Department of Agriculture (AGRI)

Chairperson: Hamadeh, Shady
Professor Emeritus: Kawar, Nasri
Professors: Abou Jawdah, Yusuf; Barbour, Elie; Bashour, Isam; Farran, Mohamad; Haidar, Mustafa; Hamadeh, Shady; Saad, Adib
Associate Professor: Chaaban, Jad
Assistant Professors: Chalak, Ali; Jaafar, Hadi; Prattis, Susan
Visiting Professor of Practice: Sawwan, Jamal
Visiting Assistant Professor: Abebe, Gumataw

Undergraduate Program

The Department of Agricultural Sciences offers a multidisciplinary program with the objective of training students in the various theoretical and practical aspects of agricultural sciences and agribusiness. Department graduates are prepared to successfully contribute to the agricultural research, business, and education programs in the region.

The department offers two programs, one leading to a BS degree in Agricultural Sciences and the Diploma of Ingénieur Agricole, and the other leading to a BS degree in Agribusiness.

The Agriculture (AGSC) program prepares students to address current agricultural issues at the regional and global levels using their scientific knowledge to improve production and protect the environment. The department provides practical and up-to-date knowledge in plant production, plant health management, and conservation of water and energy, and trains students to become skilled farm operators and managers who are innovative and responsive to the local and regional needs and who are capable of adapting to market changes and rising production costs.

Undergraduate courses are offered in the areas of agronomy, agro-chemicals, agricultural machinery, entomology, horticulture, irrigation, plant health management, plant breeding, plant pathology, soils, weed science, agricultural economics, and rural development. In addition, the program covers animal agriculture including nutrition, physiology, management, and production. Introductory courses in these subjects are offered to agriculture students within the framework of a core curriculum. Specialized and advanced courses are also offered as electives to undergraduates.

The Agribusiness (AGBU) program combines the study of management with agricultural science in order to provide students with an understanding of the economic and business principles that underlie management tools and their application to agricultural and related businesses. The educational objectives of the AGBU program are to prepare students to become entrepreneurs, business leaders, skilled farm operators, and future policy advisers who are well-grounded in agriculture and food production, capable of communicating and using their skills in order to improve their livelihood and that of their community.

Undergraduate courses are offered in the areas of agriculture, business management and accounting, marketing, agriculture economics, entrepreneurship, and rural development. Specialized and advanced courses are also offered as electives to undergraduates.
Course Descriptions

Core Courses for the BS Degree in Agriculture

AGSC 201  Orientation to Agriculture and Food Systems  2.0; 2 cr.
This course provides students with a basic introductory knowledge about the various
disciplines and related subjects in the Faculty of Agricultural and Food Sciences. It covers
the various aspects of agricultural production and development including natural resources,
plant sciences, plant health management, animal production and management, agribusiness,
nutrition and food sciences; and landscape design and eco-management.

AGSC 212  Microeconomic Theory of Food and Farming  3.0; 3 cr.
The course introduces economic principles, which are then used to explain the production of
goods and services, household behavior, economic equilibrium and the welfare consequences
of alternative exchange mechanisms. Special applications will be given to decision-making
and the allocation of resources for the agricultural firm, and consumer behavior and demand for
agricultural and food products. Fall and spring.

AGSC 215  Introduction to Soils  2.3; 3 cr.
Origin, properties, classification, and management of soil with emphasis on soil behavior
in relation to irrigated agriculture, ecology, and the environment. Prerequisite: CHEM 200 or
equivalent.

AGSC 220  Principles of Plant Physiology  2.3; 3 cr.
An introduction to environmental and physiological factors affecting crop growth and
development. Prerequisite: BIOL 200.

AGSC 221  Principles of Entomology  2.3; 3 cr.
Insect morphology, anatomy, classification, and biology in relation to pest control in
agroecosystems. Prerequisite: BIOL 200.

AGSC 222  Farm Practices  0.6; 1 cr.
Practical experience in operational activities and management decisions essential in modern
agriculture. Prerequisites: AGSC III standing and eligibility for enrollment in the regular program
at AREC.

AGSC 223  Agricultural Project  0.6; 2 cr.
Directed study with field and laboratory work. Prerequisites: AGSC III standing and eligibility for
enrollment in the regular program at AREC.

AGSC 224  General Horticulture  2.3; 3 cr.
Principles and practices in the production of fruits, ornamentals, and vegetables.

AGSC 225  Rural Social Systems in Agricultural and Rural Development  3.0; 3 cr.
An examination of institutional and sociological problems of rural areas; influence of rural
institutions on rural development.
AGSC 226  Farm Power and Machinery  2.3; 3 cr.
Internal combustion engines, power trains, drawbar performance, stability, and safe operation of tractors; functional requirements, principles of operation, performance evaluation, and selection of farm machinery.

