Department of Agricultural Sciences (AGSC)

Chairperson: Hamadeh, Shady
Professor Emeritus: Kawar, Nasri
Professors: Abou Jawdah, Yusuf; Bashour, Isam; Haidar, Mustapha; Saad, Adib
Research Professor: Nimah, Musa
Associate Professor: Chaaban, Jad
Assistant Professors: Chalak, Ali; Jaafar, Hadi

Graduate Programs

The graduate study program leading to the MS degree with a Thesis or Non-Thesis option is offered with a specialization in the following areas: Plant Science, Plant Protection, Irrigation, and Agricultural Economics.

The department of Agricultural Sciences offers stimulating graduate programs leading its graduates to successfully contribute to the research, education, and development of sustainable agricultural production and management in the region and preparing them for a productive career in Agricultural Technology, Natural Resources Management and Agribusiness. These students will then be capable of serving mainly in Lebanon, the Middle East and/or other regions in the world.

MS Degree in Agricultural Economics

Core Courses

AGSC 301  Statistical Methods in Agriculture  2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AGSC 325  Production Economics  3.0; 3 cr.
Focuses on the organization of farmers for higher income through improved resource use and competitive position.

AGSC 376  Resource and Environmental Economics  3.0; 3 cr.
Addresses and analyzes resource and environmental problems facing today’s society, with an emphasis on providing the student with an intensive introduction to the qualitative theory necessary for an effective analysis of resource problems.

AGSC 377  Economics of Water Resources  3.0; 3 cr.
This course applies the tools of neo-classical microeconomics to water resource planning and management. The primary focus of the course is on water problems within agriculture, but also examines issues related to the water needs of municipal usage, industry, and recreation/environmental purposes.
AGSC 384 Rural Social Change, Development and the Environment 3.0; 3 cr.
Provides an understanding of economic development and underdevelopment as it relates to environmental degradation and demographic, social and cultural change; with special application to the economies of the Middle East.

AGSC 389 Research Methods in Applied Economics 3.0; 3 cr.
Provides an overview of theoretical and applied research methods for the study of agricultural, resource and development economics issues. Prerequisite: AGSC 301.

AGSC 395 Graduate Seminar in Agricultural Science 1.0; 1 cr.

AGSC 396 Comprehensive Exam 0 cr.

AGSC 399 MS Thesis 9 cr.

### MS Degree in Irrigation

**Core Courses**

**AGSC 301 Statistical Methods in Agriculture** 2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

**AGSC 310 Advanced Soil Physics** 3.0; 3 cr.
Physical properties of soils in arid, semi-arid, and sub-humid regions; soil-water-plant-atmosphere relationships, plant water extraction, and evapotranspiration; salt and water flow in soils, soil heat flow, and modeling soil water extraction and evaporation.

**AGSC 326 Surface Irrigation Engineering** 3.0; 3 cr.
Principles of design, operation, and evaluation of surface irrigation systems; irrigation field design and field measurement techniques. Prerequisite: consent of instructor.

**AGSC 328 Sprinkler and Micro-Irrigation Engineering** 3.0; 3 cr.
Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems; pipeline economics, pump hydraulics, and pumping plant design considerations.

AGSC 395 Graduate Seminar in Agricultural Science 1.0; 1 cr.

AGSC 396 Comprehensive Exam 0 cr.

AGSC 399 MS Thesis 9 cr.

### MS Degree in Plant Protection

**Core Courses**

**AGSC 301 Statistical Methods in Agriculture** 2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

**AGSC 311 Advanced Principles and Methods in Plant Pathology** 2.3; 3 cr.
Serological and molecular diagnostic techniques, nucleic acids hybridization, PCR, marker assisted selection, brief review of physiology of host-pathogen relationships, and current methods of research including cloning and transgenic plants. Prerequisite: AGSC 232 or consent of instructor.
AGSC 3221 Plant Parasitic Fungi and Bacteria 2.3; 3cr.
Morphology, taxonomy, and identification of fungi and bacteria parasitic on plants. Prerequisite: AGSC 232. Alternate years.

AGSC 332 Plant-Pest Interactions 3.0; 3 cr.
Principles and factors involved in interactions between pests and their host plants; application of perspectives in chemical ecology to agricultural systems; effect of biotic and abiotic factors on the physiology, adaptation, and survival of pest populations in agroecosystems. Prerequisites: AGSC 221, AGSC 232, and AGSC 284.

AGSC 3882 Integrated Pest Management 3.0; 3 cr.
Principles and concepts of integrated pest management; monitoring and forecasting of pest population, tactics, strategies, and implementations of IPM in the agricultural ecosystems; and environmental, economic, and social implications of IPM. Prerequisites: AGSC 221, AGSC 232, and AGSC 284.

AGSC 395 Special Topics in Agricultural Science 1.0; 1 cr.
AGSC 396 Comprehensive Exam 0 cr.
AGSC 399 MS Thesis 9 cr.

Elective Courses
AGSC 300 Graduate Tutorial 1–3 cr.
Directed Study.

AGSC 307 Advanced Crop Production 3.0; 3 cr.
Theories and principles of plant growth, development, and responses to the environment, with an integrated approach to understanding crop productivity. Prerequisites: AGSC 220 and AGSC 231.

AGSC 319 Advanced Vegetable Production 3.0; 3 cr.
Physiological and genetic control of growth and management of vegetable plants and their products; effects of nutrition, irrigation, and other variables on crop performance and quality of produce; presentation and interpretation of recent research progress in vegetable production.

AGSC 323 Plant Virology 2.3; 3 cr.
Fundamental and practical aspects of plant virology including isolation, characterization, identification replication, and management of plant pathogenic viruses, including gene silencing and transgenic plants. Prerequisite: AGSC 232. Alternate years.

