Environmental Analysis and Decision Making

The Wiess School of Natural Sciences

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Degrees Offered: MS

Rice University introduced the professional master's degree in environmental analysis and decision making in fall 2002. This degree is geared to teach students rigorous methods that are needed by industrial and governmental organizations to deal with environmental issues. As an interdisciplinary program, it aims to give students the ability to predict environmental problems, not just solve them. It emphasizes core quantitative topics such as statistics, remote sensing, data analysis, and modeling. In addition, it teaches laboratory and computer skills and allows students to focus their education by taking electives in relevant fields.

The environmental analysis and decision making degree is 1 of 3 tracks in the professional master's program at Rice housed in the Wiess School of Natural Sciences. These master's degrees are designed for students seeking to gain further scientific core expertise coupled with enhanced management and communications skills. These degrees instill a level of scholastic proficiency that exceeds that of the bachelor's level, and they create the cross-functional aptitudes needed in modern industry. Skills acquired in this program will allow students to move more easily into management careers in consulting or research and development, design, and marketing of new science-based products.

Degree Requirements for MS in Environmental Analysis and Decision Making

In addition to the core science courses, students are required to complete a 3-to 6-month internship and take a set of cohort courses focusing on business and communications. At the conclusion of the internship, students must present a summary of their internship project in both oral and written form as part of the professional master's seminar.

Part-time students who already work in their area of study may fulfill the internship requirements by working on an approved project with their current employer. For general university requirements for graduate study, see pages 56-58, and also see Professional Degrees, page 58.

Admission

Admission to graduate study in environmental anyalysis and desision making is open to qualified students holding a bachelor's degree in a related field that includes general biology, chemistry, calculus, differential equations, and

linear algebra. Department faculty evaluate the previous academic record and credentials of each appplicant individually.

Science core courses

CEVE 401 *Introduction to Environmental Chemistry with lab* (F)

ESCI 450 *Remote Sensing* (S)

STAT 685 *Quantitative Environmental Decision Making* (S)

Plus a single course from each of the following:

Group A

ESCI 451 *Analysis of Environmental Data* (F)

STAT 305 *Introduction to Statistics for Biosciences* (F, S)

Group B

STAT 385 *Methods for Data Analysis* (S)

STAT 410 *Introduction to Statistical Computing and Linear Models* (F)

STAT 421 *Computational Finance II: Time Series Analysis* (S)

STAT 422 *Bayesian Data Analysis* (S)

STAT 509 *Advanced Psychological Statistics I* (F)

Group C

CEVE 411 *Air Resource Management* (S)

CEVE 412 *Hydrology and Watershed Analysis* (S)

CEVE 434 *Chemical Transport and Fate in the Environment* (F)

CEVE 511 *Atmospheric Chemistry and Physics* (F)

CEVE 550 *Environmental Organic Chemistry* (S)

Cohort Courses

NSCI 610 *Management in Science and Engineering* (F)

NSCI 501 *Professional Master's Seminar* (F, S) [required for **two** semesters]

NSCI 511 *Science Policy and Ethics* (S)

NSCI 512 *Professional Master's Project* (F,S)

Internship

An internship is conducted under the guidance of a host company, government agency, or national laboratory. A summary of the internship project is required in both oral and written form as part of the professional master's project.

Elective Courses

Note: Each of these electives is not offered every year, and some courses may have prerequisites or require instructor permission.

Students will choose 5 elective courses, three of which should be from 1 of the focus areas. At least 1 elective should be from the management and policy focus area. Recommended courses include, but are not limited to, the following:

Sustainable Development

BIOS 322 *Global Ecosystem Dynamics* (S)

BIOS 325 *Ecology* (S)

CEVE 406 *Introduction to Environmental Law* (S)

CEVE 411 *Air Resource Management* (S)

CEVE 434 *Chemical Transport and Fate in Environment* (F)

ECON 480 *Environmental Economics* (S)

ESCI 353 *Environmental Geochemistry* (S)

MGMT 617 *Managerial Decision Making* (S)

MGMT 661 *International Business Law* (S)

MGMT 674 *Production and Operations Management* (F)

MGMT 676 *Project Management/Project Finance* (S)

MGMT 721 *General Business Law* (S)

SOCI 367 *Environmental Sociology* (S)

Management and Policy

CEVE 322 *Engineering Economics for Engineers* (F)

CEVE 406 *Introduction to Environmental Law* (S)

ECON 480 *Environmental Economics* (S)

NSCI 625 *New Venture Creation in Science and Engineering* (S)

MGMT 721 *General Business Law* (S)

MGMT 661 *International Business Law* (S)

MGMT 617 *Managerial Decision Making* (S)

MGMT 674 *Production and Operations Management* (F)

MGMT 676 *Project Management/Project Finance* (S)

MGMT 636 *Systems Analysis and Database Design*

SOCI 367 *Environmental Sociology* (S)

Biological Sciences

BIOS 322 *Global Ecosystem Dynamics*

BIOS 325 *Ecology*

BIOS 424 *Microbiology and Biotechnology*

BIOS 425 *Plant Molecular Biology* (F)

CEVE 536 *Environmental Biotechnology*

ESCI 468 *Climate Change and Human Civilization* (S)

Chemistry

CENG 630 *Chemical Engineering of Nanostructured Materials* (S)

CEVE 511 *Atmospheric Chemistry and Physics* (F)

CEVE 550 *Environmental Organic Chemistry* (S)

ESCI 353 *Environmental Geochemistry* (S)

Fluid Dynamics and Transport

CENG 571 *Flow and Transport in Porous Media I* (S)

CENG 671 *Flow and Transport in Porous Media II* (F)

MECH 371 *Fluid Mechanics I* (F)

MECH 372 *Fluid Mechanics II* (S)

MECH 454/554 *Finite Element Methods in Fluid Mechanics* (F)

Engineering

CEVE 411 *Air Resource Management* (S)

CEVE 434 *Chemical Transport and Fate in the Environment* (F)

CEVE 530 *Physical/Chemical Processes in Environmental Engineering* (S)

CEVE 640 *Advanced Topics in Environmental Engineering* (F)

Advanced Computation

CAAM 378 *Introduction to Operations Research and Optimization* (F)

CAAM 420 *Computational Science I* (F)

CAAM 451 *Numerical Linear Algebra* (F)

CAAM 452 *Computational Methods for Differential Equations* (S)

CAAM 454 *Optimization Problems in Computational Engineering and Science* (S)

ESCI 441 *Geophysical Data Analysis* (F)

ESCI 451 *Analysis of Environmental Data* (F)

ESCI 454 *Geographic Information Systems* (F)

MECH 454/554 *Finite Element Methods in Fluid Mechanics* (F, S)

MECH 343 *Modeling of Dynamic Systems* (F)

MECH 417/517 *Finite Element Analysis* (S)

MECH 420 *Feedback Control of Dynamical Systems* (F)

MECH 563/ CAAM 563 *Engineering Approach to Mathematical Programming* (F)

MECH 679 / CEVE 679 *Applied Monte Carlo Analysis* (F)

STAT 421 *Methods in Computational Finance II* (S)

STAT 422 *Bayesian Data Analysis* (S)

STAT 431 *Mathematical Statistics* (F)

STAT 540 *Practicum in Statistical Modeling* (S)

STAT 541 *Multivariate Analysis* (S)

STAT 546 *Design and Analysis of Experiments and Sampling Theory*

STAT 553 *Biostatistics* (S)