RICE UNIVERSITY

PROFESSIONAL SCIENCE MASTER’S
WIESS SCHOOL OF NATURAL SCIENCES

GRADUATE DEGREE
REQUIREMENTS AND PROCEDURES

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Consult the Rice University General Announcements on-line at [http://ga.rice.edu/](http://ga.rice.edu/) for additional information or changes.
PROGRAM OVERVIEW

The Wiess School of Natural Sciences offers five degrees through the Professional Science Master’s Program.

The **Master of Science in Bioscience and Health Policy** provides skills needed for work in bio-scientific, health-related industries and governmental organizations. It aims to build leaders in science and health policy who will create and promote science and medicine.

The **Master of Science in Environmental Analysis and Decision Making** focuses on the methods needed by industrial and governmental organizations to deal with environmental issues.

The **Master of Science in Subsurface Geoscience** is geared for students who would like to become proficient in applying geological knowledge and geophysical methods to finding and developing reserves of oil and natural gas.

The **Master of Science in Nanoscale Physics** combines a strong component in quantum theory with the study of practical nanoscale and mesoscale devices.

The **Master of Science in Space Studies** combines study of space engineering, aerospace, and life sciences, with courses in management, business and communication. It will train scientists/engineers to face challenges in human/robotic space exploration and space policy.

The curriculum for all professional science master’s degrees consists of required science courses, electives, cohort courses, and a three to six month internship. This combination should enable the student to apply her/his scientific education in an industry environment.
GENERAL DEGREE REQUIREMENTS

Each degree consists of science core courses, cohort courses, elective courses, and a three to six month internship. Students must complete two reports on the internship experience, and give a presentation during the Professional Master’s Seminar.

Professional Science Master’s students must take approximately 40 semester hours of upper level courses (at the 400 level or higher), dependent upon the chosen degree. At least 24 semester hours must be completed at Rice. Students who have already taken courses substantially similar to any of the required courses (and have not used them for another degree) may request to transfer up to 9 credit hours from a former institution. To do this, students should submit a memo and copies of all relevant transcripts and course syllabi to the program committee. Each case must be individually approved by the program committee.

Students must maintain a B- (2.67) grade point average in courses counted toward the graduate degree. Students whose GPA falls below 2.67 are placed on probationary status. Students on probationary status will not be approved for an intern position or graduation.

Professional Science Master’s 5th Year Degree Option for Rice Undergraduates:

Rice students have an option to achieve these M.S degrees back-to back by adding an additional fifth year to the four undergraduate years of science studies. Advanced Rice students in good standing apply during their junior year, and then start taking required core courses of the respective program during their senior year. A plan of study based on their particular focus area will need to be approved by the track director and the PSM director.

The Dual PSM/MBA Program Track

In order to offer a deeper immersion into management and business acumen, the Professional Science Master’s at Rice has collaborated with the Rice Jones Graduate School of Business to offer the dual PSM/MBA program. Applications to both programs have to be received at the same time. According to the Professional Science Master’s track focus, graduates are qualified for leadership roles in industries related to the environment, nanotechnology, energy and government. The joint degree program can be completed in 2 1/2 to 3 years. This includes a total of 45 hours of course work in business management and 30 to 34 credit hours in the chosen PSM track. Students will complete the same core requirements as the students in the regular MBA and PSM programs. Graduates will receive a Master of Science and a MBA degree.
BIOSCIENCE AND HEALTH POLICY DEGREE

In addition to the internship and cohort courses, graduate students in the Bioscience and Health Policy program will take the following courses:

**Four Required Bioscience Classes:** The Bioscience courses give in-depth instruction in specialized areas of Bioscience. Four courses are required to obtain a broad understanding of diverse areas of cutting edge Bioscience research.

- BIOC 498 Biomems and Biomedical Microdevices
- BIOC 524 Microbiology and Biotechnology
- BIOC 563 Endocrinology
- BIOC 572 Immunology
- BIOC 585 Fundamentals of Cellular, Molecular, and Integrative Neuroscience
- BIOC 525 Plant Molecular Genetics and Development
- BIOC 544 Developmental Biology
- BIOC 545 Advanced Molecular Biology and Genetics
- BIOC 547 Biology and Medicine
- BIOC 560 Cancer Biology

**Four Statistics, Economics, and Policy Courses:**
The analytical competency requirement provides career-enhancing, marketable skills in policy analysis, economics and statistics. Students will take courses from groups A, B and C as indicated below:

**A – One Statistics Course**
- STAT 385 Methods of Data Analysis and System Optimization or STAT 453 Biostatistics
- STAT 684 Environmental Risk Assessment and Human Health

**B - One Economics/Finance Course**
- ECON 446 Applied Econometrics
- ECON 450 World Economy and Social Development
- PH3910* Introduction to Health Economics
- MGMT 679 Cost and Quality in Health Care

