Phytosanitary Technologies

new program

By

ECTS

2022

Decision of Egyptian Ministry of Higher Education to Approve the Plant Clinic

Diploma program at Suez Canal University



جمهورية مصر العربية

وزارة التعليم العالي
والبحوث العلمي

رقم (٣٢٠١) قرار وزاري
بتاريخ 2022/ ٨ / ٢٩
بشأن إجراء تعديل باللائحة الداخلية لكلية الزراعة جامعة قناة السويس
(مرحلة الدراسات العليا) بنظام الساعات المعتمدة

وزير التعليم العالي والبحث العلمي ورئيس المجلس الأعلى للجامعات

- * بعد الاطلاع على القانون رقم (49) لسنة 1972 في شأن تنظيم الجامعات والقوانين المعدلة له.
- * وعلى قرار رئيس الجمهورية رقم (809) لسنة 1975 بإصدار اللائحة التنفيذية لقانون تنظيم الجامعات والقوانين المعدلة له.
- * وعلى القرار الوزاري رقم (3070) بتاريخ 2008/9/28 بشأن اصدار اللائحة الداخلية لكلية الزراعة جامعة قناة السويس (مرحلة الدراسات العليا) بنظام الساعات المعتمدة والقرارات المعدلة له.
- * وعلى موافقة مجلس جامعة قناة السويس بجلسته بتاريخ 2022/7/27، 4/27، 2/28.
- * وعلى موافقة لجنة قطاع الدراسات الزراعية بجلستها بتاريخ 2022/8/6، 6/4.
- * وعلى موافقة المجلس الأعلى للجامعات بجلسته بتاريخ 2022/ 8/20.

ق ر ر

(المادة الاولى)

يستبدل بنص المادة (2) الوارد باللائحة الداخلية لكلية الزراعة جامعة قناة السويس (مرحلة الدراسات العليا) بنظام الساعات المعتمدة الصادرة بالقرار الوزاري رقم (3070) بتاريخ 2008/9/28 النص التالي:

مادة (2): تمنح جامعة قناة السويس بناء على طلب مجلس كلية الزراعة الشهادات العليا التالية لما بعد شح درجة البكالوريوس، وذلك في التخصصات العلمية للأقسام وفروعها:

- 1- دبلوم الدراسات العليا
- 2- دبلوم الدراسات العليا

2- الدبلوم المهني في العيادة النباتية وتقنيات صحة النبات بنظام الساعات المعتمدة.
ثانياً: درجة الماجستير في العلوم الزراعية.
ثالثاً: درجة دكتور الفلسفة في العلوم الزراعية.

(المادة الثانية)

يلحق باللائحة الداخلية لكلية الزراعة جامعة قناة السويس المشار اليها اللائحة الدراسية المرفقة والخاضع للدبلوم المهني في العيادة النباتية وتقنيات صحة النبات بنظام الساعات المعتمدة.

(المادة الثالثة)

على جميع الجهات المختصة تنفيذ هذا القرار.

وزير التعليم العالي والبحث العلمي
ورئيس المجلس الأعلى للجامعات

(د. محمد أيمن عاشور)



Introduction

Nowadays, the rapid scientific improvement requires essentially establishing new postgraduate programs that target the graduate will be able to achieve the requirements of the labor market. Therefore, this program and this list came to accomplish this target. So, this program is targeted to prepare a professional and scientific graduate.

The program of Plant clinic Diploma is developed by Department of Agricultural Botany as an output of Erasmus+ project, funded by the European Commission. Three European Universities namely, Italian University (Napoli University) Hungarian University (Debrsen University) Bulgarian University (Plovdiv -Agricultural University) that very well-known and a pioneer in plant health field and plant clinic) shared in this program, cooperating with six Egyptian universities (Mansura, Ain Shams, Alexandria, Suez Canal, Sohag, South Valley).

Moreover, the six Egyptian partners will be targeted to share and cooperate in among them to exchange the students for completing parts of the studies and collaborate and participate in teaching as well as an exchange the experiences and expertise if it is necessary.

Degree: Professional Plant Clinic Diploma

Program code PRO -DPCP

Subspecialty: Plant Clinic

Department: Agricultural Botany

General Aim of the Program:

The program aims to develop students skills enrolled in the program in the field of accurate diagnosis of plant pathogens and pests. In addition to providing them with applied skills that make students able to continuously learn and manage plant clinics efficiently. As well as continuous follow-up of graduates in the labor market to develop their professional skills in light of the rapid scientific development in the field of plant diseases. Supporting the abilities of students enrolled in the program to obtain a specialized job opportunity. Supporting effective communication and cooperation between the academic units at the university and the graduates with the labor market and all components of society. And creating a field of cooperation between the units working in the field of plant diseases in Egyptian and international universities. Supporting agricultural income by avoiding losses as a result of damage caused by plant diseases and pests.

