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1 The Faculty

1.1 Location

McGill University, Macdonald Campus
 21,111 Lakeshore Road
 Sainte-Anne de Bellevue, QC H9X 3V9
 Canada

Telephone: (514) 398-7928

Website: <http://www.macdonald.mcgill.ca>

The Faculty of Agricultural and Environmental Sciences, and the School of Dietetics and Human Nutrition are located on the Macdonald Campus of McGill at Sainte-Anne de Bellevue at the western end of Montreal Island. It is served by public transport (M.U.C.T.C. bus and train) and is easily reached from the McGill Downtown Campus and from Dorval International airport.

1.2 Administrative Officers

DEBORAH J.I. BUSZARD, B.Sc.(Bath), Ph.D.(Lond.) **Dean,
 Faculty of Agricultural and Environmental Sciences,
 and Associate Vice-Principal (Macdonald Campus)**

WILLIAM H. HENDERSHOT, B.Sc.(Tor.), M.Sc.(McG.),
 Ph.D.(U.B.C.) **Associate Dean (Academic)**

ERIC R. NORRIS, B.S.A.(Tor.), M.Sc.(Guelph),
 Ph.D.(Mich. St.) **Associate Dean (Student Affairs)**

MARCEL J. COUTURE, B.Sc.(Agr.)(McG.), M.Sc.(Guelph)
Associate Dean (Community Relations)

DIANE E. MATHER, B.Sc.(Agr.)(McG.), M.Sc.,
 Ph.D.(Guelph) **Associate Dean (Research)**

GARY O'CONNELL, B.Comm.(C'dia) **Director of
 Administrative Services**

WILLIAM R. ELLYETT, B.A.(Sir G. Wms.),
 B.Ed.(Phys.Ed.)(McG.) **Director of Athletics**

TBA **Director of Macdonald Farm**

GINETTE LEGAULT **Manager, Campus Housing**

SUZANNE HIGGINS, B.A.(McG.) **Manager,
 Student Affairs Office**

PETER D.L. KNOX, B.Sc.(Agr.)(McG.) **Supervisor,
 Property Maintenance**

1.3 Programs and Academic Units

The Faculty of Agricultural and Environmental Sciences and the School of Dietetics and Human Nutrition offer B.Sc., M.Sc. and Ph.D. programs in the areas of study of: Agricultural Sciences, Environmental Sciences, Biological Sciences, Food Science, Engineering and Nutritional Sciences. The Faculty of Agricultural and Environmental Sciences is also one of the three faculties in partnership with the McGill School of Environment.

The Faculty is comprised of eight academic units: the School of Dietetics and Human Nutrition; the departments of Agricultural and Biosystems Engineering, Agricultural Economics, Animal Science, Food Science and Agricultural Chemistry, Natural Resource Sciences, and Plant Science; and the Institute of Parasitology.

The School offers programs in dietetics and nutrition, the former leading to membership in various professional associations. Professional Practice experiences to complete the dietetics practicum are provided in the McGill teaching hospitals and in a wide variety of health, education, business, government and community agencies.

The Institute offers graduate programs leading to M.Sc. and Ph.D. degrees as well as a Graduate Certificate in Biotechnology. Major areas of research include the molecular biology, immunology, and population biology of parasites and their hosts and the biochemical pharmacology of antiparasite drugs. The underlying orientation of all research is to apply relevant modern biological techniques to reduce parasite

transmission and to improve methods of diagnosis and control.
The research background and activities of the staff encompass
many disciplines applied to the study of host-parasite interactions,

Bachelor of Science in Nutritional Sciences - B.Sc.(Nutr.Sc.)

Two programs are offered by the School of Dietetics and Human Nutrition, a three-year (90 credit) program for Nutrition and a three and one-half year (115 credit) program for Dietetics, following the Diploma of Collegial Studies.

Dietetics (School of Dietetics and Human Nutrition, [page 445](#))

Nutrition (School of Dietetics and Human Nutrition, [page 446](#))

Nutritional Biochemistry Option

Nutrition and Populations Option

Nutrition of Food Option

Bachelor of Science - B.Sc.

This is a three-year (90 credit) program following the Diploma of Collegial Studies.

Environment (McGill School of Environment, [page 476](#))

2.1.2 Minor Programs

Agricultural Economics (Agricultural Economics, [page 443](#))

Agricultural Engineering (Agricultural and Biosystems Engineering, [page 441](#))

Agricultural Production (Plant Science, [page 453](#))

Ecological Agriculture (Interdisciplinary Studies, [page 447](#))

Entrepreneurship (Agricultural Economics, [page 443](#))

Environment (McGill School of Environment, [page 472](#))

Environmental Engineering (Agricultural and Biosystems Engineering, [page 441](#))

Human Nutrition (School of Dietetics and Human Nutrition, [page 446](#))

2.1.3 Certificate Program

Ecological Agriculture (Ecological Agriculture Program, [page 447](#))

2.1.4 Diploma Programs

Farm Management and Technology Program,

a major role in the management of information, and process control in many of the above technologies. A non-professional Minor in Agricultural Engineering, consisting of 24 credits of Agricultural and Biosystems Engineering courses is available for students registered in the B.Sc.(Agr.) and B.Sc.(F.Sc.) programs. A total of 18 credits of required Agricultural and Biosystems Engineering courses will demonstrate basic engineering applications. Selection of 6 complementary credits from a wide range of Agricultural and Biosystems Engineering courses will allow more focused study in one of the 6 streams of Agricultural Engineering, viz. Agro-Environmental; Irrigation and Drainage; Agricultural Machinery and Buildings; Food and Bio-Processing; and Information and Computing Technologies.

