

**GRS Resource Specialization:**  
**Sustainable Agriculture**

*Courses Overview*

The purpose of these informational documents is to help GRS students choose courses that would be of interest for their resource specialization. This is an overview of 2017-2018 courses, although they may change in the future. The most updated information can be found on the [UBC course website](#).

*\*\* Undergraduate students are sometimes able to take graduate level courses with special permission. Please ask.*

Last updated: June 18, 2017

Course Number	Course Name	Description
ANTH 210	<b>Eating Culture</b>	An anthropological exploration of how the collection, cultivation and consumption of food shapes human society and culture.
APBI 200	<b>Introduction to Soil Science</b>	Physical, chemical and biological properties of soils; soil formation, classification, use and conservation. There are no prerequisites for this course, but background in Biology 12, Chemistry 12, and Physics 12 (or first-year university-level) is strongly advised.
APBI 210	<b>Vascular Plants</b>	A comparative study of pteridophytes, gymnosperms and angiosperms, integrating form, function, and ecology.
APBI 222	<b>Introduction to Horticulture</b>	The cultivation of key temperate fruits, vegetables, greenhouse, ornamental and nursery crops in BC, integrated with scientific and practical aspects of their sustainable production and marketing.
APBI 235	<b>Biotechnology in Agricultural Food Production</b>	Genetics, genomics, and biotechnology concepts with applications to agricultural food production and food safety.
APBI 244	<b>Introduction to Biometeorology</b>	Basic principles and processes of climatology. Energy and water balance concepts. Weather systems and climate change, microclimate of soils, crops, forests, and animals.
APBI 260	<b>Agroecology I</b>	Introduction to the biophysical and socioeconomic factors affecting systems management and production in selected agroecosystems. Credit will be granted for only one of APBI 260 or APBI 265.
APBI 265	<b>Sustainable Agriculture &amp; Food Systems</b>	Principles and practices necessary to understand practical concerns of sustainable food systems. Credit will be granted for only one of APBI 265 or APBI 260.
APBI 311	<b>Comparative Cardiovascular, Respiratory and Osmoregulatory Physiology</b>	Cardiovascular, respiratory and osmoregulatory physiology of vertebrates.
APBI 312	<b>Reproductive and Digestive Physiology</b>	Reproductive and digestive physiology, and current technologies applied to these systems in domestic and wild animals.
APBI 314	<b>Animals and Society</b>	Contemporary use of animals for food production, companionship, recreation and science; social and ethical issues concerning human impacts on animals; animals in human culture;

		protection of animals by society and the law.
APBI 315	<b>Animal Welfare and the Ethics of Animal Use</b>	Scientific assessment of animal well-being, ethical concepts applied to animal use, and animal welfare issues arising in agriculture, biomedical research and other areas.
APBI 316	<b>Equine Biology, Health and Nutrition</b>	Physiology, growth and reproduction of the horse; nutrition, diet formulation and feeding practices; common diseases, their prevention and treatment.
APBI 318	<b>Applied Plant Breeding</b>	Small-scale classical (i.e., non-biotechnological) plant breeding. Hands-on, application-oriented approach to techniques and procedures for managing seed inventories, designing and implementing a simple plant breeding program, and evaluating the impact of selection on breeding populations and desired outcomes.
APBI 322	<b>Horticultural Techniques</b>	An introduction to horticultural practice in an experiential learning format. Plant identification, seeding, propagation, pruning, cultivation media, pesticide application and safety are examined in the context of integrated crop management. An additional fee may be required for the pesticide certification examination.
APBI 324	<b>Introduction to Seed Plant Taxonomy</b>	Introduction to seed plant taxonomy emphasizing descriptive morphology and identification. Each student will be required to submit a plant collection.
APBI 327	<b>Introduction to Entomology</b>	A survey of the structure, classification and biology of insects; ecology and life-histories of insects; insect-plant relations.
APBI 328	<b>Weed Science</b>	Importance, identification, dissemination and biology of weeds; preventive, cultural, biological and chemical methods of control. No sections offered for 2017 Winter.
APBI 342	<b>Soil Biology</b>	The diversity of soil organisms (bacteria, protozoa, fungi, animals, plants) in natural and managed ecosystems; roles in primary production, nutrient cycling, decomposition and reclamation; interactions between soil organisms; responses to environmental change.
APBI 351	<b>Plant Physiology</b>	Mechanisms and regulation of functional processes contributing to the assimilation, transport and utilization of water, mineral nutrients and carbon by plants.
APBI 360	<b>Agroecology II</b>	Animals and Plants as Components of Agricultural Ecosystems. A systems approach is used to investigate the functions and interactions of plants and animals in agricultural systems. Field trips for assessment of existing agroecosystems.
APBI 361	<b>Key Indicators of Agroecosystem Sustainability</b>	A detailed exploration of biophysical, economic, and social ecosystem sustainability indicators for primary production subsystems.
APBI 398	<b>Research Methods in Applied Animal Biology</b>	Research methods including research design, scientific critique, writing proposals and reports, and oral presentation.
APBI 401	<b>Soil Processes</b>	Integration of soil physics, chemistry, and biology in understanding essential soil processes.
APBI 402	<b>Sustainable Soil Management</b>	Application of fundamental, unifying, soil science principles in sustainable ecosystem management.
APBI 403	<b>Soil Sampling, Analyses and Data Interpretation</b>	Field and laboratory analytical techniques in the chemical, biological and physical assessment of soils. Credit will be granted for only one of SOIL 503 or APBI 403.