List of credit-hour courses and their equivalent in ECTS

Courses							Assessment	
No.	Course	Code	ECTS	Credit hours			Course type	Semester
				Lecture	practical	Sum .		
1	Ecology and Etiology of plant pathogens	AGR B601	4	1	2	2	Obligatory	1 st
2	Diagnosis of plant diseases, pests and disorders	AGR B603	4	1	2	2	Obligatory	1 st
3	Plant clinic operating system	AGR B602	4	1	2	2	Obligatory	2 nd
4	Plant disease and pest control	AGR B604	4	1	2	2	Obligatory	2 nd
5	Applied Entomology-and Acarology	PLPR 601	4	1	2	2	Obligatory	1 st
6	Herbarium techniques for plant clinic	AGR B610	4	1	2	2	Obligatory	2 nd
7	Diagnosis of fungal plant disease	AGR B605	4	1	2	2	Elective	1 st
8	Diagnosis of viral plant disease	AGR B607	4	1	2	2	Elective	1 st

9	Diagnosis of bacterial plant disease	AGR B609	4	1	2	2	Elective	1 st
10	Diagnosis of nematod plant disease	AGR B611	4	1	2	2	Elective	1 st
11	Diagnosis of insects damage	PLPR 602	4	1	2	2	Elective	2 nd
12	Seed health testing methods	AGR B613	4	1	2	2	Elective	1 st
13	Greenhouse diseases and pests	AGR B615	4	1	2	2	Elective	1 st
14	Weed biology and control	AGR B606	4	1	2	2	Elective	2 nd
15	Plant diseases and pests in organic farming	AGR B608	4	1	2	2	Elective	2 nd
16	Postharvest, storage diseases and pests	PLPR 604	4	1	2	2	Elective	2 nd
17	Pesticides action and application techniques	PLPR 606	4	1	2	2	Elective	2 nd
18	Quarantine and phytosanitary techniques	AGR B612	4	1	2	2	Elective	2 nd
19	Research project	AGR B614	8	4	-	4	Obligatory	2 nd

Title and courses content

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB601	Ecology and Etiology of Plant Pathogens	4	1	2	2	None
<p>1. Objectives: The course aims to identify the causes of plant diseases and the mechanism of their spread, reproduction and methods of epidemiology.</p> <p>2. Description and Related Topics: Study of the causes of plant diseases; Koch's postulates; factors affecting plant pathogens; the source of plant pathogens and disease cycles; Primary, secondary and complex infection. Pathogen inoculum spread and infection. Pathogenicity and Virulence. Stages of Pathogenicity. Primary Pathogens versus opportunistic Pathogens. Genetic diversity of plant pathogen. Epidemiology of plant diseases. Environmental factors that contribute to the occurrence of an epidemic. Epidemiological explanation theories. Methods for isolating and studying fungi, bacteria and nematodes in the laboratory</p>						

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB603	Diagnosis of plant diseases, pests and disorders	4	1	2	2	None
<p>1. Objectives :The course aims at knowing the methods and techniques necessary to enable the student to diagnose and measure plant diseases, pests and damage to crops, using a range of diagnostic methods and various examination techniques using different identification methods. By the end of the course, the student should be able to: Diagnose and describe plant pathogens that infect various crops.</p> <p>2. Description and Related Topics: Studying different diagnostic methods for common plant diseases in crop plants based on the study of the theoretical slit followed by practical exercises, in which the student diagnoses plant diseases under field conditions as well as in the laboratory. The exercises include symptomatic diagnosis as well as microscopy, ELISA and PCR methods, and quantitative assessment of diseases under normal conditions. Moreover, the effect of physiological damage is also taken into account. Distinguishing symptoms caused by living and non-living pathogens and calculation of basic principles for the diagnosis and estimation of plant diseases in crop plants. Apply practical diagnostic methods ranging from field testing, damage quantification and microscopy to molecular and serological methods.</p>						

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB602	Plant clinic operating system	4	1	2	2	None

Objectives: The course aim is to train the student in the methods and how to manage the plant clinic, including the publishing and advertisements, dealing with the clients and writing reports.