Students are advised to consult their Major Program adviser and the Academic Adviser of the Minor in their first year. At the time of registration for their penultimate year, students must declare their intent to obtain a Minor in Agricultural Engineering. With the agreement of their Major Program adviser they must submit their program of courses already taken, and to be taken in their final year, to the Academic Adviser of the Agricultural Engineering Minor. The Academic Adviser of the Agricultural Engineering Minor will then certify which courses the student will apply toward the Minor and that the student's program conforms with the requirements of the Minor.

General Regulations

To obtain a Minor in Agricultural Engineering, students must:

- a) ensure that their academic record at the University includes a C grade or higher in the courses as specified in the course requirements given below.
- b) offer a minimum total of 24 credits from the courses as given below, of which not more than 6 credits may be counted for both the Major and the Minor programs. This restriction does not apply to elective courses in the Major program.

Required Courses: 18 credits.

Complementary Courses: 6 credits.

pkfP

Lecturers — Lynda Fraser (PT), Linda Jacobs Starkey, Maureen Lucas, Joane Routhier Mayrand, Sandy Phillips, Hugues Plourde, Heidi Ritter, Donna Schafer, Richard Stojak (PT)

Adjunct Professors — Kevin A. Cockell, Jeffrey S. Cohn, Shi-Hsiang Shen

Cross-Appointed Staff —

Food Science and Agricultural Chemistry: Selim Kermasha
Medicine: Louis Beaumier, Franco Carli, Katherine Cianflone, Réjeanne Gougeon, L. John Hoffer, Errol Marliss, Jean-François Yale

Parasitology: Marilyn E. Scott

Psychiatry: Simon Young

Health and well-being of individuals in relation to food choices and physiological status prevails as the unifying theme of the programs in the School of Dietetics and Human Nutrition. The availability of food, normal metabolism and clinical nutrition, community nutrition at the local and international level, the evaluation of nutritional products and their use in nutrition, and the communication of information about food and health form the core of academic programs.

DIETETICS MAJOR

Academic Advising Coordinator:

Linda Jacobs Starkey, Ph.D., RD, FDC

Graduates are qualified for challenging professional and leadership positions related to food and health, as dietitians, nutritionists and food administrators. The designations "Dietitian" and "Nutritionist" are reserved titles in the province of Quebec. As clinical nutritionists, dietitians may work in health and food service centres and hospitals, nutrition counselling centres, clinics and private practice. As community nutritionists, dietitians are involved in nutrition education programs through schools, sports centres and local and international health agencies. The dietitian in the food service sector participates in all aspects of management to assure quality food products. Postgraduate programs are available to qualified graduates. The duration of the program is three and one-half years. Successful graduates are qualified for membership in Dietitians of Canada and the Ordre professionnelle de diététistes du Québec. Forty weeks supervised professional experience in clinical and community nutrition and food service systems management are included.

Required Courses: 103 credits.

Note: The School firmly applies prerequisite requirements (with C grade as pass) for registration in all required courses in the Dietetics Major.

Complementary Courses: 6 credits.

Electives: 6 credits, selected in consultation with an Academic Adviser, to meet the minimum 115-credit requirement for the degree.

All required and complementary courses must be passed with a minimum grade of C.

Complementary Courses (6 credits)

Electives (6 credits)

Elective courses should be chosen in consultation with the academic adviser. The following courses most often fit the timetable; elective choice is not limited to these courses.

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be received prior to commencement of each level of Stage. There are no exceptions possible.

NUTRITION MAJOR

Academic Advising Coordinator: Kristine G. Koski

This Major covers the many aspects of human nutrition and food and gives first, an education in the scientific fundamentals of these disciplines and second, an opportunity to develop specialization in nutritional biochemistry, nutrition and populations or nutrition of food. Graduates normally will continue on to further studies preparing for careers in research, medicine or as specialists in nutrition. Research nutritionists, aside from working as university teachers and researchers, may be employed by government and

6.5 Department of Food Science and Agricultural Chemistry

Macdonald Stewart Building – Room MS1-034
Telephone: (514) 398-7898
Email: foodscience@macdonald.mcgill.ca
Website: <http://agrenv.mcgill.ca/foodscience/>

Chair — Inteaz Alli

Professors — Inteaz Alli, William D. Marshall, James P. Smith,
Frederik R. Van De Voort