**C - Two Policy Courses**
- POST 430 Shaping of Health Policy
- HEAL 498 Disparities in Health in America
- PHIL 336 Medical Ethics
Minimum of Two Elective Courses:
The electives reflect individual academic interests and career goals. Any course from the above list of Bioscience courses can be taken as an elective, provided it was not taken as a required course. In addition, the following classes qualify as elective classes:

ANTH 381  Medical Anthropology
ECON 450  World Economy and Social Development
GHLT 462  Global Health Design Challenges
HEAL 407  Epidemiology
HEAL 498  Disparities in Health in America
HI 5324*  Nanomedicine in Healthcare
MGMT 678  U.S. Healthcare Management
MGMT 679  Cost and Quality in Health Care
MGMT 961  Business Law
PH3910*  Introduction to Health Economics
PHIL 336  Medical Ethics
POST 430  Shaping of Health Policy
SOSC 420  Health Care: Competition and Managed Care
SOCI 514  Science at Risk – Out of the lab and into the society
STAT 385  Methods of Data Analysis and System Optimization or
STAT 453  Biostatistics
STAT 684  Environmental Risk Assessment and Human Health
GS 120254*  Cell and Systems Physiology
GS 120043*  Principles of Pathology

Other courses can be submitted for approval by the faculty oversight group.

TOTAL REQUIRED CREDIT HOURS: 39

Note: Each course may not be not offered every year, and some courses may have prerequisites or require instructor permission.
*Students can also choose electives from courses offered at UT Graduate School of Biomedical Sciences (GS), Health Science Center (PH), and UT School of Biomedical Informatics (HI) as listed above.
ENVIRONMENTAL ANALYSIS AND DECISION MAKING DEGREE

In addition to the internship and cohort courses, graduate students in the Environmental Analysis and Decision Making program will take the following courses:

Required Science Core Courses

EBIO 570 Ecosystem Management and Conservation (S)
CEVE 510 Principles of Environmental Engineering (TBA) or
    CEVE 501 Chemistry for Environmental Engineering and Science (F)
STAT 685 Quantitative Environmental Decision Making (S)

Elective Courses

Students will choose 21 credit hours elective of courses from the following three focus areas and satisfying the following requirements:

one course (3 credits) from each of EBIO, CEVE and STAT,
one course (3 credits) from the Management and Policy focus area,
and three courses (9 credits) from one focus area.

Recommended courses include, but are not limited to, the following:

Environmental Sustainability
CEVE 307:  Energy and the Environment (S)
CEVE 501:  Chemistry for Environmental Engineering and Science (F)
CEVE 412:  Hydrology and Watershed Analysis (S)
CEVE 415:  Water Resources Engineering and Planning (F)
CEVE 510:  Principles of Environmental Engineering
CEVE 511:  Atmospheric Processes (F)
CEVE 512:  Hydrologic Design Lab (S)
CEVE 520:  Environmental Remediation and Restoration (F)
CEVE 534:  Fate and Transport of Contaminants in the Environment (F)
CEVE 536:  Environmental Biotechnology and Bioremediation (S)
CEVE 550:  Environmental Organic Chemistry (S)
EBIO 323:  Conservation Biology (F)
EBIO 325:  Ecology (F)
EBIO 336:  Plant Diversity (S)
EBIO 563:  Current topics in Ecology (F)
EBIO 568:  Current topics in Conservation Biology (S)
EBIO 569:  Core course in Ecology and Evolutionary Biology (F)
ESCI 340:  Global Biogeochemical Cycles (F)
ESCI 424: Earth Science and the Environment (S)
ESCI 450: Remote Sensing (S)
ESCI 454: Geographic Information Science (F)
STAT 684: Environmental Risk Assessment and Human Health (F)

Management and Policy
CEVE 505: Engineering Project Management and Ethics (F)
CEVE 506: Global Environmental Law and Sustainable Development (S)
CEVE 528: Engineering Economics (S)
CEVE 529: Ethics and Engineering Leadership (S)
ESCI 417: Petroleum Industry Economics and Management (S)
ECON 437: Energy Economics (F)
ECON 480: Environmental Economics (F)
SOCI 367: Environmental Sociology (F)
MGMT 609: Managing in a Carbon Constrained World (S)
MGMT 610: Fundamentals of the Energy Industry (F)
MGMT 661: International Business Law (S)
MGMT 674: Production and Operations Management (F)
MGMT 676: Social Enterprise (F)
MGMT 721: General Business Law (F)

Quantitative Decision-Making
EBIO 338: Design and Analysis of Biological Experiments (F)
CEVE 313: Uncertainty and Risk in Urban Infrastructures (S)
CEVE 528: Engineering Economics (S)
ESCI 450: Remote Sensing (S)
ESCI 454: Geographic Information Science (F)
ECON 480: Environmental Economics (F)
STAT 312: Probability and Statistics for Civil and Environmental Engineers (F)
STAT 405*: Statistical Computing (F)
STAT 410: Introduction to Linear Models (F)
STAT 553: Biostatistics (S)
STAT 606*: SAS Statistical Programming
STAT 684: Environmental Risk Assessment and Human Health (F)

*Only one of these two courses may be counted toward the degree.