AGSC 227  Surveying and Irrigation Principles  0.3; 1 cr.
Topographic surveying, irrigation methods evaluation, soil physical properties, soil water, and water flow measurement.

AGSC 228  Irrigation Principles  2.3; 3 cr.
Surveying, land preparation, water measurement, conveyance and application, pumping, drainage and soil-water relationships; introduction to farm irrigation methods.

AGSC 231  Principles of Agronomy  2.3; 3 cr.
Principles and cultural practices in the production of field crops.

AGSC 232  Principles of Plant Pathology  2.3; 3 cr.
Fundamentals and practical aspects of plant diseases, their causes, and control.

AGSC 235  Agricultural Extension in Development  2.0; 2 cr.
A comparative study of developmental philosophy, objectives, and adaptation to developing countries; principles and methods of extension and adult teaching. Prerequisite: AGSC 225.

AGSC 241  Farm Management  3.0; 3 cr.
A course that focuses on the application of modern principles and techniques of management to the farm sector. Prerequisite: AGSC 212 or ECON 203.

AGSC 265  Soil Fertility  2.3; 3 cr.
Behavior of native and applied fertilizer elements in soils in relation to crop production, soil fertility evaluation, fertilizer manufacture, fertilizer application in irrigation systems, and economics of fertilizer use. Prerequisite: AGSC 215.

AGSC 284  Fundamentals of Weed Science  2.3; 3 cr.
Fundamentals of weed ecology and weed management practices with emphasis on chemical weed control and integrated weed management systems.

AGSC 290  Project Planning and Appraisal  3.0; 3 cr.
Introduces different techniques commonly used in project planning and appraisal.

AGSC 296  Agriculture Project Presentation  1 cr.
Prerequisite: AGSC IV standing.

AVSC 222  General Livestock Production  2.3; 3 cr.
Modern principles and practices in beef, sheep, and dairy production and reproduction.
AVSC 224  Agricultural Microbiology  2.3; 3 cr.
A course that covers basic and applied microbiology. The basic microbiology includes bacteriology, virology, parasitology, and immunology, and the applied microbiology includes veterinary, soil, water, and food microbiology.

AVSC 226  Poultry Production  2.3; 3 cr.
Modern principles and practices in poultry production with special emphasis on Middle Eastern conditions. Prerequisite: AVSC 271.

AVSC 243  Genetics  3.0; 3 cr.
Principles of inheritance, with an introduction to modern genetics.

AVSC 271  Animal Nutrition  3.0; 3 cr.
Structure and functioning of digestive systems of livestock and poultry; bioenergetics, nutritional deficiencies, and nutrient requirements of farm animals. Prerequisite: NFSC 261.

AVSC 275  Anatomy and Physiology of Farm Animals  3.0; 3 cr.
Systematic anatomy and physiology of farm animals.

Elective Courses for the BS Degree in Agriculture

AGSC 219  Apiculture  2.3; 3 cr.
The course introduces the basics of the honeybee world by exploring the natural history of apiculture, honeybee biogeography and evolution, biology, social structure, natural enemies, hive products and pollination dynamics. It illustrates the ecological aspects of one of nature’s most fascinating creatures under the looming environmental degradation and focuses on hands-on beekeeping activities.

AGSC 250  Organic Farming  1.2; 3 cr.
Advances in organic farming and growing systems with emphasis on farm planning, certification, marketing, information, and organic farming practices.

AGSC 251  Vegetable Production  3.0; 3 cr.
The course introduces students in the Agriculture program to a good scientific and hands on practical knowledge of vegetable production. Students will also gain an understanding of the physiological controls on vegetable crop yield under protective and local environments. They will become familiar with the current sources of information available to produce and develop production management skills through the production vegetables. Practical sessions will guide the students to understand different vegetable crop production techniques used in Lebanon and worldwide.

AGSC 252  Conservation Agriculture  2.3; 3 cr.
The course is an introduction to conservation agriculture. Options and suitable agricultural techniques which enhance the amount of water and organic matter in the soil and reduce erosion and pests will be discussed. Prerequisites: AGSC 215, AGSC 231, and AGSC 284.
AGSC 262  Introduction to Irrigation Methods  3.0; 3 cr.  Innovative methods for the design of irrigation systems including micro-irrigation, sprinkle irrigation, and surface irrigation. Conceptual and detailed design of irrigation networks and system components from the professional perspective. **Prerequisite:** AGSC 228 or AGSC 202.

AGSC 293  Integrated Plant Health Management for Economic Crops  3.0; 3 cr.  Basic concepts of the integrated approach to the proper management of plant diseases and insect pests of economic crops including components of plant health management (PHM) programs, and the feasibility and economics of various management strategies; specific PHM cases on major crops are discussed. **Prerequisites:** AGSC 221 and AGSC 232.