Description and Related Topics: plant clinic service delivery, plant clinic workforce, plant clinic data and information, plant clinic performance, quality of plant clinic, farmer-centric plant clinic, on wheels. the mobile plant clinic, networking of plant clinic, online plant clinic, improving plant clinics communication

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB604	Plant disease and pest control	4	1	2	2	None

1. Objectives: Use appropriate pest control methods. Building strategies for integrated control of plant diseases.

2 Description and Related Topics: Break down the development of plant diseases into useful components in the design and implementation of disease control programs .The use of physical methods, including the use of solar heat and fumigation, the use of regulatory methods, including plant quarantine and the agricultural cycle, the use of alternative biological methods, the use of agricultural methods, the use of chemical control, and the adoption of the idea of integrated control.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
PLPR601	Applied Entomology and Acarology	4	1	2	2	None

Objectives: The course aims to know the economic importance of arthropod pests on crop production and know the major features of morphological and biological of different types

Description and Related Topics: Economic importance of arthropods on agricultural crops - general characteristics and body areas of insects - biology, life cycle and food habits of the main groups of Insect pests attacking cereal crops -legume crops - main

vegetable crops - Some deciduous orchids - evergreen orchards - ornamental plants. General characteristics and classification of plant mites, life cycle and feeding habits of plant mites Key Pests - Symptoms and damage to major vegetables, field crops and orchids - Modern approaches to controlling harmful insects and weeds to reduce their impact on crop production, focusing on the basic principles of integrated pest management

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB605	Diagnosis of fungal plant disease	4	1	2	2	None

1. Objectives: The course aims to train the student on how to diagnose the field and laboratory of fungal diseases using the virtual and microscopic examination and using other modern methods and techniques.

2. Description and Related Topics: concepts of detection and diagnosis of fungal disease. Tools and techniques used in the detection and diagnosis of fungal diseases; special applications of plant disease diagnostic tools; diagnostic relationship in the fight against plant diseases. Methods used in the detection and diagnosis of fungal plant diseases. The use of molecular diagnostic techniques in the diagnosis of fungal diseases. The role of symptoms and pathological signs in diagnosing, detecting and determining pathogens. Detection of plant pathogens. Traditional diagnostic techniques. Advanced and molecular diagnostic techniques. Recent advances in diagnostic techniques. Special applications for plant disease diagnosis. Diagnostics in plant disease management.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB607	Diagnosis of viral plant disease	4	1	2	2	None

1. Objectives: Studying methods of identifying and diagnosing viral infections on different agricultural crops by different biological and biological methods.

2. Description and Related Topics: History of plant viruses, shape, size, composition, structure and physical properties of viruses. Symptomatology of important plant viral diseases, transmission, virus vector relationship. Virus nomenclature and classification, genome organization, replication and movement of viruses. Isolation and purification, electron microscopy, protein and nucleic acid based diagnostics. Mycoviruses, phytoplasma arbo and baculoviruses, satellite

viruses, satellite RNAs, phages, viroids, prions. Mechanism of resistance, genetic engineering and management of plant viruses. Study of symptoms caused by viruses, transmission, assay of viruses, physical properties, purification, serological tests.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB609	Diagnosis of bacterial plant disease	4	1	2	2	None

1. Objectives: Study of plant pathogenic bacteria, identification and training on different diagnostic methods for bacterial diseases by microscopic and serological methods.

2. Description and Related Topics: Introducing the student to the types of prokaryotic organisms, including facultative parasitizing bacteria, obligatory parasitizing bacteria, mycoplasma, rickettsia, and general morphological, physiological and biochemical characteristics. It also studies the environments suitable for the survival of these organisms, methods of their spread, and how plant disease occurs. Pathological factors that help bacteria and related organisms to cause disease are also studied. The most important disease symptoms caused by prokaryotic organisms and how to distinguish them from other disease symptoms caused by other pathogens are studied. The most important diseases caused by prokaryotic organisms that affect the vegetative system of the plant and the root system are studied, including the most important diseases caused by facultative parasitizing bacteria - the most important diseases caused by obligate parasitizing bacteria, Helicobacter, mycoplasma and rickettsia. Training on different identification and diagnosis methods for bacterial diseases.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB611	Diagnosis of nematode plant disease	4	1	2	2	None

1.Objectives: The course aims to introduce students to the basic and applied aspects of plant parasitic nematodes and how to take samples and extract nematodes from soil and infected plant materials. Symptoms of nematode infestation on various horticultural and field crops.