TOTAL REQUIRED CREDIT HOURS: 39

NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.
In addition to the internship and cohort courses, graduate students in the Subsurface Geoscience program will take the following courses:

### Required Professional Courses (9 credits):

- NSCI 610  Management in Science and Engineering (F/S)
- 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)
- NSCI 510  Internship

There are two focus areas in the Subsurface Geoscience track: **Geology and Geophysics**

### GEOLOGY FOCUS AREA:

**Required Courses  (22 credits)**

- ESCI 334 Geological Field Methods (S)
- ESCI 415 Petroleum Geology (S)
- ESCI 417 Petroleum Industry Economics and Management (S)
- ESCI 427 Sequence Stratigraphy (S)
- ESCI 428 Seismic Reflection Data Interpretation (F)
- ESCI 436 Well Logging and Petrophysics (S)
- ESCI 442 Exploration Geophysics (F)

**Students will choose three electives (9 credits):**

**Suggested Electives:**

- ESCI 420 Modern Exploration Technology (S)
- ESCI 444 Seismic Data Processing (S)
- ESCI 463 Advanced Structural Geology I (S)
- ESCI 504 Siliciclastic Depositional Systems (F)
- ESCI 506 Carbonate Depositional Systems (S)
- ESCI 544 Hydrocarbon Exploration (AAPG Imperial Barrel competition) (S)
NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.

**GEOPHYSICS FOCUS AREA:**

**Required Courses (22 credits)**
- ESCI 415 Petroleum Geology (S)
- ESCI 417 Petroleum Industry Economics and Management (S)
- ESCI 420 Modern Exploration Technology (S)
- ESCI 428 Seismic Reflection Data Interpretation (F)
- ESCI 442 Exploration Geophysics (F)
- ESCI 440 Geophysical Data Analysis: Digital Signal Processing (S), or ESCI 441 Geophysical Data Analysis: Inverse Methods (S)
- ESCI 444 Seismic Data Processing (S)

**Students will choose three electives (9 credits):**

**Suggested Electives:** Students will choose three electives.
- ESCI 334 Geological Field Methods (S)
- ESCI 427 Sequence Stratigraphy (S)
- ESCI 436 Well Logging and Petrophysics (S)
- ESCI 445 Joint Inversion of Exploration of Geophysical Data
- ESCI 463 Tectonic Systems (F)
- ESCI 544 Hydrocarbon Exploration (AAPG Imperial Barrel competition) (S)

NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.

**Internship:**
A three to six month internship under the guidance of a host company, government agency or national laboratory is required. At the conclusion of this internship, students must present their internship project in both oral and written form as part of the Professional Master’s Project.

**TOTAL REQUIRED CREDIT HOURS: 40 credits**
NANOSCALE PHYSICS DEGREE

In addition to the internship and cohort courses, graduate students in the Nanoscale Physics program will take the following courses:

Core science courses: (15 hrs)

- PHYS 533 Nanostructures and Nanotechnology I (F)
- PHYS 534 Nanostructures and Nanotechnology II (S)
- PHYS 537 Methods of Experimental Physics I (F)
- PHYS 538 Methods of Experimental Physics II (S)
- PHYS 539 Characterization and Fabrication at the Nanoscale (F)

Required Cohort Courses: (9 hrs)

- 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)

FOCUS AREAS: (12 hrs)

Nano-Materials

- PHYS 416 Computational Physics (S)
- MSCI 535 Crystallography and Diffraction plus lab (S)
- MSCI 580 Microscopy Methods in Material Science (S)
- MSCI 614 Special Topics: Principles of Nanoscale Mechanics (F)
- MSCI 650 Nanomaterials and Nanomechanics (S)

Nano-Optics and Nano-Photonics

- ELEC 568 Laser Spectroscopy (F)
- ELEC 521 High Performance Nanoscale Systems
- ELEC 571 Imaging at the Nanoscale (S)
- ELEC 573 Optical Spectroscopy of Nanomaterials (S)
ELEC 603  Nano-optics and Nano-photonics (F)
ELEC 685  Fundamentals of Medical Imaging (F)
PHYS 569  Ultrafast Optical Phenomena (S)

