

# NATURAL RESOURCES (NATR)

## **NATR 100. Intro to Forestry and NR. (3 Credits)**

Field identification of important forest trees and shrubs, their growth characteristics and uses are introduced. Basic instruction is provided in forest management problems, forest measurement, utilization, forest ecology, silviculture, forest wetlands, natural resources recreation, wildlife conservation, urban forestry and natural resource organizations. Several field forestry exercises are used to provide students with practical experience. 3 credits (2 lecture hours, 3 laboratory hours), fall semester

## **NATR 101. General Ecology. (3 Credits)**

Interrelationships among living organisms and their environment. Examines the nature of diversity, niche dimensions, species' roles and habitats, organism adaptations, life histories, population dynamics, symbiotic relationships, and biome and landscape ecology. 3 credits (3 lecture hours), fall or spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

## **NATR 103. Natural Resources Equipment Op. (2 Credits)**

Operation, safety and preventative maintenance of natural resource equipment including chainsaws, log skidder, log loader, dump truck, bulldozer, forklift, skid steer loader, backhoe, and flatbed trailer is practiced. Included in this course is the instruction and hands-on operation of chainsaws, which with additional training in adult first aid/ CPR and environmental concerns will qualify students for New York State Logger certification. This course has an additional lab fee. 2 credits (1 lecture hour, 2 laboratory hours), fall or spring semester

## **NATR 110. Natural Resources Measurements. (3 Credits)**

Measurements of forest and wildlife resources, statistical analysis of data and presentation of results. Includes mapping, timber inventories, wildlife population surveys, and report writing. Pre-requisite or Co-requisite: MAGN 101 or equivalent or by permission from the instructor. 3 credits (2 lecture hours, 3 laboratory hours), spring semester

## **NATR 113. Intro to Global Positioning Sys. (1 Credit)**

This course provides an introduction to the global positioning system (GPS). The basic principles of GPS are covered with emphasis on field applications in the natural resources and renewable energy areas. The course will also provide a brief introduction to the geographic information system (GIS) with emphasis being placed on data viewers and online GIS applications. Students will be expected to conduct field surveys using both handheld and real-time differential GPS units as well as incorporate those within GIS data viewers. The course will also familiarize the students with the high-end, open-source and commercial GIS software used within the geospatial technology courses offered within the environmental sciences curricula at the 200-, 300-, and 400-levels. 1 credit (1 lecture hour, 2 laboratory hours), seven weeks, fall semester

## **NATR 115. Forest Ecology. (3 Credits)**

Physical and biological factors that affect the forest community are discussed. Emphasis is placed on forest ecosystem dynamics and establishing a scientific basis for the cultural treatment of forest stands. Forest community interactions are discussed in detail. Specific types of old growth, wetland, and eastern mesophytic forest communities are analyzed. Prerequisite: NATR 100 or permission of instructor 3 credits (2 lecture hours, 3 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

## **NATR 120. Intro To Recreation Area Mgmt. (3 Credits)**

Basic principles of outdoor recreation and use of leisure time as applied to the development and management of park and recreation areas. Observations and analyses of local recreation areas, trail development and improvement activities. 3 credits (2 lecture hours, 3 laboratory hours), fall semester

## **NATR 130. North American Waterfowl. (1 Credit)**

Identification, life histories, production areas, nuisance issues, and management of North American ducks, geese, swans and shorebirds. Course includes extensive field observation and maintaining field journals. This course is a certified NYS DEC Waterfowl ID Course and students may opt to take the exam to receive the certificate required to get an access permit for select National Wildlife Refuges and state lands open to waterfowl hunting. Pre-requisite or Co-requisite: NATR 101 or by permission from the instructor. 1 credit (1 lecture hour) spring semester.