Associate Professors — Ashraf A. Ismail, Selim Kermasha,
Hosahalli Ramaswamy, Benjamin K. Simpson,

with at least 3 credits chosen from: 3-6
 373-521B (3) Soil Microbiology & Biochemistry
 372-490J (3) Plan global de fertilisation
 and the remaining credits to be chosen from: 15-18
 260-270A (3) Ethics and the Environment
 330-435A (3) Soil and Water Quality Management
 330-491G (3) Co-op Experience
 334-333A (3) Resource Economics
 344-205B (3) Principles of Ecology
 349-311B (3) Ethology
 350-452B (3) Biocontrol of Insect Pests
 367-300B (3) Cropping Systems
 367-361B (3) Pest Management & the Environment
 367-434B (3) Weed Biology and Control
 367-460A (3) Plant Ecology
 373-331B (3) Microbial Ecology
 374-410A (3) The Forest Ecosystem
 375-375B (3) Issues in Environmental Sciences
 382-512B (3) Herbs and Phytochemicals

a minimum of 3 credits, one Animal Production course from the following:
 342-301A (3) Principles of Animal Breeding
 342-312B (3) Animal Pathology
 342-324A (3) Animal Reproduction
 342-450A (3) Dairy Cattle Production
 342-452B (3) Beef Cattle and Sheep Production
 342-454B (3) Swine Production
 342-456A (3) Poultry Production

a minimum of 3 credits from the following Plant Production courses:
 367-300B (3) Cropping Systems
 367-305A (3) Plant Pathology
 367-310A (3) Plant Propagation
 367-322B (3) Greenhouse Management
 367-331A (3) Field Crops
 367-341A,B (1) Horticulture – The Alliums
 367-342A,B (1) Horticulture – Perennial Vegetable Crops
 367-343A,B (1) Horticulture – Root Crops
 367-344A,B (1) Horticulture – Salad Crops
 367-345A,B (1) Horticulture – Solanaceous Crops
 367-346A,B (1) Horticulture – Temperate Tree Fruits
 367-347A,B (1) Horticulture – Small Fruits
 367-421A (3) Landscape Plant Materials
 367-434B (3) Weed Biology and Control
 367-525A (3) Advanced Micropropagation

a minimum of 3 credits, one Soil Science course from the following:
 372-315B (3) Soil Fertility and Fertilizers
 372-326A (3) 3HZhD7RaowiBDirIzZNhpropagation

Notes:

- 1) Most courses listed at the 30 0level and higher have prerequisites. Although instructors may waive prerequisite(s) in some cases, students are urged to prepare their program of study to ensure that they have met all conditions.
- 2) Not all courses are available in any given year. Consult departmental listings for full course descriptions and offerings.
- 3) Students using 330-491G towards the requirements of the Certificate/Minor are limited to an experience on farms or other enterprises that are either organic, biodynamic, or practicing permaculture. The placement must be approved by the academic adviser for the Certificate/Minor.
- 4) 373-521B is an alternate year course.

AGRICULTURAL SCIENCES MAJOR

Professor K.A. Stewart
 Raymond Building Room R2-022A
 Telephone: (514) 398-7851 ext. 7872

The Agricultural Sciences program is designed to provide a general scientific and applied background for modern agriculture without the requirements for a specialized program and to develop an appreciation of applied agriculture in its on-farm environment. Graduates may be employed in agri-business, agricultural extension and communications, sales and marketing, teaching or farm management. This program leads to accreditation from the Ordre des agronomes du Québec.

Required Courses: 36 credits.

Complementary Courses: 36 credits.

Electives: selected in consultation with Academic Adviser, to meet the minimum 90-credit requirement for the degree.

CREDITS

Required Courses:	36
330-495D,N Seminar and Assignment	2
333-211A Biochemistry I	3
334-200A Principles of Microeconomics	3
342-250A Principles of Animal Science	3
344-202B Cellular Biology	3
350-452B Biocontrol of Insect Pests	3
356-204A Genetics	4
360-310A,B Statistical Methods I	3
362-230B The Microbial World	3
367-211A Principles of Plant Science	3
372-210A Principles of Soil Science	3
375-375B Issues in Environmental Sciences	3

Complementary Courses: 36

at least one of:

- 342-323A (4) Mammalian Physiology
- 367-353B (4) Plant Structure and Function

360-310A,B	Statistical Methods I	3
367-201B	Comparative Plant Biology	3
375-375B	Issues in Environmental Sciences	3

Complementary Courses: 30

a minimum of 30 credits selected from the following list in consultation with the Academic Adviser

338-201A	(3) Introductory Meteorology	
349-307A	(3) Natural History of the Vertebrates	
349-311B	(3) Ethology	
349-313B	(3) Zoogeography	
349-315A	(3) Science of Inland Waters	
360-306A	(3) Mathematical Methods in Ecology	
362-230B	(3) The Microbial World	
367-358A	(3) Flowering Plant Diversity	
367-460A	(3) Plant Ecology	
372-200B	(3) Introduction to Earth Science	
372-210A	(3) Principles of Soil Science	
373-331B	(3) Microbial Ecology	
373-496D,N	(3) Project	
374-410A	(3) The Forest Ecosystem	
374-420B	(3) Environmental Issues in Forestry	
375-333A	(3) Physical and Biological Aspects of Pollution	
375-401A	(4) Fisheries and Wildlife Management	
375-410B	(3) Wildlife Ecology	
375-437B	(3) Assessing Environmental Impact	
375-475B	(3) Desert Ecology	

With the permission of the Academic Adviser, ecological or environmental courses offered on the Downtown Campus may be substituted for those appearing in the above list of Complementary Courses.