Nano-Bio
BIOE 342/442 Tissue Engineering (F)
BIOE 498  Biomems & Medical Microdevices (S)
CHEM 547  Supramolecular Chemistry (F)
CHEM 600  Biological Chemistry or Nanoscale Chemistry?
ELEC 571  Imaging at the Nanoscale (S)
ELEC 568  Laser Spectroscopy (F)
HI 5324  Nanomedicine in Healthcare (F)
PHYS 539  Characterization and Fabrication at the Nanoscale (F)

Management Electives (min 3 hrs)
CEVE 322  Engineering Economics and Management (S)
MGMT 609  Energy Constrained World (S)
MGMT 661  International Business Law (F)
MGMT 669  Business Strategy in Energy Industry (S)
MGMT 674  Production and Operations Management (F)
MGMT 676  Project Management/Project Finance (S)
MGMT 721  General Business Law (S)

TOTAL REQUIRED CREDIT HOURS: 41 credits
SPACE STUDIES DEGREE

In addition to the internship and cohort courses, graduate students in the Space Studies program will take the following courses:

Cohort Courses:

NSCI 511 Science Policy and Ethics
NSCI 610 Management for Science and Engineering
NSCI 510/512 Internship and Project
NSCI 501/NSCI 502 Master Seminar/Space Seminar

Five Science courses:

ASTR 5470 Solar System Physics
STAT 410 Intro to Regression and Statistical Computing
MECH 572 Aerospace Systems Engineering

With two courses to be chosen from the list below:

ASTR 554 Astrophysics of the Sun
ASTR 451 Astrophysics I: Sun and Stars
BIOC 415 Experimental Physiology
BIO 540 Metabolic Engineering
ESCI 414 Physics and Chemistry for the Atmosphere
ESCI 460 Geological and Geophysical Fluid Dynamics
MECH 454 Computational Fluid Mechanics
Two Statistics/Computation Courses: The analytical competency requirement provides career-enhancing, marketable skills in finance, economics and computation. Students can choose courses as follows.

Choose two courses from:

CEVE 528    Engineering Economics
MECH 454    Computational Fluid Mechanics
PHYS 416    Computational Physics
STAT 310    Probability and Statistics
STAT 405    Statistical Computing and Graphics

Three Electives according to student’s interest: These course electives reflect individual academic interests and career goals. At least two courses should be chosen from the science/engineering focus areas.

Focus: Engineering

CEVE 504    Atmospheric Particular Matter
CEVE 505    Eng. Project Development & Management
CEVE 511    Atmospheric Processes
CEVE 576    Structural Dynamics and Control
COMP/ELEC/MECH 498    Intro to Robotics
COMP 551    Advanced Mobile Robotics/Lab
MECH 474    Advanced Computational Mechanics
MECH 583    Convective Heat Transfer
MECH 591    Gas Dynamics
MECH 599    Human Factors in Space
MECH 599/Sect 2    Spacecraft Navigation
MECH 599/Sect 3    Design for Aerospace Environments
MECH 691    Hypersonic Aerodynamics

NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.
Focus: Sciences (Astro Science/Earth Science/Life Sciences)

- ASTR 542 Nebular Astrophysics
- ASTR 551 Astrophysics I: Sun and Stars
- ASTR 552 Astrophysics II Galaxy and Cosmology
- ASTR 554 Astrophysics of the Sun
- ASTR 555 Protostars and Planets
- ASTR 565 Compact Objects
- ASTR 700 Independent Study Course

NOTE: FOCUS AREAS IN EARTH SCIENCE, PHYSICS AND LIFE SCIENCES can be chosen - depending on student’s background. Students will consult with academic advisor about appropriate selection of their elective science courses.

Focus: Management

- MGMT 734 Technology Entrepreneurship
- MGMT 629 Business Plan Development
- MGMT 601 Financial Statement Analysis
- MGMT 618 Complexities of People and Organizations
- MGMT 658 Applied Risk Management
- MGMT 619 Corporate Governance
- MGMT 719 Thinking Strategically

NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.

TOTAL REQUIRED CREDIT HOURS: 39 credits
COHORT COURSES

Students enrolled in all five degree tracks are required to participate in a set of cohort courses that focus on building communication and business skills.

A. Management for Science and Engineering (NSCI 610) — This course is designed for science and engineering students who want to understand the management of new and/or small technology-based businesses. The course is taught in modular format to give students insight into how technology-oriented firms manage intellectual property, marketing, organization behavior, strategy, accounting, and finance.

B. Science and Technology Policy and Ethics (NSCI 511) — An introduction to the policy, ethics, politics, and legal issues that relate to science and technology – discovery and application. This course presents a framework for analyzing ethical issues in business and professional work. The course will explore ways in which government policy and business practices can promote or inhibit advances in science and technology while influencing the ethical choices of the professionals involved. Case studies will be used.