## **NATR 140. Geology. (3 Credits)**

Nature and origin of minerals and rocks, and the development of land formations with special emphasis on plate tectonics and associated phenomena. Agents of erosion with resulting land formations. 3 credits (2 lecture hours, 2 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

## **NATR 142. Plane Surveying I. (3 Credits)**

The principles of plane surveying are explored. Investigation is made of elementary field techniques and office procedures with emphasis on agricultural and conservation applications. Familiarization with various modern surveying instruments, analysis of error and survey computation is emphasized. Field work includes taping, profile and differential leveling, traversing and topographic mapping. Prerequisite: MAGN 101 or equivalent 3 credits (2 lecture hours, 3 laboratory hours), fall semester

## **NATR 144. Seminar/Environmental Resc I. (1 Credit)**

Designed to inform the freshman Environmental Science student with the various options of study within the department and the career opportunities for each. Other presentations will deal with such topics as enhancing your classroom success, the pre-registration process, ethics, placement, letters of applications, resumes, interviewing techniques and meeting professionals from various environmental fields. Required for all freshman in the Environmental Sciences majors. 1 credit (1 hour recitation), fall semester

## **NATR 145. Intro Environmental Technology. (3 Credits)**

A study of the basic concepts of water pollution control, air pollution control, and solid waste management. Review of regulations relating to Environmental Protection and waste minimization/pollution prevention activities are covered. This is a hybrid course: online lectures with in-person laboratory. This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science. 3 credits (2 lecture hours, 3 laboratory hours), fall semester

## **NATR 150. Aquaculture. (3 Credits)**

An introduction to the husbandry of aquatic organisms. Course places emphasis on rearing unit theory and management, stock inventory, growth projections, and water quality management. Laboratory exercises feature visits to state and commercial hatcheries, and hands-on activities at the Morrisville State College Aquaculture Center. This course has an additional laboratory fee. 3 credits (2 lecture hours, 4 laboratory hours), fall semester

**NATR 152. Fish Reproduction. (2 Credits)**

This course explores fish reproductive strategies and their management implications; topics include: modes and requirements of reproduction, embryology, induced spawning techniques, genetics, hybridization and genetic engineering. Laboratories include manual spawning of salmon and trout, and egg inventory. This course has an additional laboratory fee. Prerequisites: NATR 150, NATR 252 2 credits (1 lecture hour, 2 laboratory hours), fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 153. Marine Biology. (3 Credits)**

Introductory course to marine ecology, marine ecosystems, and survey of marine animal phyla. Course will cover the basic processes of marine ecosystems such as tides, currents, and general oceanography. Course will provide a survey of marine ecosystems (coral reefs, estuaries, mangroves, seagrass beds, kelp forests, intertidal and pelagic zones) and their processes. Course will cover marine animal phyla and biodiversity from Cnidarian to Pinnipeds (jellyfish to seals). 3 credits (3 lecture hours) fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 156. Aquaculture Practicum I. (1 Credit)**

Hands-on experience in aquaculture facility management with emphasis on daily routine and records keeping. Care of cultured fish and plants, facility maintenance, including fish stock inventory, water quality management, and shipping and transporting fish. Prerequisite: NATR 150 or permission of instructor 1 credit fall or spring semester

**NATR 158. Fish Nutrition. (2 Credits)**

Introduction to the nutritional requirements of fish. Emphasis is placed on natural and artificial feeding of fishes, digestive physiology and anatomy, nutritional requirements and deficiencies, and feed formulation. Laboratories include hands-on study of fish digestive anatomy, and the calculation of feed rations. This course has an additional lab fee. Prerequisite: MAGN 101, NATR 150 Co-requisite: NATR 252 2 credits (1 lecture hour, 3 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 160. Principles of Arboriculture. (2 Credits)**

Introduction to the art, science and technology of woody plant health care. Emphasis on the care of landscape trees and shrubs in residential, campus and municipal settings. Major topics include tree mechanics, pruning and training trees; cabling; risk tree management; site evaluation and tree planting and establishment. Co-requisite: NATR 161 2 credits (2 lecture hours), fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science (and Scientific Reasoning).

**NATR 161. Practices of Arboriculture. (1 Credit)**

Practical education and experience in the establishment and care of trees and shrubs in the landscape. Emphasis on individual and small groups of plants in residential, campus and municipal settings. Students work in teams under close supervision. Major activities include pruning, climbing with rope and saddle, and risk tree evaluation. This course has an additional laboratory fee. Co-requisite: NATR 160 1 credit (3 laboratory hours), fall semester

**NATR 210. Dendrology. (3 Credits)**

Field study, identification, taxonomy and natural history of more than 100 important forest trees and shrubs of North America. 3 credits (2 lecture hours, 3 laboratory hours), fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science (and Scientific Reasoning).