AGSC 294  Applied Plant Protection  2.3; 3 cr.  Observations and study of major insect pests and plant diseases on field and greenhouse crops, with emphasis on recognition, identification, and management. **Prerequisites:** AGSC 221 and AGSC 232, or equivalent.

AGSC 295  Pesticides  3.0; 3 cr.  A survey of the commonly used insecticides, fungicides, rodenticides, and related materials as to their chemistry, mode of action, and relation of structure to activity, toxicity, metabolism, and hazards to the environment.

AGSC 299  Special Topics in Agricultural Science  2 cr.  Directed study. Tutorial. **Prerequisites:** Fourth year standing and consent of instructor.

AVSC 230  Animal Health and Diseases  3 cr.  Introduces students of varying backgrounds to principles of Animal Biological and Health Sciences. Presents selected different commensal and pathogenic organisms causing common symptomatic and asymptomatic diseases; signs of health and disease specific to different domestic, marine mammal, fish and wildlife animal species; epidemiology of disease incidence; immunology, immune competence vs. tolerance, and vaccination principles; emerging animal diseases; monitoring disease incidence using surveillance techniques; vector biology; and methods used to prevent disease occurrence including principles of management, environmental modification and nutritional support. **Free elective.**

AVSC 241  Principles of Dairying  2.3; 3 cr.  Management, housing, feeding, breeding, and record-keeping in dairy production.

AVSC 242  Small Ruminant Production in Arid Regions  2.3; 3 cr.  Breeding, feeding, and management of sheep and goats under arid conditions.

AVSC 276  Animal Physiology Laboratory  0.3; 1 cr.  **Pre- or corequisite:** AVSC 275.

AVSC 277  Animal Breeding  2.0; 2 cr.  Principles of permanent improvement of animal and poultry production. **Prerequisite:** AVSC 243 or BIOL 223.

AVSC 278  Feeds and Feeding  2.3; 3 cr.  Characteristics, conservation, and preparation of feeds; feeding of various classes of livestock.
AVSC 279  
**Companion Pet Birds and Animals**  
3.0; 3 cr.  
Breed and stock selection, equipment, stocking densities, routine management, rearing, feeding, behavior and interaction with humans, optimum production, and health care of pet birds and pet animals. *Free elective.*

AVSC 280  
**Aquarium, Marine, and Farming Fish**  
3.0; 3 cr.  
A course that covers the different fishing techniques, fish farming, characteristics of fish, comparison of classes of fish, the setup of fresh water and marine aquariums, and the common diseases of fish. *Free elective.*

AVSC 281  
**Production of Novel Avian Species**  
3.0; 3 cr.  
Management practices in the production of economically beneficial avian species other than the domestic chicken (e.g., ratites, turkey, water fowl, and others.) *Free elective.*

AVSC 282  
**Pet Birds and Animals**  
3.0; 3 cr.  
A course that describes the anatomy and physiology of pets belonging to mammalia, reptilia, aves, and osteichthyes. The history, classification, breeds, selection, rearing, feeding, production, and health of sixteen pets will be studied. *Prerequisite: BIOL 200.*

AVSC 299A  
**Special Topics in Animal Sciences for Agriculture program**  
2 cr.  
Directed study. Tutorial. *Prerequisites: Fourth year standing and consent of instructor.*

**Core Courses for the BS Degree in Agribusiness**

AGSC 202  
**Introduction to Land and Water Resources**  
2.3; 3 cr.  
Develop an understanding of current issues in land and water resources, including: soil and water conservation and management; land classification and reclamation; soils and environmental quality; sustainable agro-ecosystems. *Prerequisite: AGSC 204.*

AGSC 203  
**Crop Production and Protection**  
2.3; 3 cr.  
The course provides an overview of the technologies used in the production of crops. The student will acquire a knowledge and understanding of current crop production systems, the end market requirements for products as well as the quality standards of these products. Students will also learn current techniques in crop protection and yield management.

AGSC 204  
**Natural Sciences for Agribusiness**  
3.0; 3 cr.  
This course is an introduction to chemistry and biology designed for first year agribusiness students. It aims to familiarize students with the basic concepts and theoretical principles of modern chemistry and biology. Students will gain an appreciation of the importance that biology and chemistry play in our natural lives.

AGBU 210  
**Marketing in Agribusiness**  
3.0; 3 cr.  
An overview of marketing activities in Agro-food industries, including marketing inputs in strategic planning, global marketing, marketing research, analysis of buyer behavior, market segmentation and positioning, and development of the marketing mix elements. *Prerequisite: Junior status standing.*
AGBU 211  Introduction to Agricultural Issues and Policies  3.0; 3 cr.
Survey of global food and agricultural issues. Covers: role of agriculture in economic
development; trade in food and agricultural products; global food production, consumption
and marketing patterns; economics of technical change and food assistance; agriculture and
the environment.