2. Description and Related Topics: Introduction to plant-parasitic nematodes. The structure and organization of nematodes- Reproduction, development, and survival of plant parasitic nematodes- nematode extract from soil or plant materials, Sampling, extraction, staining and identification of nematodes from soil and infested plant materials- Detection and identification plant nematode- Diagnosis of nematode diseases.

Training on prepare the temporary and permanent slides to study morphological features of nematodes; Staining of nematodes and their egg masses in roots.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
PLPR602	Diagnosis of Insects damage	4	1	2	2	None

1.Objectives: The student's understanding of the levels of economic damage and - Knowing the nature of damage caused by insect infestation and understanding the causes of the spread of insect pests - Familiarity with common diagnostic methods for damage caused by insects - Understanding the procedures for predicting biological disasters for the crop.

2. Description and Related Topics: An overview of the concept of natural balance in the ecosystem. Census dynamics of insect pests and variables affecting their growth rate. Types of insect pests according to the concept of economic damage level. The basic methods for monitoring and predicting the numbers of insect pests are to monitor plant invasions. The use of computing image processing techniques for early detection of insect pest problems and the severity of damage caused by insect pests on agricultural crops. Classification of insect pests on the basis of damage. Determining the damages and estimating the rate of infestation and crop losses caused by insect pests on different agricultural crops. Field diagnosis methods and detection of the infestation of various insect pests on different agricultural crops. Methods of sampling insect

pests and assessing their damage by counting insects. Techniques for detecting insect pests that live in the soil. Methods for detecting and diagnosing hidden infestations caused by insect excavators in the field and in the laboratory. Methods of detection and diagnosis of insect infestation stored in the warehouse. Concepts, principles and tools of integrated pest management in order to keep the population of insect pests below the level of economic damage

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB613	Seed health testing methods	4	1	2	2	None

1.Objectives: Identification, nature, detection, transmission, epidemiology, impacts/losses of seed borne diseases and their control.
 2. Description and Related Topics: The economic importance of seed pathology. Morphology and anatomy of infested monocotyledonous and dicotyledonous seeds. Modern theories in seed and seedling diseases. Mechanisms and methods of seed disease transmission, transmission of pathogens from seed to plant. Seed certificates and damage limits, types of losses caused by seed borne diseases in true seeds and vegetative parts, mechanisms of plant and seed resistance against seed invasion by seed borne pathogens. Epidemiological factors affecting transmission of seed-borne diseases, and prediction of epidemics through seed-borne infections. Production of mycotoxins that affect seed quality and their impact on human, animal and plant health, seed-borne pathogens/diseases, pathogen-free seed production procedures, seed health testing, and microorganism detection methods. Training in traditional and advanced techniques in detection and identification of seed-borne fungi, bacteria and viruses. Relationship between seed borne infection and disease expression in the field.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB615	Greenhouse diseases and pests	4	1	2	2	None

1.Objectives: This course focuses on pest and disease management of greenhouse crops vegetables and flowers.
 2.Description and Related Topics: Definition and description of greenhouses and description of their environment, - Environmental conditions that help the spread of diseases inside plastic or glass reserves - Means of spreading diseases

inside greenhouses - Sampling of the most important diseases in greenhouses - Diseases of the root system and soil diseases (especially diseases of fungal wilt and bacterial wilt - and diseases of the Sclerotinia diseases and nematode knots) - Vegetative system diseases (spots, blights and viral diseases) - Fruit diseases (spots and fruit rots) - Various methods of resistance to diseases of protected crops. Agricultural operations inside greenhouses and their relationship to the spread or control of pathogens inside greenhouses.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB606	Weed biology and control	4	1	2	2	None

1.Objectives: Weed ecology and control to introduce students to the basic biological and ecological aspects of weeds that affect their population dynamics
 2.Description and Related Topics: Introduction and overview of weed identification and agricultural losses caused by weeds. Classification of weeds Annual weeds, dormancy, germination and institution. Biennial and perennial herbs. Weed environment. Ecology weeds (environmental invasion). Factors that weeds and crop plants compete on and the characteristics that make weed successful. Weed reproduction and seed dispersal. Weeds and climate change. Agricultural weed control (prevention, crop rotation and plowing). Mechanical weed control (manual pulling, hoeing, inter-tillage, shearing, flame, burning and floods). Chemical weed control (chemical activity, time Method of application and soil sterilization). Herbicide labels and sprayer calibrations. Biological control (Allelopathy, insects, pathogens and vertebrates). Integrated weed management.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB608	Plant diseases and pests in organic farming	4	1	2	2	None

1. Objectives: The course aims to know and train the student to deal with crops produced under organic farming conditions, diagnose their pathogens, and work on integrated and safe pest and disease control.