MICROBIOLOGY MAJOR

Academic Advisers: Professors D. Niven (U1), B.T. Driscoll (U2), E. Idzia k(U3)

Students receive training in fundamental principles and applied aspects of Microbiology. Successful graduates are competent to work in university, government and industrial research laboratories and in the pharmaceutical, fermentation and food industries.

Required Courses: 60 credits.

Electives: to meet the minimum requirement of 90 credits for the degree; chosen in consultation with the Academic Adviser.

	CREDITS
Required Courses:	60
333-211A	Biochemistry I 3
333-212A	Biochemistry Laboratory 2
344-200A	Biology of Organisms 3
344-202B	Cellular Biology 3
344-205B	Principles of Ecology 3
349-424B	Parasitology 3
356-204A	Genetics 4
360-310A,B	Statistical Methods I 3
362-200A	Laboratory Methods in Microbiology 3
362-230B	The Microbial World 3
362-337D,N	Frontiers in Microbiology 1
362-341A	Mechanisms of Pathogenicity 3
362-492D,N	Project 5
362-495D,N	Seminar 3
367-201B	Comparative Plant Biology 3
373-331B	Microbial Ecology 3
373-338A	Bacterial Molecular Genetics 3
373-442A	Food Microbiology and Sanitation 3
391-400B	Eukaryotic Cells and Viruses 3
391-438A	Immunology 3

RESOURCE CONSERVATION MAJOR

Academic Adviser: Professor B. Côté

The Major prepares students to deal with problems in integrated resource management and environmental protection with the objective of making optimal use of natural resources under any given set of economic, social and ecological conditions. Students follow a series of required courses and select complementary courses on physical, biological, soil and aquatic resources from approved lists on each of these themes.

Required Courses: 25 credits

Complementary Courses: 33 credits.

Electives: to meet the minimum 90-credit requirement for the degree.

	CREDITS
Required Courses:	25
333-211A	Biochemistry I 3
334-200A	Principles of Microeconomics 3
334-333A	Resource Economics 3
344-205B	Principles of Ecology 3
349-315A	Science of Inland Waters 3
372-200B	Introduction to Earth Science 3
372-210A	Principles of Soil Science 3
375-437B	Assessing Environmental Impact 2
375-491D,N	Seminar 2
Complementary Courses:	min. 33
367-201B	(3) Comparative Plant Biology 3
or 367-211A	(3) Principles of Plant Science
360-310A,B	(3) Statistical Methods I 3
or 189-203A ¹	(3) Principles of Statistics I
At least two of the following:	6
336-214A	(3) Surveying
336-217B	(3) Hydrology and Drainage
or 183-322A ¹	(3) Hydrology
336-416A	(3) Engineering for Land Development
338-201A	(3) Introductory Meteorology
375-333A	(3) Physical and Biological Aspects of Pollution
At least three of the following:	9 or 10
177-465A ¹	(3) Conservation Biology
350-335A	(3) Soil Ecology and Management
360-306A	(3) Mathematical Methods in Ecology
367-358A	(3) Flowering Plant Diversity
373-331B	(3) Microbial Ecology
374-410A	(3) The Forest Ecosystem
375-401A	(4) Fisheries and Wildlife Management
At least three of the following:	9
330-435A	(3) Soil and Water Quality Management
372-315B	(3) Soil Fertility and Fertilizers
372-326A	(3) Soil Genesis and Classification
372-331B	(3) Soil Physics
372-410B	(3) Soil Chemistry
373-521B	(3) Soil Microbiology and Biochemistry
At least one of the following:	3
183-201B ¹	(3) Geographical Information Systems 1
336-350B	(3) GIS & Biosystems
375-310B	(3) Air Photo and Imagery Interpretation

¹ Downtown Campus

Note: Other courses on the Downtown Campus may be equivalent to some required courses; consult the Academic Adviser.

SOIL SCIENCE MAJOR

Academic Adviser: Professor Mehuys

Students majoring in Soil Science gain an understanding of the nature of soils, in terms of their physical, biological, biochemical, and chemical properties, and of survey and management techniques which promote their sustained fertility, productivity, and conservation. Students may choose to take a specialized orientation related to either soils and crops, or soil and water conservation. The first option is more biologically oriented, while the second is concerned more with resource management and environmental protection. The Soil Science Major qualifies the graduate for membership in l'Ordre des agronomes du Québec and professional agrologist organizations in the other provinces.