AGSC 212  Microeconomic Theory of Food and Farming  3.0; 3 cr.
The course introduces economic principles, which are then used to explain the production of
goods and services, household behavior, economic equilibrium and the welfare consequences
of alternative exchange mechanisms. Special applications will be given to decision-making
and the allocation of resources for the agricultural firm, and consumer behavior and demand for
agricultural and food products.

AGBU 213  Legal Aspects of Agribusiness  3 cr.
The main objective of the course is to help Agribusiness students understand the Lebanese and
American legal aspects of common agricultural business activities, as well as the formation
and function of Agri-commercial companies and related ethical principles. Prerequisite: Junior
status standing.

AGBU 229  Entrepreneurship in Agriculture  3.0; 3 cr.
Integration of production, marketing, accounting, finance, agricultural policy, human behavior,
and business environment concepts in management of agricultural businesses using the
compilation by students of agribusiness plans. Prerequisite: Junior status standing.

AGBU 236  New Trends in Agricultural and Food Systems  3.0; 3 cr.
Current trends in agricultural trade; developments in private sector markets and in public
policy; the concerns related to the effects of agricultural trade on the environment, food
security, and regional development. The course will also address the issue of the challenges
to food exporters from developing countries posed by the need to comply with ever-stricter
standards. The course will also cover the global market structures of the agricultural products
most relevant to the Mediterranean countries and the experience and present thinking about
the pros and cons of the spread of genetically modified products, designation of origins and
other food labeling mechanisms. Prerequisite: Senior status in Agribusiness.

AGBU 239  Agribusiness Communication Skills Workshop  0 cr.
A ten-hour workshop designed to introduce students to the various communication skills
needed in a typical work environment. Mastering these skills plays a profound role in shaping
and advancing professional careers in all types of industries and work scopes. The workshop
introduces specific guidelines for the effective use of a variety of communication skills in the
workplace in an interactive manner, simulating the work environment.

AGBU 240  Career Planning Workshop for Agribusiness  0 cr.
A ten-hour workshop designed to build awareness of changing career patterns and major
personal and professional influences that impact future careers. Issues such as preparation for
joining the labor market, basic career guidance, understanding career stages, and practicing
self-assessment are emphasized. Prerequisite: Junior status standing.
AGBU 248  Operation Management for Agribusiness  3 cr.
This course covers the essentials of supply chain management and quantitative techniques needed for the planning and implementation of agribusiness operations. This course includes optimization of production and cost minimization. Prerequisite: Senior status standing.

AGSC 253  Harvest and Post-harvest Issues and Strategies  3.0; 3 cr.
Discuss: the structure of the agricultural harvesting and marketing system with emphasis on factors determining farm level prices; emphasizes how markets coordinate consumer desires and producer costs through marketing channels; impact of market structure, grades, information, product form, and advertising on farm prices; International trade impact on producers, consumers, agribusiness, and government. Prerequisites: AGSC 202, AGSC 203, and AGSC 212.

AGBU 255  Field Study of the Rural Agro-economy  3.0; 3 cr.
Tours of agribusiness enterprises and rural farms in Lebanon are organized with the intent to observe the management and marketing practices used in successful operations of different agribusiness structures. Students will also learn how the agriculture value chain is structured within the rural economy. Prerequisites: AGSC 202 and AGSC 203.

AGBU 256  Summer Internship  1 cr.

AGBU 292  Agribusiness Final Year Project  5.0; 5 cr.
Milestone course for students in Agribusiness. Application of concepts, tools, and principles including management, finance, marketing, economic theory, and quantitative methods to applied agricultural decisions on selected agricultural and agribusiness projects that enhance team-building as well as written, and oral communication skills. Prerequisite: Senior status standing.

AVSC 220  Livestock Production  3.0; 3 cr.
The course is divided into three main sections. The first section introduces the types and breeds of livestock, terminology, methods, management systems, techniques of animal production and consumer impact. The second section introduces the students to the modern management practices required for the production of economically beneficial avian species including the domestic chickens, turkeys, water fowls, game birds and others. The third section discusses the nature of economic diseases in domestic animals and avian species and the regulations of World Trade Organization in import and export of animals, including rules that prevent the trans boundary transmission of microbes causing economic diseases.

Elective Course for the BS in Biology

AVSC 213/BIOL 290 AW  Comparative Animal Anatomy  3.2; 4 cr.
Comparative Anatomy is the study of differences in structure, form, and function among humans, invertebrate and vertebrate animals. This course is broad in scope and will examine anatomy within the unifying framework of form, function, and molecular evolutionary morphology using textbook and primary journal article readings, specimens, and fossil examination, with laboratory anatomic dissection. This course will lay a foundation for further graduate work and so is most helpful for students interested in biomedical and veterinary medical studies, physical and biological anthropology, agriculture and biodiversity, and evolutionary biology.