

**Study Plan**  
**Faculty of Agriculture**  
**Ph.D. in Plant Protection**

**First: GENERAL RULES & CONDITIONS:**

Plan Number			2013
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1. This plan confirms to the valid regulations of programs of graduate studies.
2. Specialties of Admission:
  - The First priority: M.A. in Plant Protection or any of its fields.
  - The Second priority: M.A. in Horticulture and Plant Protection or any of its fields
  - The Third priority: M.A. in Plant Production or any of its fields
  - The Fourth priority: M.A. in Agricultural Sciences or any of its fields.
  - The Fifth priority: M.A. in Biological Sciences or any of its fields.
3. Admission policies: The Third Policy

**Second: SPECIAL CONDITIONS:** None.

**Third: STUDY PLAN: Studying (54) Credit hours as follows:**

**1. Obligatory Courses : Studying (18) credit hours successfully:**

Course No.	Course Title	Credit Hours	Theory	Prac.	Prerequisite
0606921	Ecology and Management of Plant Pathology	3	3	-	
0606931	Seed Pathology	3	3	-	
0606950	Biotechnology in Plant Protection	2	2	-	
0606951	Biological Control	3	3	-	
0606953	Ecology of Insect Population	3	3	-	
0606972	Weed Ecology and Physiology	3	3	-	
0606991	Seminar in Plant Protection	1	1	-	

**2. Elective Courses: Studying (18) Credit hours successfully from the following:**

Course No.	Course Title	Credit Hours	Theory	Prac.	Prerequisite
0606913	Pesticide Analysis	3	2	1	
0606923	Nematode Ecology	3	3	-	
0606945	Selected Topics in Plant Protection	3	3	-	
0606952	Insect Taxonomy	3	2	1	
0606954	Pesticide Toxicology	3	3	-	
0606955	Insect – Plant Relationship	3	3	-	
0606956	Immature Insects	3	3	-	
0606957	Herbicides	3	3	-	
0606958	Wild Medicinal Herbs	3	2	1	
0606962	Nematode Taxonomy	3	2	1	
0606963	Ecology and Genetics of Phyto-Pathogenic Bacteria	3	3	-	
0606964	Reproduction and Genetics of Viral Diseases	3	3	-	
0606965	Fungal Taxonomy	3	2	1	

**3. Pass the qualifying Exam: (0606998)**

**4. Thesis: (18) Credit hours # (0606999).**

**Course Description**  
**Faculty of Agriculture**  
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**(0606913) Pesticide Analysis (3 Credit Hours)**

The course deals with sample preparation, extraction and clean-up methods, use of different detection systems, and determination methods including: Spectrophotometry, TLC, GLC, HPLC, NMR, MS, bioassays and other methods. The practical part includes sample preparation, extraction, clean-up, detection and determination methods.

**(0606921) Ecology & Management of Plant Diseases (3 Credit Hours)**

This course deals with ecological relationships of soil-borne and foliar pathogens. Fundamentals and techniques of plant disease management. Disease dynamics related to management, exclusion and eradication of pathogens; principles of plant protection.

**(0606923) Nematode Ecology (3 Credit Hours)**

This course deals with study of the distribution of nematode population, and effects of biotic factors on nematode populations; including soil temperature, moisture, type, PH, in addition to gases, inorganic and organic matter contents in the soil. Nematode survival mechanisms will be also discussed.

**(0606931) Seed Pathology (3 Credit Hours)**

The objectives of this course is to give the students an idea about seed-borne diseases, their causal agents, including fungi, bacteria, viruses, and nematodes, their mode of transmission, economic importance, the effect on seed viability, seed anatomy in relation to pathogens transmission, the effect of environmental factors on pathogens transmission, seed healthy tests, production of disease free seedlings, the recent techniques for the detection of these diseases in the seeds, and control methods.

**(0606945) Selective Subjects in Plant Protection (3 Credit Hours)**

It is a course of three lectures weekly, not mentioned in the study plan. The suggested course will be given in view of availability of lecturer and importance of the subject matter. Practical period could be given according to needs.

**(0606950) Biotechnology in Plant Protection (2 Credit Hours)**

This course deals with the most recent developments in modern technology through the use of living organisms, their materials, or residues for agricultural pest management including insects, plant diseases and weeds and application methods of this modern technology. It includes also a training part for students on the required instruments used in biotechnology. Certain lectures may be converted into practical.