Required Courses: 41 credits.

Complementary Courses: 21 - 23 credits, selected from an approved list in consultation with the Academic Adviser.

Soils and Crops Option: 21- 23 credits

Soil Conservation Option: 21 credits

Electives: to meet the minimum requirement of 90 credits for the degree.

CREDITS

Required Courses:

41

WILDLIFE BIOLOGY MAJOR

Academic Advisers: Professors R. Titman (Sept. - Dec., 2001),
M. Curtis (Jan. - Aug., 2002 (U1);
D. Berteaux (U2); D. Bird (U3)

This program emphasizes understanding the ecology of vertebrate animals, their biological and physical environment and the interactions that are important in the management of ecological communities and wildlife species. Employment opportunities exist in resource planning, nature interpretation, wildlife management and environmental impact assessment. By careful course selection students may meet requirements for certification by the Wildlife Society.

Required Courses: 34 credits.

Complementary Courses: 26 credits.

Electives: to meet the requirement of 90 credits for the degree.

The Molecular Option emphasizes molecular genetics, plant improvement, and biotechnology. These two options form botanists prepared for exciting careers in the knowledge economy. Graduates are finding employment within private industries, government services, consulting, teaching, and many have gone on to do postgraduate research. These programs can be completed entirely on the Macdonald Campus or one semester can be spent taking courses on the Downtown Campus during the final year.

6.8 Department of Plant Science

Raymond Building – Room R2-019
Telephone: (514) 398-7851
Email: infoplsci@macdonald.mcgill.ca
Website: <http://www.agrenv.mcgill.ca/plant>

Chair — Marc Fortin

Emeritus Professors — Ralph H. Estey, William F. Grant,
W.E. Sackston, Howard A. Stepler

Professors — Deborah J. Buszard, Donald L. Smith,
Alan K. Watson

Associate Professors — Danielle J. Donnelly, Pierre Dutilleul,
Marc Fortin (*William Dawson Scholar*), Suha J.-Hare,
Ajjamada C. Kushalappa, Diane E. Mather, Timothy C. Paulitz,
Salvatore A. Sparace, Katrine A. Stewart, Marcia J. Waterway

Assistant Professor — Philippe Seguin

Lecturers — Serge Lussier, Patrick Nantel, David D. Wees

Associate Member — Timothy A. Johns (*School of Dietetics and
Human Nutrition*)

Adjunct Professors — Miles R. Bullen, Todd Capson,
Odile Carisse, Daniel Cloutier, Warren K. Coleman,
Bruce E. Coulman, Sylvie Jenni, Shahrokh Khanizadeh,
Jean-François Laliberté, Cindy Morris, Louise O'Donoghue,
Thérèse Ouellet

The Department of Plant Science administers Majors in Botanical Science and Plant Science. (Full descriptions of these Majors are available at <http://www.agrenv.mcgill.ca/plant/undergrad.htm>. A minimum of 90 credits is needed to complete each Major. It is recommended that students take organic chemistry prior to entering these Majors.

BOTANICAL SCIENCE MAJOR

Academic Adviser: Professor D.J. Donnelly

The Botanical Science Major offers two options for those interested in working with plants, one emphasizing the ecology of plants and their environment and the other emphasizing the physiology and molecular biology of plants. The Ecology Option emphasizes ecology, conservation, and environmental sciences.

Notes:

- 1) Most courses listed at the 300 level and higher have prerequisites. Although instructors may waive prerequisite(s) in some cases, students are urged to prepare their program of study well before their final year.
- 2) Not all courses are available in any given year. Consult departmental listings for full course descriptions and offerings.

7 Description of Courses

Courses are listed numerically by prefix. For courses in the following areas, consult listings with the appropriate prefix:

Agricultural and Biosystems Engineering - 336 (page 457)
Animal Science - 342 (page 459)
Biology - 344 (page 460)
Biotechnology - 394 (page 466)
Economics - 334 (page 456)
English - 348 (page 460)
Entomology - 350 (page 460) and 373
Ethics - 260 (page 454)
Extension - 352 (page 461)
Food Science and Agricultural Chemistry - 333 (page 455)
Forest Resources - 374 (page 464)
General Agriculture - 330 (page 454)
Genetics - 356 (page 461)
Mathematics - 360 (page 461)
McGill School of Environment - 170 (page 454)
Microbiology - 362 and 373 (page 461)
Natural Resource Sciences - 373 (page 463)
Nutrition and Dietetics - 382 (page 465)
Parasitology - 391 (page 466)
Physics - 338 (page 459)
Plant Science - 367 (page 463)
Renewable Resources - 375 (page 464)
Soil Science - 372 and 373 (page 463)
Zoology - 349 (page 460)

All pre- and co-requisites in a course sequence leading to a more advanced course must be successfully completed before registration will be permitted in the advanced course.

The names of course instructors are listed on the Course Timetable available on *infoMcGill* via the Web <http://www.mcgill.ca/students/courses/>.