2. Description and Related Topics: Definition of organic farming - environments of organic farming - nutritional needs and the environment for modern and unconventional farming methods - a study of pathogens, animal and insect pests that cause losses under organic farming conditions. Recognizing the symptoms and signs of pests and pathogens - optimal agricultural treatments to resist plant diseases and pests under organic farming conditions - most important models of plant diseases and pests for crops grown in private environments and ways to combat them. Integrated control under organic farming conditions.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
PLPR604	Postharvest, storage diseases and pests	4	1	2	2	None

1. Objectives: the course aims to deepen detailed scientific knowledge and understanding of biochemical processes in living raw materials during storage and after harvesting. It has deep and detailed scientific knowledge and understanding of ecology, physiology and the detection, use and control of micro-organisms in food systems

2. Description and Related Topics: Post-harvest losses - animal pests, small mammals and rodents Environment and their livelihoods. Control methods: physical / chemical 3. Fungi and bacteria. Classification: Describe the important groups of fungi and bacteria that infect crops after harvest. Diagnostic methods. Environmental growth conditions: O₂ / CO₂ / modified air systems, heat and moisture requirements. Control methods: preventive and curative. Agricultural, biotechnological and chemical. Climate modification capabilities to combat fungi and bacteria. Applied entomology. Spiders and insects in stored products. Biology: spiders, insects: Beetles and weevils / Lepidoptera / Diptera Integrated management of pests and diseases after harvest - Study of the structure of fruits and vegetables and cut flowers in relation to post-harvest physiology; and dissolved solids, acidity and ascorbic acid; Postharvest treatment of horticultural and field products Observations for disease symptoms.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB610	Herbarium techniques for plant clinic	4	1	2	2	None

1.Objectives Study of different organisms. Store samples for future studies. Provides assistance with systematic studies.

2. Description and Related Topics: Study of different organisms. Store samples for future studies. Provides assistance with systematic studies. Introducing the herbarium technique in plant disease; Collection, drying and preservation of samples. Functions of the herbarium, storage of samples, and the basic information required for registration, writing of descriptions, photography, and methods of microbial preservation, methods of cryopreservation and freezing of bacterial cells, virus and spores of fungi. Herbarium uses agricultural groups and associated data as follows: • Reference materials for precise definition. • Basic biological materials for taxonomists and other researchers to study. • The basic material on which the use of scientific names depends. • Permanent record of species in time and place. • Documented distribution maps. , including taxonomic, ecological, biochemical and DNA sequencing analyses.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
PLPR606	Pesticides action and application techniques	4	1	2	2	None

1. Objectives. The main aim of the course is to understand how to safely use and handling of pesticides efficiently with minimal harmful effects to environment and non-target organisms to ensure food safety.

2. Description and Related Topics: Introduction and overview of the importance of pesticides, historical development and international agreements related to the use of pesticides General and toxicological considerations of pesticides and enzymes responsible for the metabolism of pesticides Definition and classification of pesticides in terms of type, grouping and mode of action Types of organochlorine and carbamate pesticides, and their mode of action Types of organophosphate and neonicotinoid pesticides, and method What they work Types of pyrethroid and botanical pesticides and how they work Biocides: Microbial (bacterial, fungal, etc) Insecticides Types and mode of action Types of fungicides and how they work Types of herbicides, and how they work Guidance on best practices for aerial application

of pesticides Spraying techniques Pesticides, their equipment, calibration and dosages Pesticides and the environment; The concept of risk, exposure and toxicity are introductory concepts in the IPM study.

Course Code	Course Title	ECTS	Credit hour			Prerequisite
			L	P	Sum.	
AGRB612	Quarantine and phytosanitary techniques	4	1	2	2	None

1. Objectives : The course aims to introduce learners to the principles and role of plant quarantine in combating pests and diseases.

2. Description and related Topics: Definition of pests, pesticides and genetically modified substances. Attention; The importance of quarantine - local and international. Quarantine restrictions on the movement of agricultural products, seeds and planting materials; Case history of pests/diseases and plant protection organization in Egypt. Business related to the registration of pesticides. History of Quarantine Legislation,. Environmental Laws, Industrial Registration, Import and Export of Biocides. Identify pest/disease free areas; Symptomatic diagnosis and other techniques that detect pests/pathogens; VHT and other safer techniques for disinfection/rescue of infected material. WTO regulations; non-tariff barriers; Pest risk analysis. Sanitary and Phytosanitary Measures