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 elesewhere, s/he may be exempted. In addition to taking the core courses, the student will choose 5 elec tives 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*
ENVI 536 *Environmental Biotechnology*
ESCI 468 *Paleoclimate and Human Response*

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

Fluid Mechanics and Transport

CENG 571–671 *Flow and Transport in Porous Media I* and *II*
ENVI 412 *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*
ENVI 434 *Chemical Transport and Fate in the Environment*
ENVI 530 *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*