The course credit weight is given in parentheses after the title.

- Denotes courses not offered in 2001-02.
- ★ Denotes courses offered only in alternate years.

Denotes limited enrolment.

7.1 Environment

A listing of McGill School of Environment courses is given

terms of their chemical and physical properties (i.e., rheology, optical characteristics, etc.) and how they can be used to advantage in food systems.

★ **333-519B ADVANCED FOOD PROCESSING.** (3) (3 lectures) (Prerequisite: 333-330B) Advanced technologies associated with food processing studied in more detail. Topics include food irradiation, reverse osmosis, super critical fluid extraction and extrusion.

★ **333-520A BIOPHYSICAL CHEMISTRY OF FOOD.** (3) (3 lectures) (Prerequisite: 333-233B) This courses will cover recent advances in the application of spectroscopic techniques, including infrared, Raman, near-infrared, circular dichroism, and fluorescence spectroscopy, to the study of biomolecules of relevance to food. Particular emphasis will be placed on the molecular basis of structure-function and structure-functionality relationships.

★ **333-530A ADVANCED ANALYTICAL CHEMISTRY.** (3) (3 lectures) (Prerequisite: 333-213A) Selected instrumental methodologies including advances in automated chromatography, wide band NMR, chemical sensors, and the application of other spectroscopic techniques to the analysis of food constituents.

333-535A FOOD BIOTECHNOLOGY. (3) (3 lectures) (Prerequisite: 362-230B) Developments in biotechnology as it relates to food production and processing concerning traditional food fermentations as well as novel food biotechnology enzymes, ingredients, genetic engineering, plant tissue culture and developments for microbiological and food analysis.

7.5 Agricultural Economics

334-200A PRINCIPLES OF MICROECONOMICS. (3) (3 lectures) The field of economics as it relates to the activities of individual consumers, firms and organizations. Emphasis is on the application of economic principles and concepts to everyday decision making and to the analysis of current economic issues.

334-201B P

334-491A RESEARCH SEMINAR IN AGRICULTURAL ECONOMICS

non-engineering students, covering heat transfer, mass and energy balances, food process unit operations, material transport/steam/refrigeration systems.

336-325A FOOD ENGINEERING. (3) (3 lectures and one 3-hour lab) Heat and mass transfer, enthalpy and mass balances, sterilizing, freezing, fluid flow, pipes, steam, refrigeration, pumps and valves.

336-330B GIS FOR BIOSYSTEMS MANAGEMENT. (3) (2 lectures and one 2-hour lab) Applications of PC-based Geographic Information Systems (GIS) to the presentation and analysis of natural resources information. Spatial data sources and capture, data structure and analysis and modelling will be reviewed with reference to natural resource management and environmental concerns.

336-341B STRENGTH OF MATERIALS. (4) (3 lectures and one 3-hour lab) (Prerequisite: 336-210A) Stress, strain, resilience, elastic and plastic properties of materials; bending moment and shear force diagrams; bending and shear stress; deflections; simple, fixed and continuous beams, torsion and helical springs, reinforced concrete beams; columns, bending and direct stress; general case of plane stress; Mohr's circle.

● **336-411A OFF-ROAD POWER MACHINERY.** (3) (2 lectures and one 3-hour lab) (Prerequisite: 336-211B)

336-412A AGRICULTURAL MACHINERY. (3) (3 lectures and one 3-hour lab) Study and analysis of machines for tillage, harvesting, crop processing and handling. Field tests, load studies, design requirements; design of machines and components for agricultural applications.

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The following courses to be taken with the Faculty of Engineering, McGill Downtown Campus. (See the Faculty of Engineering section for descriptions.)

305-346B HEAT TRANSFER. (3) (3 lectures and 1 hour problem)

305-362B MECHANICAL L

342-495D,N SEMINAR. (2) (1 lecture and 1 lab) Instruction on the

pest management, with emphasis on biological control (use of predators, parasites and pathogens against pest insects), population monitoring, and manipulation of environmental, behavioral and physiological factors in the pest's way of life. Physical, cultural, and genetic controls and an introduction to the use of non-toxic biochemical controls (attractants, repellents, pheromones, anti-metabolites).

Graduate courses available to undergraduates with permission:

● ★ **350-525B INSECT ECOLOGY.** (3)

★ **350-535B AQUATIC ENTOMOLOGY.** (3)

350-600A,B INSECT PATHOLOGY. (3)

350-610D ADVANCED TAXONOMY AND ZOOLOGY. (3)

7.13 Extension Methods

● **352-300B COMMUNICATIONS – EXTENSION METHODS.** (3)
(Weekly 3-hour workshops)

7.14 Genetics

For course offering by term, refer to

<http://www.agrenv.mcgill.ca/plant/undergrad.htm>.