APBI 410	<b>Applied Animal Health and Physiology</b>	Application of physiology and pathology principles to health and disease of domestic animals.
APBI 412	<b>Belowground Ecosystems</b>	Concepts, methods, and applications of belowground ecology with emphasis on biotic interactions in soil; roles that aboveground and belowground communities play in regulating the structure and function of terrestrial ecosystems and their responses to global change. Credit will be granted for only one of FRST 512 or APBI 412.
APBI 413	<b>Stress and Coping in Animals</b>	Understanding, assessing, and managing stress in farm, companion, captive wildlife, and research animals: sources of stress; behavioural, emotional, cognitive, and physiological responses; effects on growth, reproduction, health.
APBI 414	<b>Animals and Global Issues</b>	Research seminar integrating diverse information to address global animal issues including: animal-source foods and human health, environmental impact of livestock production, trade in exotic animals.
APBI 415	<b>Applied Animal Behaviour</b>	Application of principles and research methods of animal behaviour to practical problems in the care of farm, companion, wild and research animals, and in animal training, and human-wildlife conflict.
APBI 416	<b>Animal Welfare and Conservation Biology</b>	Evaluation of humane treatment of individual animals living in the wild and managed within conservation biology. Assessment of attitudes and viewpoints of the role of animal welfare in conservation biology.
APBI 417	<b>Production and Postharvest Physiology of Vegetable Crops</b>	Morphology, growth and development, production, composition, quality, and postharvest physiology of vegetable crops.
APBI 418	<b>Intensive Fish Production</b>	Management of fin fish throughout the life cycle; broodstock, egg, larvae, and juvenile. Control of environmental factors, including pathogens, for maximum productivity at all life stages.
APBI 419	<b>Fish Health</b>	Management of fish health in aquaculture; common fish pathogens, epidemiology, prevention, and treatment of diseases.
APBI 426	<b>Plant-Microbe Interactions</b>	Biology and physiology of selected plant-microbe relationships. Impacts of plant-microbe relationships on society.
APBI 428	<b>Integrated Pest Management</b>	Development and implementation of multi-disciplinary pest management programs in agricultural crops.
APBI 440	<b>Plant Genomics</b>	Concepts, principles, and recent discoveries in genome structure and comparative genomics in plants with a focus on economically important plants; applications of genomics approaches to questions in plant genetics, evolution, and ecology.
APBI 442	<b>Wine Grape and Berry Biology</b>	Grapevine genetics, morphology, and physiology and major biological features of other important berry crops for British Columbia such as blueberry, cranberry, and raspberry. Credit will be granted for only one of APBI 442 or PLNT 542.
APBI 444	<b>Agroforestry</b>	An introduction to the application of knowledge and principles of agroecology and forest ecology to global agroforestry systems. The course includes a one-weekend field trip that requires a supplemental fee.
APBI 460	<b>Advanced Agroecology</b>	The relationship between biological diversity and sustainability for the management of agroecosystems; emphasise on ecological interactions between natural ecosystems and agroecosystems,