C. Professional Master’s Seminar (NSCI 501) — Students must register for the professional master’s seminar during two semesters of study. This weekly seminar serves to provide exposure to local industry leaders from all three program tracks, introduce career management and business relations tools, further develop written and oral communication skills, and provide a forum for students to present internship project results.

Communication abilities will be assessed during the Master Seminar beginning with an assessment workshop before start of semester. Each student will receive individual recommendations on how to improve over the course of the degree program. Internship presentation and reports will also be graded and assessed by the PSM Communication faculty.

The seminar course is given on a pass/fail basis only. Attendance at seminars is mandatory unless the course administrator has excused the absence in advance. Students are allowed two excused absences per semester.

D. Professional Master’s Project (NSCI 512) — Students must register for this course during their final semester. Students will receive a letter grade in this course based upon the quality of their internship/project presentation and associated reports. Presentations will be made as part of the Professional Master’s Seminar.
STUDENT ADVISING

Two weeks prior to the first semester of study, students will submit a proposed study plan for the entire duration of the degree. Students will indicate which focus area they are interested in and which electives they would like to take. During orientation week, advisors will meet with each student to review and approve the proposed study plan. Students should continue to consult their advisors throughout their time at Rice to revise their study plans as necessary. Consultation is especially important before enrollment in courses for the next semester. In addition to monthly faculty visits, regular faculty/student meetings are scheduled by the PSM Office to facilitate continued dialogue between the advising faculty and the students.

Sample Study Plan for NP Track

YEAR 1

Fall Semester
- PHYS 533  Nanostructures and Nanotechnology I
- PHYS 539  Characterization and Fabrication at the Nanoscale
- PHYS 537  Methods of Experimental Physics I
- NSCI 610  Management in Science and Engineering
- NSCI 501  Professional Master's Seminar

Spring Semester
- Elective
- PHYS 534  Nanostructures and Nanotechnology II
- PHYS 538  Methods of Experimental Physics II
- PHYS 416  Numerical Methods and Modeling
- MSCI 580  Microscopy in Material Science
- NSCI 501  Professional Master's Seminar

Summer
- NSCI 510  Industrial Internship

YEAR 2

Fall Semester
- NSCI 510  Industrial Internship (continued)

Spring Semester
- 3 electives
- Science Policy & Ethics course

Total Credit Hours required: 41
INTERNSHIP PROGRAM

Students should refer to the Professional Science Master’s Program Internship Handbook, which outlines the stages of the internship process, provides copies of necessary forms, and lists guidelines for the employer.

A. Internship Requirements

In addition to coursework, we require a three to six month industrial internship as part of the Professional Science Master’s program. This internship should provide the student with practical experience in an industrial environment and bring about stronger industry/university ties.

Internships will typically begin in the summer session after the first year of coursework. Six-month internships begin in the summer and end in December. The student would then complete the final semester of coursework in the spring session. A three-month internship might take place during the summer session, allowing a student to complete the third semester of coursework in the fall. Alternatively, a three-month internship might begin midway through the summer session and end sometime during the fall. In most cases, the sponsoring company will financially support the intern during the internship period.

Full-time students who have adequate previous industrial experience, or working professionals enrolled on a part-time basis, may request to substitute an independent project for the internship requirement by submitting necessary information to the program committee and obtain approval from the appropriate track director. Students may enroll in classes while completing the approved project.

Students hoping to perform their internship in a non-industrial setting should submit a memo to the program committee outlining the proposed internship and its relationship to the student’s professional development to request permission for this variance.

Only students in good standing will be permitted to accept an internship position. Determination of a student’s standing will include assessment of the student’s GPA (a minimum average of a B- (2.67) is required) and class participation in the Professional Master’s Seminar. Furthermore, students must demonstrate a significant amount of effort in obtaining an internship.

If a full-time student is participating in an internship during the spring or fall semester, the student should register for the PSM internship course, NSCI 510, during that semester. This step will insure that the student maintains full-time student status and remains eligible for student loans and Rice health insurance. The student will not be charged full tuition during this semester, only a minimal charge to maintain full-time status.
B. Finding a position

Students are encouraged to begin searching for an internship during their first semester of coursework. Students must demonstrate a significant amount of effort in obtaining an internship. Interviewing may begin as early as the first semester, and should occur no later than midway through the second semester. Rice’s Center for Career Development will help students identify potential positions, prepare resumes, and train for interviews. Before the end of the first semester, students should have attended several career-related workshops offered by the Career Development Center. During the first semester the student should submit a Student Learning Plan and a resume to both the PSM Program Director and the Assistant Director of Graduate Students in the Center for Career Development.