**NATR 211. Forest Protection. (3 Credits)**

Overall view of the agents damaging to the forest and their management: meteorology, insects, disease causing organisms, beneficial organisms, IPM, fire behavior and control, and invasive species. Hybrid course: on-line lectures with in-person laboratory. Pre or Co-requisite: NATR 101 General Ecology or permission from the instructor. 3 credits (2 lecture hours, 3 laboratory hours), spring semester

**NATR 213. Basics Geospatial Technology. (2 Credits)**

This course involves a basic introduction to geospatial technology with focus on the practical applications of geographic information (GIS) and global positioning systems (GPS) in mapping natural and renewable resources. The basic principles of GIS and GPS are discussed with emphasis on computer-assisted mapping. Focus will be on running ArcGIS and its application in a number of assigned class projects. Students are also expected to understand how to conduct surveys using both standard and real-time differential GPS as well as generate thematic maps. GPS measurements and digital orthoimages are utilized in creating geographically-referenced, spatial data. Prerequisite: NATR 113, or permission of instructor 2 credit (1.5 lecture hour, 2 laboratory hours), 10-week course, spring semester

**NATR 215. Practices Of Silviculture. (3 Credits)**

Application is made of silvicultural techniques for tending the forest stand in order to meet the goals and objectives of the forest landholder utilizing the principles of forest ecology. Emphasis is on understanding the forest ecosystem and the impact of cultural practices such as thinning, harvest cutting, timber stand improvement and stand regeneration. Prerequisites: NATR 110 and NATR 115. Pre- or co-requisite: NATR 213. 3 credits (2 lecture hours, 3 laboratory hours), spring semester.

**NATR 221. Invasive Species Management. (3 Credits)**

Biology, impact and management of invasive species found in or threatening New York State. Terrestrial and aquatic plants, animals (including insects), and diseases are discussed. Classroom focus is on pathways, factors leading to invasion, impact, management and control strategies, and restoration options. Laboratories will involve hands-on surveying and management efforts. Prerequisite: NATR 101 or similar, or by permission from the instructor. 3 credits (2 lecture hours, 3 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science (and Scientific Reasoning).

**NATR 232. Wildlife Ecology & Management. (3 Credits)**

A study of the art and science of wildlife management, including topics pertinent to understanding wildlife populations, their habitats, their ecology and management. Laboratories emphasize identification and life histories of principle North American mammals and game birds, specimen preparation, collection techniques, cover mapping, and habitat manipulation. Prerequisite: NATR 101 or permission of the instructor. Pre or co-requisite: NATR 213. 3 credits (2 lecture hours, 3 laboratory hours), spring semester. This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 242. Environmental Law. (3 Credits)**

**NATR 246. Internship Natural Resources. (1-4 Credits)**

The purpose of this course is to encourage students to gain experience relative to their major area of study. Students work at an approved internship site in the natural resources field. While working, students maintain a log of activities and progress towards individually established goals. Upon completion, students compile a written report of their internship work and the success of their goals. Prerequisite: Completion of one semester in Natural Resources Conservation or a related major and permission of faculty. 1-4 credits

**NATR 250. Aquatic Ecology. (3 Credits)**

AA study of the physical, chemical and biological interactions of freshwater environments throughout Central New York. Includes ecology, origins, communities and populations of lakes, streams, wetlands, and estuaries. Laboratories include identification of aquatic plants, invertebrates, reptiles and amphibians, habitat assessment, wetland delineation, and the use of bioindicators. Field studies are conducted on local streams, lakes and wetlands. Prerequisite: NATR 101 3 credits (2 lecture hours, 3 laboratory hours), fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 252. Fish Ecology and Management. (3 Credits)**

A study of the morphology, biology, ecology, behavior, and taxonomy of fishes. Strong emphasis is placed on the identification of New York's common freshwater and estuarine fish species. Other topics include systematics, reproductive ecology, population dynamics, fisheries management, and the application of seines, trap nets, gill nets, and electroshocking fishing gear. Pre or co-requisite: NATR 101 or permission of the instructor 3 credits (2 lecture hours, 3 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 254. Fish Health Management. (3 Credits)**

Capstone course in the Aquaculture series, dealing with the development and maintenance of hygienic culture facilities. The course progresses from disease and diagnostic theory, through pathogenic and parasitic agents, to chemical and cultural means of disease prevention and eradication. Laboratory exercises include necroptic and microbiologic techniques, pathogen and parasite identification, and chemotherapeutic treatments. This course has an additional lab fee. Prerequisites: NATR 150 and NATR 252, or permission of instructor 3 credits (2 lecture hours, 3 laboratory hours), spring semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science.