		including connections between agroecology and conservation biology. A fee will be assessed each student to cover field trip costs.
APBI 490	<b>Advanced Topics in Applied Biology</b>	Analysis and interpretation of current issues in applied biology.
APBI 495	<b>Principles of Wildlife Management in Forests and Agricultural Environments</b>	Impacts of wildlife on crop productivity in temperate and tropical environments, the resiliency of wildlife populations to conventional control methodology, adoption of innovative methods to reduce crop damage, and the impact of introduced species on native fauna.
APSC 261	<b>Technology and Society I</b>	The course deals with the influence of technology on the social, political, economic, and environmental aspects of society. The specific subject matter varies from year to year. Examples of subjects considered include, resources, energy, nuclear power, technology, the effects of technology on the family, education, agriculture, international policy and others.
APSC 262	<b>Technology and Society II</b>	The course deals with the influence of technology on the social, political, economic and environmental aspects of society. The subject matter varies from year to year and differs from APSC 261. It may be taken as a continuation of APSC 261 or taken independently. Examples of subjects considered include pollution, work place health hazards, social impact of computers, problem solving, green revolution, technology and the third world, engineering ethics and others.
BIOL 210	<b>Vascular Plants</b>	A comparative study of pteridophytes, gymnosperms and angiosperms, integrating form, function and ecology.
BIOL 230	<b>Fundamentals of Ecology</b>	Dynamics of plant and animal populations, structure of ecological communities and functioning of ecosystems. Interpretation of research results and application to environmental issues. Labs meet once a month.
BIOL 306	<b>Advanced Ecology</b>	Ecology of populations, communities and ecosystems. Tests of ecological theory with experiments and application to environmental issues.
BIOL 310	<b>Introduction to Animal Behaviour</b>	Animal behavior from an ecological and evolutionary perspective; the methods used to study behaviour and test its adaptive significance.
BIOL 343	<b>Plants and Peoples</b>	The interactions of plants and human societies: the role of people in the origin, evolution and dispersal of food, drug and economic plants, and the influences of plants on human societies. Suitable for upper-level Arts students.
BIOL 416	<b>Principles of Conservation Biology</b>	Ecological basis of conserving biological diversity and ecosystem services; application of ecological theory to global and local conservation problems in the context of economic, legal, political, and social perspectives.
BIOL 462	<b>Ecological Plant Biochemistry</b>	The structure, biosynthesis, distribution and biological function of secondary plant metabolites.
CEEN 523**	<b>Energy and the Environment</b>	Energy/environment/society interactions; development of energy resources; energy demand and its determinants; policy dimension of energy and climate change; impacts on ecosystems; life cycle analysis; impact assessment and other tools for quantitative and qualitative evaluation of alternative energy sources; case studies.
CONS 101	<b>Introduction to Conservation</b>	Seminars on current natural resources conservation and forest sciences topics.