The internship position should be directly related to the student’s area of study and suited to their interests in a company, government agency, or national laboratory. Students should avoid internships that involve proprietary information or technologies that cannot be revealed to the faculty advisor or prospective employers. Although working with proprietary information can involve exposure to cutting edge developments, it defeats the purpose of providing the student with an experience that can be used to illustrate the student’s qualifications for other professional opportunities and creating knowledge that can be shared with others, which most master’s projects in all fields seek to do. Students who wish to undertake an internship that involves work that cannot be reported in an internship report must have the internship approved by their faculty advisors. It is not acceptable to turn in reports that omit the scientific or technical work done (the evidence that the student has applied his or her academic knowledge) on the grounds that the work is confidential.

Students will also have several opportunities to make contact with potential employers through the Rice’s Career Fairs, Professional Science Master’s Seminar, PSM receptions and luncheons, university events, alumni contacts, and course professors. They can also monitor job opportunities through Rice’s Career Development Center and are encouraged to make use of the career/job research tools provided by them.

C. Internship Evaluation

Students and employers will be required to provide progress reports during and immediately following the internship period. These forms, listed below, are provided on the program web site and in the Professional Science Master’s Program Internship Handbook. It is the student’s responsibility to insure that all forms are submitted to the program committee on time.

- Student Learning Plan – this document should be submitted before October 22
- Internship Definition Document - this document must be submitted and approved by the track director BEFORE the student accepts the internship position
- Interim Evaluation Form for Employers – to be turned in midway through the internship period
• Interim Evaluation Form for Students – to be turned in midway through the internship period
• Final Evaluation Form for Employers – to be turned in within one week after completion of the internship period
• Final Evaluation Form for Students – to be turned in within one week after completion of the internship period

Students substituting an independent project for the internship will use the following forms to propose a project and report progress on the approved project.

• **Student Learning Plan** – this document should be submitted before October 22. The plan should contain the signature of the track director confirming that the internship has been waived and replaced by an independent project.
• **Project Definition Document** – this document should be submitted and approved by the track director at least 12 weeks before the start of the final semester of study
• **Project Update Report** – to be turned in 6 weeks before the start of the final semester of study

A timeline for the completion of each form will be forwarded to each intern by the program coordinator.

Students will not be permitted to resume coursework and cannot graduate until all forms have been received. Failure to submit these documents in a timely manner will result in the student being put on probation, and a letter stating this status will be put into the student's file. If the student continues to be delinquent in submitting the required forms, the track director, after consultation with the faculty, can terminate the student from the program.
PROJECT REPORTS AND PRESENTATION

At the conclusion of the internship or independent project, students must present a summary of their project(s) in both oral and written form. The goals are to:

(a) Test the student’s abilities to organize and present information to different audiences,
(b) Test the student’s ability to make recommendations based on business goals, and
(c) Evaluate the integration of academic knowledge and industry or not-for-profit experience obtained during the internship.

Students will be assigned a letter grade for the quality of the three reports (a preliminary report and two final reports, described below) and presentation in the required course, Professional Master’s Project, NSCI 512. In the case of an unsatisfactory performance, a second presentation can be scheduled. A second unsatisfactory performance will result in dismissal from the program. PSM Communication Faculty can provide coaching in individual writing and presenting. Students may also enroll in a PSM Communication graduate thesis/project writing group that meets weekly in the semester in which students prepare the reports and presentation.

A preliminary report must be submitted with the Interim Evaluation Documents. This report should provide a company background (including target market and competitors) and a definition of one major assignment, project, or problem. The preliminary report might also contain a planned approach to the assignment or problem, and an explanation of methods that will be used.

Two final reports are required – one written for a business audience and one written for a technical audience. While preparing these documents, the student learns how to address audiences of various knowledge levels and concerns, thus preparing the student for her/his role in technical business environments. Detailed instructions for these reports are shown below.

• Before the 6th week of the semester immediately following the internship or project period, two copies of each report should be given to the PSM Office.
• Within 4 weeks of submittal, reports will be evaluated by faculty and returned to the student for editing.
• One week before his/her scheduled presentation, the student will submit the revised reports to the PSM Office and Track Advisor.

The oral presentation will be given to an audience consisting of both scientific and business professionals as well as fellow students and professors. The PSM Office will schedule student presentations during the Professional Master’s Seminar.
• One week before giving the presentation, the student is required to complete at least one practice session with the PSM Communication Faculty.

Detailed Instructions for the Internship Reports

A. Preliminary Report

Audience: Program Director and the student’s Faculty Advisor

Purpose: To communicate the scope of work accomplished on the project problem, the timeline for finishing the work (or handing it over to another person in the case of a continuing project), and the principal links between courses the student has taken and the work accomplished in the internship. This connection constitutes the student’s contribution to knowledge about the relationship between academic study and its applications, parallel to the intellectual insights otherwise documented in a thesis submitted for a master’s degree in other fields.