356-204A GENETICS. (4) (3 lectures, one 3-hour lab, one 1-hour tutorial.) The course integrates classical, molecular and population genetics of animals, plants, bacteria and viruses. The aim is to understand the flow of genetic information within a cell, within families and in populations. Emphasis will be placed on problem solving.

synthetic organisms acquire resources, develop and grow, reproduce, and interact with various groups of fungi and herbivores. Comparisons will be made among the following major groups: cyanobacteria, algae, liverworts, mosses, seedless vascular plants, gymnosperms, and angiosperms.

367-211A PRINCIPLES OF PLANT SCIENCE. (3) (3lectures and one 2-hour lab) A study of major world crop species with emphasis on their adaptation and distribution in relation to the economic botany of the plants.

367-215A ORIENTATION IN PLANT SCIENCES. (1) An orientation to selected themes and problems in the pure and applied plant sciences, including crop production, plant ecology and diversity and

367-361B PEST MANAGEMENT AND THE ENVIRONMENT. (3) (3 lectures) Pests, pest impacts on the global food system and strategies for pest management. Pest management methods, models and programs, and how to reduce pest management impacts on the environment.

367-421A LANDSCAPE PLANT MATERIALS. (3) (2 lectures and one 3-hour lab) (Prerequisites: 367-211A or 367-201B) A study of the major types of woody and herbaceous ornamental plants used in landscaping and how the landscaping industry uses plants to improve the environment. Laboratory includes a specimen collection of landscape plants widely used in Québec.

367-434B WEED BIOLOGY AND CONTROL. (3) (3 lectures and one 3-hour lab) (Prerequisite: 367-211A or 367-201B) A study of the biology of undesirable vegetation as related to the principles of prevention and physical, biological, managerial and chemical control. Emphasis on the environmental impact of the different methods of weed control.

367-450A,B SPECIAL TOPICS IN PLANT SCIENCE I. (2) A course of independent study by the student with the guidance of a professor
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according to ecological principles. Land use in peri-urban and rural settings, and the use of participatory action research.

373-384L FIELD RESEARCH PROJECT. (3) (Prerequisite: 24 credits of university training in a field relating to the environment, including one course in statistics, 360-310A, or equivalent. Pre- or co-requisite: 373-381/) Small group field research project.

373-421B TOPICS IN WILDLIFE CONSERVATION. (3) (3 lectures) Study of current controversial issues focusing on wildlife conservation. Topics include: animal rights, exotic species, ecotourism, urban wildlife, multi-use of national parks, harvesting of wildlife, biological controls, and endangered species.

373-442A FOOD MICROBIOLOGY AND SANITATION. (3) (3 lectures and 1 3-hour lab) (Prerequisite: 362-230B) Microorganisms, and their products important to the food industry. These will be discussed in terms of production of foods, preservation and processing of foods, facility sanitation and waste disposal, potential for causing food borne disease outbreaks.

373-496D,N PROJECT I. (3) Development of research techniques through selection of problem, formulation of hypotheses and objectives, research design, review of pertinent literature, experimental work, discussion and conclusion of results with oral presentation of completed report, all in consultation with research director.

373-497D,N PROJECT II. (5) Development of research techniques through selection of problem, formulation of hypotheses and objectives, research design, review of pertinent literature, experimental work, discussion and conclusion of results with oral presentation of completed report, all in consultation with research director. Similar to 373-496D,N, with a more elaborate research program.

★ **373-515B PARASITOID BEHAVIORAL ECOLOGY.** (3) (3 lectures and one 2-hour seminar) (Prerequisite: 373-330A or equivalent) The origin and diversity of parasitoid species will be presented. Aspects of behavioral ecology that pertain to host selection, optimal allocation of progeny and sex and host-parasitoid interactions are examined. The importance of these processes is discussed in a biological control perspective.

373-520B INSECT PHYSIOLOGY. (3) (Prerequisite: Permission of instructor) Organismal approach to insects, emphasizing the physiology and development, and the physiological relations of insects to their environment.

★ **373-521B SOIL MICROBIOLOGY AND BIOCHEMISTRY.** (3) (Prerequisite: 372-210A) Soil environments, soil microorganisms and their function in the biogeochemical cycles of C, N, P and S. Basics of soil bioremediation.

373-550B VETERINARY AND MEDICAL ENTOMOLOGY. (3) (Prerequisite: Permission of instructor) Environmental aspects of veterinary and medical entomology. An advanced course dealing with the biology and ecology of insects and acarines as aetiological agents and vectors of disease, and their control. Integrated approaches to problem solving.

373-772A ADVANCED MICROBIAL GENETICS

projects to examine their accuracy in predicting consequences and attenuating undesirable effects.

- ★ **375-475B DESERT ECOLOGY.** (3) (Field course) (Prerequi-

8 Graduate Programs

Graduate work, in the Faculty of Graduate Studies and Research, McGill University, Montreal, may be undertaken on the Macdonald Campus, through the Departments of Agricultural and Biosystems Engineering, Agricultural Economics, Animal Science, Food Science and Agricultural Chemistry, Natural Resource Sciences, and Plant Science; the Institute of Parasitology; and the School of Dietetics and Human Nutrition.