MS Degree in Plant Science

Core Courses*
AGSC 301 Statistical Methods in Agriculture 2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

---

1 Emphasis Plant Pathology
2 Emphasis Entomology and Weed Science
* 9 credits out of the marked courses are required core courses
AGSC 307*  Advanced Crop Production  3.0; 3 cr.
Theories and principles of plant growth, development, and responses to the environment, with an integrated approach to understanding crop productivity. Prerequisites: AGSC 220 and AGSC 231.

AGSC 308*  Plant Tissue Culture and Crop Improvement  2.3; 3 cr.
This course introduces students in the Agriculture program a sound understanding of the applied and scientific basis of micro propagation and in-vitro plant breeding.

AGSC 310*  Advanced Soil Physics  3.0; 3 cr.
Physical properties of soils in arid, semi-arid, and sub-humid regions; soil-water-plant-atmosphere relationships, plant water extraction, and evapotranspiration; salt and water flow in soils, soil heat flow, and modeling soil water extraction and evaporation.

AGSC 312*  Fertilizer Technology and Use  3.0; 3 cr.
Fertilizers in agricultural development, current developments in fertilizer technology, fertigation, and special problems associated with fertilizer use and research methodology in soil fertility. Prerequisite: AGSC 265.

AGSC 319*  Advanced Vegetable Production  3.0; 3 cr.
Physiological and genetic control of growth and management of vegetable plants and their products; effects of nutrition, irrigation, and other variables on crop performance and quality of produce; presentation and interpretation of recent research progress in vegetable production.

AGSC 324*  Methods of Soil and Plant Tissue Analysis  2.3; 3 cr.
Analytical techniques, operation of instruments in plant analysis and in physical, chemical, and mineralogical analysis of soils.

AGSC 395  Special Topics in Agricultural Science  1.0; 1 cr.
AGSC 396  Comprehensive Exam  0 cr.
AGSC 399  MS Thesis  9 cr.

Elective Courses
AGSC 300  Graduate Tutorial  1–3 cr.
Directed Study.

AGSC 311  Advanced Principles and Methods in Plant Pathology  2.3; 3 cr.
Serological and molecular diagnostic techniques, nucleic acids hybridization, PCR, marker assisted selection, brief review of physiology of host-pathogen relationships, and current methods of research including cloning and transgenic plants. Prerequisite: AGSC 232 or consent of instructor.

AGSC 322  Plant Parasitic Fungi and Bacteria  2.3; 3 cr.
Morphology, taxonomy, and identification of fungi and bacteria parasitic on plants. Prerequisite: AGSC 232. Alternate years.

AGSC 323  Plant Virology  2.3; 3 cr.
Fundamental and practical aspects of plant virology including isolation, characterization, identification replication, and management of plant pathogenic viruses, including gene silencing and transgenic plants. Prerequisite: AGSC 232. Alternate years.

* 9 credits out of the marked courses are required core courses
**AGSC 332**  
**Plant-Pest Interactions**  
3.0; 3 cr.  
Principles and factors involved in interactions between pests and their host plants; application of perspectives in chemical ecology to agricultural systems; effect of biotic and abiotic factors on the physiology, adaptation, and survival of pest populations in agroecosystems. **Prerequisites:** AGSC 221, AGSC 232, and AGSC 284.

**AGSC 388**  
**Integrated Pest Management**  
3.0; 3 cr.  
Principles and concepts of integrated pest management (IPM); monitoring and forecasting of pest population, tactics, strategies, and implementations of IPM in the agricultural ecosystems; and environmental, economic, and social implications of IPM. **Prerequisites:** AGSC 221, AGSC 232, and AGSC 284.

All AGSC graduate courses are electives to all majors upon the approval of the adviser.

**AGSC 300**  
**Graduate Tutorial**  
1-3 cr.  
*Directed Study*

**AGSC 302**  
**Scientific Communication**  
1.2; 2 cr.  
The course covers the techniques of developing manuscripts, posters, and oral presentations.

**AGSC 309**  
**Drainage of Agricultural Lands**  
3.0; 3 cr.  
Soil properties, porous media flow, hydraulic conductivity measurement, soil leaching requirements, drainage investigations, and surface and subsurface drainage system design.

**AGSC 316**  
**Ground Water Hydrology**  
3.0; 3 cr.  
Occurrence, storage, distribution, and movement of groundwater; confined and unconfined aquifer properties, well-aquifer hydraulics and relationships, and ground water basin management.

**AGSC 317**  
**Surface Water Hydrology**  
3.0; 3 cr.  
Relevant statistical concepts and extreme event distributions, rainfall frequency analysis, rainfall-runoff relationships, unit hydrograph theory, overland flow routing, and stochastic processes in hydrology.

**AGSC 320**  
**Project Planning and Management**  
3.0; 3 cr.  
Project preparation, evaluation, and management. **Alternate years.**

**AGSC 326**  
**Surface Irrigation Engineering**  
3.0; 3 cr.  
Principles of design, operation, and evaluation of surface irrigation systems; irrigation field design and field measurement techniques. **Prerequisite:** consent of instructor.

**AGSC 328**  
**Sprinkler and Micro-Irrigation Engineering**  
3.0; 3 cr.  
Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems; pipeline economics, pump hydraulics, and pumping plant design considerations.

**AGSC 376**  
**Resource and Environmental Economics**  
3.0; 3 cr.  
Addresses and analyzes resource and environmental problems facing today's society, with an emphasis on providing the student with an intensive introduction to the qualitative theory necessary for an effective analysis of resource problems.