**(0606951) Biological Control (3 Credit Hours)**

This course deals with the study of the philosophy and importance of biological control and the obstacles which limit its application. It also covers the biology and impact of predators and parasites, including different methods of importation, conservation, augmentation of release of natural enemies. The role of biological control in IPM will be also emphasized.

**(0606952) Insect Taxonomy (3 Credit Hours)**

This course deals with systematic entomology, including nomenclatural terms and definitions, systematic literature, taxonomic procedures, use and construction of identification keys, diagnostic morphological features of insect families. Collection and preservation of insect is required.

**(0606953) Ecology of Insect Populations (3 Credit Hours)**

This course deals with sampling methods to monitor changes in insect abundance, strategies to develop and use forecasts to predict insect outbreaks, and modeling and system analysis to assess yield losses and effectiveness of control measures.

**(0606954) Pesticide Toxicology (3 Credit Hours)**

This course deals with toxicology: definition-elements. Measurement of toxicity, entry, distribution, storage, metabolism, induction and excretion of toxicants (pesticides), mechanism of toxic action: organochlorines, organophosphorus, carbamates, pyrethroids, others, selective toxicity. Recognition and management of pesticides poisoning in humans and animals: Terms: carcinogenicity, mutagenicity, teratology, reproduction etc.

**(0606955) Insect-Plant Relationship (3 Credit Hours)**

The course deals with insect finding of a host plant, feeding on plants, toxic substances in plants. It also emphasizes on host plant resistance to insects.

**(0606956) Immature Insects (3 Credit Hours)**

This course deals with immature insects is a course about the taxonomy of Exopterygota and Endopterygota immature insects. Students will learn morphological structures and monophyly unique to each of major orders, identify all immature insects to order and most to family on sight, identify all immature insects to family and some to genus or species with taxonomic keys and microscope. The biology, behavior, habitat, food, life history and physiology of some representative species will be discussed.

**(0606957) Herbicides (3 Credit Hours)**

This course deals with the herbicides, their physiological and biological effects, their mixtures and the extent of these mixtures in herbicide activation. The nature of herbicide chemical structure and its activity relation to plants, mechanism of action, biological changes and toxicity symptoms on plants. The fate of herbicide in plants and environment are also discussed. Certain lectures could be changed to practical.

**(0606958) Wild Medicinal Herbs (3 Credit Hours)**

The course deals with wild herbs in Jordan, their medicinal value, species, geographical location, ecology, active constituents, healing properties, and their importance as source for natural products of ecological importance. It deals also with the effect of plant chemicals on agricultural pests, and their possible use in pest management. Information on poisonous wild herbs and their medicinal and ecological importance are also discussed.

**(0606962) Nematode Taxonomy (3 Credit Hours)**

This course deals with the study of different theories and methods of nematode systematics. The practical part includes identification of nematode genera and certain species using diagnostic morphological keys. Also identification will be performed on the basis of differential host range test, electrophoretic and cytogenetical methods.

**(0606963) Ecology & Genetic Phytopathogenic Bacteria (3 Credit Hours)**

This course deals with the information about the different survival structures of bacteria under favorable and unfavorable environmental conditions in their environment. Also information on the basic and advanced information about genetics, diversity of bacteria, drug resistance, and the employment of bacteria in biological control is discussed.

**(0606964) Replication and Genetics of Plant Viruses (3 Credit Hours)**

The course deals with advanced information regarding virus variation, mechanisms of variation and genetics of plant viruses, plants that includes gene mapping. It also discusses the difficulties imposed by eukaryotic system on replication, survival and how plant viruses cope with these difficulties.

**(0606965) Fungal Taxonomy (3 Credit Hours)**

This course deals with the study of fungal taxonomy with the study of nomenclature terms and definitions, systematic literature, taxonomic procedures, use of identification keys, diagnostic morphological features of fungal classes with brief information about their sexual and asexual fruiting bodies.

**(0606972) Weed Ecology and Physiology (3 Credit Hours)**

The course covers weed biology including means of propagation and dissemination, ecological adaptations emphasizing weediness and persistence, various weed interferences, development of resistance to herbicides. Comparative ecophysiology of weeds and crops. The course includes some literature studies and presentation of research papers.

**(0606991) Seminar in Plant Protection (1 Credit Hour)**

The student collects information from local, regional and international scientific journals and books published in the last five years. The student presents the topic using suitable illustration facilities, followed by general discussion.