

UNIVERSITY OF THE DISTRICT OF COLUMBIA

COLLEGE OF AGRICULTURE, URBAN SUSTAINABILITY
AND ENVIRONMENTAL SCIENCES

Course Descriptions - Professional Science Master's Degree Program

WTRM-500 Water Quality Assessment, Monitoring & Treatment (3)

This course is designed to introduce students to the principle and practical aspect of water and wastewater quality assessment, monitoring and treatment. Students will be able to analyze the definite (water quantity) and indefinite (water quality) characteristics of water, including water quality standards, water quality monitoring, water quality assessment tools, regulations and the basics of water and wastewater treatment processes and their limitations in the context of integrated river water resources management requirements. Students will be engaged in rigorous field studies, site tour of water and wastewater treatment plants, laboratory analysis using state-of-the art lab technologies ranging from DR2800 Spectrophotometer through Gas Chromatography Mass Spectrophotometer and Inductive Couple Plasma Mass Spectrophotometer.

WTRM-501 Surface & Ground Water Hydrology (3)

This course concentrates on the analysis and quantification of surface and groundwater hydrological processes, such as rainfall, evapotranspiration, runoff, groundwater recharge, groundwater storage, groundwater movement and management of the water environment. The course provides a conceptual and quantitative understanding of hydrology and the basic principles of hydraulics as a basis for later applied studies of water quality assessment, water resources engineering and management. Hydrology laboratory exercises, field study and term project are included.

WTRM-502 Public Communication for STEM Professionals (3)

This course focuses on the principles of effective oral and written communication skills, scientific presentation skills, as well as improving general speaking skills and communication with non-specialist policy makers. The course is designed to help lower anxiety about public speaking and to further develop individual delivery and style.

WTRM-503 Environmental Impact Assessment: Integrated project (3)

This course is designed to provide a critical overview of the theory and practice of Environmental Impact Assessment (EIA). Students will learn basic principles of environmental impact assessment and environmental impact reports in class. Students will practice how to conduct environmental impact assessments and write environmental impact statements and reports.

WTRM-504 Ethics, Responsible Conduct of Research and Professional Responsibility (3)

This course is designed to explore ethical rules and constraints, to provide students with an understanding of the standards of professional responsibility. Through a case-based approach, students will consider various ethical issues within the often competing demands imposed by the operation of the "rule of law" and concerns for public safety & security.

WTRM-505 GIS for Water Resource Management (3)

This course equips the student with a set of spatial data management and analysis tools, which can be applied to different water resources problems. The course focuses on the principle and application of the

Geographical Information System to water resource management.

WTRM-600 Stream Restoration (3)

This course is designed to provide a technical understanding of the theoretical and practical principles of stream restoration used to return an impaired or degraded river corridor ecosystem to a close approximation of its remaining natural potential. The course explores the scientific basis of stream restoration programs through interdisciplinary theories and practice and presents principles of hydrology, sedimentation engineering, geomorphology, and ecology relevant to the design and evaluation of stream restoration projects. Students will be exposed to a variety of stream restoration concepts through lectures, seminars, field trips, and independent project assessments.

WTRM-601 Water Quality Modeling (3)

This course is designed to give graduate level students an overview of water quantity and quality aspects of surface water characteristics and the analytical methods used in the development of water quality models and the application of these models to stream and river systems, lakes and reservoir systems and estuaries. Students will develop and apply mathematical conceptualization and formulation of physical, chemical, biological processes to predict hydrological, water quality constituent transport and fate in the bodies of water. Student will be able to assess and predict current and future water quality status for both conventional pollutants and toxic organic contaminants. Water quality modeling and simulation tools include SWMM, WEST, QUAL2K and AQUATOX.

WTRM-690 Internship (3)

Students will be engaged in supervised work-and-learning experiences in water resources management, under the direction of a University faculty members and employees of participating firms. Students are expected to dedicate (10) ten to (20) twenty hours a week to their internships during the academic year and (20) twenty to (40) forty hours a week during a five week summer term. The internship program will have students involved in data collection, analysis and interpretation, field and/or laboratory experiences and writing reports.

