Environmental Analysis and Decision Making

The Wiess School of Natural Sciences

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Degrees Offered: M.S.

Rice University will introduce a professional master’s degree in Environmental Analysis and Decision Making for the 2002–2003 academic year. 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 one of three tracks in the new 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 create the cross-functional aptitudes needed in modern industry. 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 M.S. in Environmental Analysis and Decision Making

The 21-month professional master’s program begins with two semesters of course work at Rice followed by a six-month industrial internship. After the internship, students return to Rice for a final semester of course work. In addition to taking technical courses, students in the Environmental Analysis and Decision Making program will take two management courses, one science policy and ethics course, and a seminar jointly with the students involved in the other professional master’s tracks. No thesis is required; however, students are required to present their internship projects in both oral and written form in the Professional Master’s Seminar. Students also are required to attend events organized by the Rice Alliance for Technology and Entrepreneurship and will be guided in courses by the efforts of the Cain Project in Engineering and Professional Communication.

For general university requirements for graduate study, see pages 67–68, and see also Professional Degrees, page 63.

To insure that all students obtain an excellent quantitative background, each student will be required to take the core courses listed below. If a student can demonstrate that s/he has learned the material elsewhere, s/he may be exempted. In addition to taking the core courses, the student will choose 5 electives from the list below. We recommend that three of the electives be in one focus area (biological sciences, chemistry, fluids and transport, engineering, policy, or advanced computation).

Year 1

Fall Semester
Elective
STAT 305 Introduction to Statistics for Biosciences with 1 hour environmental lab
ENVI 401 Introduction to Environmental Chemistry
MGMT 750 Management for Science and Engineering
NSCI 501 Professional Master’s Seminar

Spring Semester
2 electives
CAAM 353 Computational Numerical Analysis
STAT 410 Introduction to Statistical Computing and Linear Models
STAT 510 Advanced Environmental Statistics Lab
NSCI 501 Professional Master’s Seminar

Summer
Industrial Internship

Year 2

Fall Semester
NSCI 500 Industrial Internship
NSCI 501 Professional Master’s Seminar

Spring Semester
2 electives
Science Policy and Ethics
ESCI 450 Remote Sensing
NSCI 501 Professional Master’s Seminar

Elective Courses: (Students must take five; three should be in one focus area, and at least one should be from management and policy area.)

Biological Sciences
BIOS 322 Global Ecosystem Dynamics
BIOS 324 Wetland Ecosystems
BIOS 325 Ecology
BIOS 424 Microbiology and Biotechnology
BIOS 425 Plant Molecular Biology

Chemistry
ENVI 511 Atmospheric Chemistry and Physics
ENVI 550 Applied Water Chemistry
ESCI 353 Environmental Geochemistry

Elec 468 Paleoclimate and Human Response
Fluid Mechanics and Transport
CENG 571–671 Flow and Transport in Porous Media I and II
ENVI412 Hydrology and Watershed Analysis
MECH 371–372 Fluid Mechanics I and II
MECH 454/554 Finite Element Methods in Fluid Mechanics
MECH 673 Advanced Fluid Mechanics I
Engineering
ENVI 411 Air Resource Management
ENVI434 Chemical Transport and Fate in the Environment
ENVI530 Physical/Chemical Processes in Environmental Engineering
ENVI 640 Advanced Topics in Environmental Engineering
Management and Policy
CAAM 378 Introduction to Operations Research
ECON 480 Environmental Economics
ENGI 303 Engineering Economics and Management
ENVI 406 Introduction to Environmental Law
MGMT 617 Managerial Decision Making
MGMT 636 Systems Analysis and Database Design
MGMT 661 International Business Law
MGMT 674 Production and Operations Management
MGMT 676 Project Management/Project Finance
MGMT 721 General Business Law
MGMT 751 New Venture Creation in Science and Engineering
SOCI 367 Environmental Sociology
Advanced Computation
CAAM 420 Computational Science I
CAAM 451 Numerical Linear Algebra
CAAM 452 Computational Methods for Differential Equations
CAAM 454 Optimization Problems in Computational Engineering and Science
COMP 361 Visual Methods for Science and Engineering
ELEC 531 Statistical Signal Processing
ELEC 532 Wavelet and Spectral Analysis
ELEC 539 Digital Image Processing
ESCI 441 Geophysical Data Analysis
ESCI 454 Geographic Information Systems
MECH 417/517 Finite Element Analysis
MECH 454/554 Finite Element Methods in Fluid Mechanics
MECH 563/CAAM 563 Engineering Approach to Mathematical Programming
MECH 679/CIVI 679 Applied Monte Carlo Analysis
STAT 420 Quality and Process Control from an Experimental Design Perspective
STAT 421 Introduction to Time Series Analysis
STAT 422 Bayesian Data Analysis
STAT 431 Mathematical Statistics
STAT 540 Practicum in Statistical Modeling
STAT 541 Multivariate Analysis
STAT 546 Design and Analysis of Experiments and Sampling Theory
STAT 550 Nonparametric Function Estimation
STAT 551 Time Series Analysis and Spatial Processes
STAT 553 Biostatistics