The advanced courses of study offered lead to the degrees of Master of Science, and Doctor of Philosophy, Master of Science/Master of Business Administration, Graduate Certificate in Biotechnology.

Information on these programs and related fellowships is available from the Student Affairs Office, Macdonald Campus of McGill University, Sainte-Anne de Bellevue, QC H9X 3V9.

The Faculty of Graduate Studies and Research Calendar and full information regarding graduate courses, theses, registration, fellowships, etc. can be accessed on the Faculty of Graduate Studies and Research Website <http://www.mcgill.ca/fgsr/>.

9 Farm Management and Technology Program

Farm Management and Technology Program
 Faculty of Agricultural and Environmental Sciences
 P.O. Box 204, Macdonald Campus of McGill
 21,111 Lakeshore Road
 Sainte-Anne de Bellevue, Quebec, H9X 3V9

Telephone: (514) 398-7814

Fax: (514) 398-7955

Email: fmt@macdonald.mcgill.ca

Website: <http://www.agrenv.mcgill.ca/fmt>

Director - Marcel J. Couture

This 3-year academic and practical program is offered on the Macdonald Campus and taught by the staff of the Faculty of Agricultural and Environmental Sciences of McGill University. The program is funded by the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec and authorized by the Ministère de l'Éducation du Québec (M.E.Q.).

The educational goals of the program are:

- 1) to make our graduates competent in the exercise of their profession;
- 2) to help the student's integration into professional life;
- 3) to foster professional mobility;
- 4) to foster an interest in continual development of professional knowledge.

Six (6) academic terms are spent on the Macdonald Campus studying a sequence of courses in Soil, Plant, and Animal Science; Engineering; Economics; and Management. One summer "stage" or practicum is spent on a farm other than the home farm where the student learns the many skills and encounters the many problems related to modern commercial agriculture. Students will also have a one-week internship on farms (other than the home farm) during the academic semesters in year one. This will enable them to relate their academic work to the reality of farming. Courses in English, French, Humanities, Physical Education and two complementary courses taken during the program will entitle the student to receive a Diplôme d'études collégiales (D.E.C.) from the Ministère de l'Éducation du Québec. The students will also receive a document from Macdonald Campus attesting that they have successfully completed the requirements of the Farm Management and Technology Program.

Entrance Requirements

1. Students should have a good practical knowledge of farming under Eastern Canadian conditions. One year of experience is

recommended but under special conditions a four-month summer season is acceptable.

2. The minimum academic entrance requirements are a Quebec High School Leaving Certificate (Secondary V), or its equivalent and any other academic requirement set by the MEQ.
3. All candidates for admission must make arrangements to come to the Macdonald Campus for an interview prior to admission to the program.
4. Admission to this program is only in the Fall semester.
5. We strongly encourage incoming students to acquire their driver's permit (both for cars and farm equipment) before coming to Macdonald Campus. This is first for safety reasons given that students work with farm equipment (soil preparation) very early on as they arrive at Macdonald. As well, most farmers require that their employees and stagiaires possess a driver's license.

Academic Standing

Attendance at class is compulsory. Students with an attendance of less than 80% may not be permitted to write examinations.

Examinations and other work in courses will be marked according to the percentage system. The minimum passing mark in a course is 60%

When a student's cumulative percent average (CPA) or semester percent average (SPA) first drops below 60%, withdrawal is advised. Students who choose to remain in the program are on probation.

Students on probation are normally permitted to register for not more than 10 credits per semester. They are not permitted to be on probation for more than one semester.

Microcomputing
Precision Farming
Soil and Water Conservation
Soil Preparation
Tools and Machinery Maintenance

Agricultural Economics

Agricultural Marketing
Introduction to Economics
Farm Business Management 1
Farm Business Management 2
Farm Business Management 3
Farm Project
Management of Human Resources

Animal Science

Animal Anatomy and Physiology
Introduction to Animal Science

English

English 1
(B10) English for Farm Management and Technology
(Section 1 or 2)
English 2
(A11) Composition & Literature (Section 1)
(A10) Introduction to Literature (Section 2)
English 3
(A20) Literary Genre
English 4
(A30) Literary Themes

French

Français 1: Communication
Français 2: Communication en Agriculture

Humanities

Humanities 1: Knowledge...Learning...To Be
Humanities 2: World Views and Ethical Issues
Humanities 3: Social and Organizational Issues

Natural Resource Sciences

Agro-Environmental Fertilization Plan 1 (Fr.: PAEF 1)
Agro-Environmental Fertilization Plan 2 (Fr.: PAEF 2)
Soil Fertilization

Physical Education

Physical Education and Health
Physical Education: Practical
Physical Education in Daily Life

Plant Science

Agricultural Botany
Pesticide Use

ELECTIVE PRODUCTION COURSES

We offer two specializations. Students must take two courses in jeq'zhlhéfe7hDIRIzZZhëDIRIzZ1IzratuBsoolzrronmZbal FertR777ocbmject