CONS 200	<b>Foundations of Conservation</b>	Conceptual foundations of conservation; means of conserving nature and natural resources.
CONS 330	<b>Conservation Science and Sustainability</b>	Fundamental concepts in conservation science. Different philosophies, perspectives, and disciplines used in setting priorities for managing biodiversity at all scales.
CONS 340	<b>Introduction to Geographic Information Systems (GIS) for Forestry and Conservation</b>	Introduction to principles, practice and context of Geographic Information Systems (GIS) applied to forest management and natural resource conservation issues. Priority enrolment to students in the Faculty of Forestry; third- or fourth-year standing.
CONS 481	<b>Conservation Planning and Wildland Recreation</b>	Theory and tools needed for the selection and design of protected areas, the designation of land use types, and the management and conservation of wildland recreation resources.
ECON 370	<b>Benefit-Cost Analysis and the Economics of Project Evaluation</b>	Techniques and problems in benefit-cost analysis of public projects. Examination of alternative approaches to public decision-making such as cost-effectiveness analysis and multiple-objective frameworks. Case studies of projects in the areas of natural resources, the environment, human resources, public services, and transportation.
ECON 371	<b>Economics of the Environment</b>	Economic analysis applied to various environmental issues, including sustainable development, quality of life, and environmental impacts of specific industrial and consumption activities. The design and implementation of government policies. Global environmental effects of human economic activity.
ECON 471	<b>Economics of Nonrenewable Resources</b>	Application of economic analysis to the management of nonrenewable natural resources. Emphasis is placed on the economics of alternative energy sources. Other topics include mineral economics, criteria for the optimal use of resources, and measurement of resources. No sections offered for 2017 Winter.
ECON 472	<b>Economics of Renewable Resources</b>	Application of economic analysis to the management of renewable resources. Special attention is given to criteria for the optimal use of depleting resources such as forests and water. Other topics include public policy with regard to environmental quality, conservation, and outdoor recreation.
ECON 573**	<b>Environmental Economics</b>	
ECON 574**	<b>Special Topics in the Economics of Resource Use</b>	
EOSC 110	<b>The Solid Earth: A Dynamic Planet</b>	Earth's origin, composition, structure, and natural resources. Plate tectonics as the driving force for volcanism, mountain building, and earthquakes. Imaging Earth's interior. Environmental geoscience and sustainability. (Consult the Credit Exclusion list for the Faculty of Science section of the Calendar.)
EOSC 112	<b>The Fluid Earth: Atmosphere and Ocean</b>	Introduction to processes in ocean and atmosphere. Heat, current, winds, clouds, marine life, resources. Effects of coupling, climate change, pollution. (Consult the Credit Exclusion list, within the Faculty of Science section in the Calendar.)
EOSC 311	<b>The Earth and its Resources</b>	An introduction to the Earth with emphasis on its industrial and aesthetic resources. Rocks, minerals, gold, diamonds, sediments, fossils, oil and gas, canyons, and volcanoes and the processes that create them. Not for credit in the Faculties of Science and

		Applied Science. No background in Science or Mathematics is required.
EOSC 314	<b>The Ocean Environment</b>	An introduction to the oceans and the processes that have shaped them, their composition and movement, waves, tides, beaches, interactions with the atmosphere and human exploitation of the non-living resources. Not for credit in the Faculties of Science or Applied Science. No background in Science or Mathematics is required.
EOSC 315	<b>The Ocean Ecosystem</b>	An introduction to life in the oceans, its variety and evolution; primary producers and their links to the environment, zooplankton, marine communities, living marine resources and their role in today's world. Not for credit in the Faculties of Science or Applied Science.
EOSC 329	<b>Groundwater Hydrology</b>	Introduction to theory of groundwater flow; flow nets; regional groundwater resource evaluation; well hydraulics; role of groundwater in geologic processes.
EOSC 330	<b>Principles of Geomorphology</b>	Landform development; morphological and historical analysis of landforms; applications in engineering and resource development
EOSC 429	<b>Groundwater Contamination</b>	Contaminant transport processes in groundwater flow systems; aqueous and multiphase transport; mathematical models describing migration and chemical evolution of contaminant plumes; case studies.
FRE 306	<b>Introduction to Global Food Markets</b>	An overview of global food markets including recent trends (e.g., vertical coordination, strategic alliances, multinationals and small firms in niche markets), marketing and trade institutions such as state-trading enterprises and WTO regulations, issues specific to developing nations, and case studies.
FRE 340	<b>International Agricultural Development</b>	Characteristics, processes and sources of economic growth, role of agricultural and resource sectors in economic growth, analysis of output and input markets in those sectors, policy failures, tools for empirical analysis of rural markets, growth, and the environment.
FRE 374	<b>Land and Resource Economics</b>	Willingness to pay, opportunity costs, externalities, and market failures in natural resource markets; dynamic efficiency; economic applications including mineral, marine, forest, land, water, and biodiversity.
FRE 385	<b>Quantitative Methods for Business and Resource Management</b>	Applied problem solving using spreadsheet and database software. Cases concern statistical analysis, data manipulation, financial statements, linear programming and simulation.
FRE 420	<b>The Economics of International Trade and the Environment</b>	Market failure and gains from trade in the presence of natural resource externalities; the multilateral trading system and the environment; case studies in trade-related environmental impacts.
FRE 490	<b>Current Issues in Food and Resource Economics</b>	
FRST 305	<b>Silviculture</b>	Silviculture concepts and principles; stand dynamics; artificial and natural regeneration; cultural techniques for forest stand establishment and stand tending; silvicultural systems; decision making and development of prescriptions; connections to forest planning.
FRST 411	<b>Complex Adaptive</b>	Concepts of complex adaptive systems (CAS); exploration of how