Content: The report will be approximately three to five pages long or the length needed to discuss summarily the following topics:

(a) The scope of work accomplished on the project problem

(b) The timeline for finishing the work (or handing it over to another person in the case of a continuing project)

(c) The principal links between courses the student has taken and the work accomplished in the internship

(d) A one-page profile of the company


Sample Format:
1. Summary – Two paragraphs: One paragraph that summarizes the situation at the host company and the type of major project the student has been assigned. In some cases, students have been given two or three small projects to enable them to experience a range of types of work the company does. A second paragraph should summarize the degree of
completion and the general argument the student expects to make about the types of connections between the courses taken and the project(s) done.

2. Discussion

2.1. The principal challenge in the project (scope and nature of work that was to be done, including a summary of the technique or process technology and rationale for technology)

2.2. Business and financial aspects relevant to the project.

2.3. Timeline of project(s) and current stage of completion

2.4. Reflection (one to three paragraphs) on the connections between courses taken in the program and the experience gained in these projects. What insight into the academic knowledge has been gained through involvement in the internship?

3. Conclusion: Estimate of work to be done in the remaining period, assistance needed (if any), problems to be solved (for example, approval process for disclosing information from the company), and so on. Request for any needed assistance.

4. Appendix. A one to two page profile of the company, including its principal business, locations, mission, size, divisions, workforce, clients, and notable business reputation.
B. Executive Summary and Report for Business Audience

**Audience:** Management or decision-maker with whom a student has worked in the internship project

**Purpose:** To communicate an understanding of the central challenge in the project (if analysis was required), work done, and possible recommendations based on business goals and business audience’s knowledge and expectations.

**Content:** Executive Summary (1-2 pages, double-spaced) and Report (approximately 7-10 pages, double-spaced). Uses typical business document format or format of host company.

**Sample Format:**

**Executive Summary**
In same order as report, discusses all major items at a high level; stands alone.

**Report**

*Introduction:*
Sets stage by introducing project background including context within the company, what led to the project and/or problem to be solved, statement of the project, steps in investigation, solution (introduces product/process), benefits and or business reasons for project. No extensive company background is required.

*Body:*
Necessary discussion of recommended solution (i.e., brief explanation of product or process technology and rationale for technology with focus on business and financial aspects). This section should explain the basis for the project and issues involved in carrying out the project—these may help to form the justification for the work within the context of the company’s goals. This section might include opportunity costs; risk analysis (health, environment, legal); a summary of regulations surrounding product or a technical model on which product/process is based; a definition of target market and market potential; explanation of state-of-the-art of technology (with limited detail and with vocabulary aimed at a non-technical audience); comparison/contrast of this solution with that of competitors; competitive advantages (such as patents or other barriers to entry into the market); financial requirements for execution (may include cost/benefit analysis); alternative methods of executing (with cost/benefit analysis); steps in execution; and explanation of results or work done.
Conclusion:
Recap of recommended solution(s) (i.e., products and processes) and the business rationale. May include ‘next steps.’

Appendices Add any appendices illustrating results or related information necessary for acting upon the recommendation or understanding the report’s conclusion.

Writing Opening Paragraphs:

Within the opening paragraphs of the executive summary and the report, the student should discuss ways in which his or her project fits within the context of the company’s ongoing work. (This opening is brief--approximately two to six sentences in the executive summary and approximately two to four paragraphs in the discussion section.)

This context should provide your audience with the following information:

- Briefly explains the company situation that led to the student’s project;
- Provides a statement of the project;
- Discusses the purpose of the project—for example, how it contributes to company goals or goals of other projects;
- Gives reasons for the project’s value to the company.

Do not give extremely general background information. Remember that management knows the company’s background. For example, if the internship had been done on a campus project, a report addressed to Rice University President David Leebron would NOT open with a sentence that says,

*Rice University is located in Houston, Texas, and offers both undergraduate and graduate degrees.*

President Leebron already knows these facts. However, if the student had been exploring the costs and benefits associated with meeting green architectural standards in constructing the two proposed new colleges, the executive summary might begin as follows:

*As Rice University began the planning process for building two new residential colleges, its Architectural Planning Committee (APC) not only considered the capital investment required but also the impact of high operational costs. The APC was especially concerned about the impact of rising energy prices. Green architecture could prove beneficial in keeping operational costs at a reasonable level, regardless of energy price fluctuations; and green architecture has the added benefit of minimizing environmental impact. Given the potential advantages, the APC strongly urged the Facilities and Engineering Department (FED) to analyze the costs and benefits of using green architecture in its design.*
The FED Director assigned me to a project with two other staff members to identify both the costs of meeting standards for green architecture and the associated energy savings that might be gained over 5, 10, and 15 years under a range of energy prices.