WTRM-699 Capstone Seminar (1)

This course is designed for the senior level graduate students to gain coherence in their knowledge of their previous course studies and professional development. Students will practice and be able to critically review and analyze the latest research findings, write technical reports, prepare a grant proposal in the area of their concentration.

ENSC-508 Ecological Economics (3)

A new sub-discipline called "Ecological Economics" is the most recent effort to combine the thoughts of economists and ecologists, as well as combine the scientific, political and ethical issues. In contrast with neo-classical economics, ecological economics are primarily concerned with the relationship between socio-economic systems and the biological/physical world, and put the environmental and ecological systems at the forefront of their thinking. This course will be organized in a seminar format including lectures, guest lecturers, student presentations and discussions, and a final term paper. The major objectives are to train students in the following major perspectives: (1) historical perspective on the coupled human and natural systems; (2) the relationship between economic growth, environment and human well-being; (3) conceptual foundations and principles of ecological economics; and (4) empirical application of ecological economics. The Ecological Economics course is designed to bring students to the interface of natural sciences and social sciences. This course should be of interest to a variety of students in such fields as forestry, wildlife, biology, soil/agronomy, economics and sociology as long as they have some training or motivation in ecology, economics and interaction between human and nature. As an interdisciplinary course, students from several departments and colleges (e.g. School of Forestry and Wildlife Sciences, College of Agriculture, College of Business, Dept. of History) can take this course.

ENSC 509 Advanced Climate Science

This course is designed to explore the science of climate change and carbon accounting in terrestrial systems, against the background of the policy context for climate change mitigation and adaptation. The principles and practice of carbon accounting are explored by applying current scientific understanding of the factors influencing carbon in the environment, based on a range of modeling approaches. Students will be able to explore global climate change as a result of human activities; assess the effect of enhanced greenhouse gas emissions on climate change, and describe the social, economic and political implications of climate change, and evaluate ways in which we attempt to manage and adapt to this change.

ENSC-512 Food Production and Agro-ecology

The goal of this course is to give students a broad introduction to agroecology including aspects of both the natural and social sciences. The lecture portion of the course will focus on natural sciences relating to agriculture including food production, population, community, and ecosystem ecology, and the environmental impacts of both conventional and sustainable agricultural management systems. Lectures will also touch on the social, political, and economic forces that relate to farming communities, food distribution, transportation, and consumption. All of these issues will be further examined in hands-on experiences during several field trips and a film series included in the course.

ENSC 510 Urban Land Use-Planning

This course is designed to explore the techniques, processes, and personal and professional skills required to effectively manage growth and urban land use change. While primarily focused on the planning practice in the United States, the principles and techniques reviewed and presented may have international application. By the end of the quarter, students should be able to (1) discern the merits and demerits of the many critiques of land use planning, (2) evaluate the value of various innovations in contemporary land use planning practice, (3) contemplate about land use policies in relation to the market, and the institutional and social context in which they intervene, and (4) enable better and more just patterns of urban development and growth.

WTRM 506 Quantitative and Qualitative Research Methods

The Research Methods course provides comprehensive study of research methods, both quantitative and qualitative. An overview is presented of the quantitative and qualitative research methods and designs applicable to the systematic analysis of the varieties of human behaviors. Scientific problem-solving will be emphasized to include observational techniques and measurement tools, coding, analytic strategies, and reporting of research. Reviews of applications within the psychological literature will be covered. The course will encourage students to focus on research that has been used in their appropriate fields. This course will help in preparing students for their analytical courses and will facilitate understanding of research in later work as a practitioner in the field.

ENSC-511 Advanced Sustainable Urban Agriculture

This course will explore the place and potential of urban agriculture in environmental planning, management, and development. Topics to be covered include fundamentals of a sustainable food system, horticultural principals and techniques, the place of food systems in urban planning, how urban agriculture can be accommodated within the urban built fabric, and contemporary examples of community gardening and urban agriculture locally and in other parts of the country. The principles of stormwater and solid waste management, nutrient and water cycles, and sustainable material sourcing will be explored as well.