	<b>Systems, Global Change Science, and Ecology Sustainability</b>	CAS can be used to manage natural and social environments for multiple goals under changing climatic and socio-economic conditions.
FRST 443	<b>Remote Sensing for Ecosystem Management</b>	Basic biological concepts related to interpretation of remote sensing data for land management, including the use of films and filters, and interpretation of air photographs, and other imagery.
FRST 520	<b>Land and Forest Resource Economics</b>	Applications of advanced theory and quantitative analysis to problems in forest resource and land economics; multiple land use; institutions for sustainable land use; optimal management and policy.
GEOB 270	<b>Geographic Information Science</b>	Computer-based graphical methods of data input and analysis. Emphasis on data visualization techniques such as cartographic modelling and exploratory data analysis. Prerequisite: Not available to those who completed GEOG 370 before September 2005.
GEOB 370	<b>Advanced Geographic Information Science</b>	Theoretical and practical aspects of Geographic Information Systems, including cartographic modeling, digital terrain models, management issues, and spatial interpolation.
GEOG 310	<b>Environment and Sustainability</b>	Concepts of environment and resource; the role of physical geography in understanding the interaction of humans and the environment; introduction to the management of environment-resource systems.
GEOG 361	<b>Introduction to Economic Geography</b>	History and methods of economic geography. Location of resource industries, manufacturing, and service activities with emphasis on British Columbia in its North American and world setting. Recommended for students with no previous exposure to Economic Geography, before taking other courses in the 36x and 46x series.
GEOG 410	<b>Environment and Society</b>	Geographical analysis of society-environment relations. Relates resource management to environmental politics, political economy, and sustainable development. Perspectives drawn from political ecology and political economy, environmental history and environmental philosophy.
HIST 106	<b>Global Environmental History</b>	The impact humans have had on the environment, and the ways in which the physical environment has shaped human history: climate, agriculture, energy use, and urbanization.
LFS 400	<b>Audio Storytelling</b>	Adopts a journalistic framework to communicate powerful stories and present academic content in new ways through the use of audio technology.
POLI 375A	<b>Global Environmental Politics</b>	Ecological consequences of the global political economy.
SOCI 360A	<b>Sociology and Natural Resources</b>	Sociological perspectives on property, resource industries (such as agriculture, fishing, forestry and mining), resource development, and resource communities. May also include examination of social aspects of resource development in the Third World.

UFOR 403	<b>Ecological Restoration</b>	Ecological principles relevant to restoration of ecosystems are applied to the restoration of several types of ecosystems.
SOIL 515	Integrated Watershed Management	Methods of watershed evaluation, land-water interactions, key aspects of hydrology, water quality and aquatic biota, land use impacts on water resources, community involvement, and integration of multiple land use activities and their cumulative impacts. Credit will be granted for only one of SOIL 515 or RMES 515.

**Other graduate courses might be available if student meets eligibility**

**[https://www.grad.ubc.ca/sites/default/files/forms/enrolment\\_undergraduate.pdf](https://www.grad.ubc.ca/sites/default/files/forms/enrolment_undergraduate.pdf)**

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