**NATR 256. Aquaculture Practicum II. (1 Credit)**

A continuation of the Aquaculture Practicum series, addressing advanced methods in aquaculture, including fish handling, incubation and early-rearing of fish stocks, feed ration calculations, grow out projections, and harvesting and shipping of fish. Prerequisite: NATR 156, MAGN 101 Co-requisite: NATR 158 1 credit, fall or spring semester

**NATR 257. Aquaculture Practicum III. (1 Credit)**

In this continuation of the Aquaculture Practicum series, the student assumes the role of a fish hatchery crew supervisor. In supervising the daily routine of work crews, the student develops mentoring and leadership skills. Additional competency is developed in grow-out, harvesting, fish sales, and delivery. Prerequisite: NATR 256 1 credit, fall or spring semester

**NATR 258. Aquaculture Practicum IV. (1 Credit)**

Final course in the Aquaculture Practicum series. Students will continue to develop and apply mentoring and leadership skills in the management of the Morrisville State College Aquaculture Center. AP IV students will plan and implement work schedules of AP I-III students, conduct performance evaluations, determine feed orders and supply budgets, and develop long-range strategic plans for the AQ Center. Prerequisite: NATR 257 1 credit, fall or spring

**NATR 260. Principles of Zoology. (4 Credits)**

An integrated lecture and laboratory course that presents an introduction to the study of vertebrate and invertebrate animals. Emphasis on zoological organization, identification, diversity, evolution, behavior, form and function, physiology and reproduction. 4 credits, Fall

**NATR 261. Advanced Arboriculture Practic. (1 Credit)**

This course will include advanced arboriculture knowledge and skills associated with hazard tree identification, tree pruning, climbing with a rope and saddle, and use of tree pruning equipment. Students will additionally gain leadership skills by mentoring NATR 161 students by acting as crew leaders for projects, assisting them with skill development, and demonstrating arboriculture skills. Prerequisite: B or higher in NATR 160 and NATR 161 or with instructor's permission. 1 credit (2 laboratory hours), fall semester

**NATR 280. Herpetology. (3 Credits)**

Herpetology is a course designed to investigate the thermal physiology, taxonomy, distribution and natural history of reptiles and amphibians. Emphasis is placed on local forms. Techniques of field identification, collection and preservation are covered in the laboratory component. Prerequisite: Grade of 'C' or better in BIOL 120, or General Ecology NATR 101. 3 credits (2 lecture hours, 4 laboratory hours) fall semester This course satisfies the Liberal Arts and Sciences requirement and the SUNY General Education Requirement for Natural Science

**NATR 288. Research in Aquatic Science I. (1 Credit)**

This course provides the ground work for developing and initiating a research project in the aquatic sciences. Students will progress through the steps of conceiving and conducting background research, formulating research objectives, developing a research methodology, and initiating data collection. The efforts of this course will culminate in NATR 289 Research in Aquatic Science II. Prerequisites: Aquaculture and Aquatic Science major AND permission of instructor 1 credit (approximately 4 hours/week independent research, 60 hours total), fall or spring semester

**NATR 289. Research Aquatic Science II. (1 Credit)**

This course provides the continuation of the research project initiated in research in aquatic science I. Students will progress through the steps of data collection and analysis, data description and summarization, synthesis of conclusion and presentation of results. The course will culminate in an oral, conference-type research presentation. Prerequisite: Research in Aquatic Science I and permission of the instructor 1 credit (approximately 4 hours/week independent research, 60 hours total), fall or spring semester

**NATR 310. Urban Forest Management. (3 Credits)**

Urban Forest Management will introduce students to urban forest ecosystems and their management. Topics include the benefits and uses of urban trees and forests, tree inventory, tree appraisal, tree establishment, urban forest and open space planning and management, street tree maintenance, and program coordination and funding. Course includes a semester long data collection and analysis project. Prerequisite: NATR 101 or BIOL 102 or permission of instructor. 3 credits (2 lecture hours, 2 laboratory hours).