Such an opening would connect the president’s knowledge that two new buildings were on the horizon with the specific institutional problem (cost containment in the event of rising energy prices) and the student’s project. The openings of the executive summary and the introduction to the discussion section of a report for a business audience should always accomplish this task.

The opening to the report might begin the same but add greater detail about the background:

As Rice University began the planning process for building two new residential colleges, its Architectural Planning Committee (APC) not only considered the capital investment required but also the impact of high operational costs. The APC was especially concerned about the impact of rising energy prices. Although predictions were that energy prices could fall below $50 a barrel by 2009, the APC saw ample evidence that utility prices in the coming 15 years could fluctuate widely. The APC wanted to take these fluctuations into account in its planning.

One area that needed exploring was that of green architecture.

The APC suggested that green architecture be explored because of its potential in keeping operational costs at reasonable levels (regardless of energy price fluctuations) and also for its ability to minimize environmental impact. Given the potential advantages, the APC strongly urged the Facilities and Engineering Department (FED) to analyze the costs and benefits of using green architecture in the new colleges’ construction.

The FED had a limited timeframe within which to prepare specifications for the two new colleges before requesting proposals from architectural firms. To take into account the possible increase in energy costs, the FED decided to evaluate the desirability of requiring that the plans meet standards for sustainability as set out in the Leadership in Energy and Environmental Design (LEED) certification program. I was assigned to the FED department and worked with two staff members to investigate the possible cost savings to be obtained through construction of colleges that meet the LEED criteria....

NOTE: Some internships complicate the challenge of reporting on work done. For example, one student was assigned several small projects in different areas of a department so that she would gain breadth of experience. While the variety was valuable, the student was concerned about how to present a unified report on these
projects. She was able to connect them by reporting them as projects that featured different problems in the permitting process. Another student who had worked for a not-for-profit agency as well as for a company was able to show how the two different entities contributed to land conservation efforts.

Working on proprietary projects also creates difficulties. Another student had worked on a highly proprietary project (which is not such a great idea since most students want to be able to tell other prospective employers about work accomplished during the internship). This student had to show her business report as well as the technical report, written to the head of the company, to the faculty advisor and program coordinator. As a result, her presentation had to be more vague, and her fellow students could not gain from the technical content of her work.

C. Report for Technical Audience

Audience: Faculty with whom a student has worked in the internship project and Directors of specific track.

Purpose: To communicate project background, problem definition, steps in investigation, and solutions with an emphasis on technology and fit with company’s or organization’s product or technical goals.

Content: Abstract (1/2 - 1 page, double-spaced) and report (not more than 20 pages, double-spaced) in scientific report format. This report should demonstrate the student’s scientific knowledge that has been applied in the project, including any calculations or analysis required.


Sample Format:

1. Abstract - overview of company problem or need, steps in project, the recommended solution, and rationale for solution. Limit: 250 words.

2. Project Background
   2.1. Description of organizational context including company background, company products and factors leading to project. (2 pages)
   2.2. Needs for project (probably 5 to 6 pages):
       2.2.1. Company goals in product development or technical problems in company products/processes in need of solutions
       2.2.2. Steps in project definition
       2.2.3. Resulting technical goals

3. Report on the technical solution to the defined problem and goals. (probably 7 to 8 pages)

4. Project outcome in context of company (probably 2 to 3 pages)
   4.1. The merits of the project in light of the technical and/or strategic goals of the company—i.e. costs and benefits
   4.2. How the project might benefit the company if recommendations or solutions were executed
4.3. Recommended steps in executing the recommendations
4.4. Resources needed for executing the recommendations

5. Bibliography
6. Appendices
D. Presentation for Mixed Audience

**Audience:** Faculty members of the PMS Oversight Committee, faculty whom a student has worked with in the internship project, local members of the Board of Affiliates, representatives of the host company, fellow students, professors, and other appropriate guests.

**Purpose:** To communicate project background, problem definition, steps in investigation, and recommendations based upon technology and business goals. Technical data are presented to support the recommendations. The student must consider the audience’s expectations as well as its knowledge of business and technology.

**Length:** 25 - 30 minutes, plus 10 minutes for questions and answers
MANAGEMENT ELECTIVES

Through special arrangement with the Jesse H. Jones Graduate School of Management, Professional Master’s students have the opportunity to register for several elective courses offered through the MBA program, such as:

MGMT 609  Energy Constrained World
MGMT 611  Geopolitics of Energy
MGMT 669  Business Strategy in Energy Industry
MGMT 661  International Business Law
MGMT 674  Production and Operations Management
MGMT 667  Competitive Strategy in Emerging Markets
MGMT 676  Social Enterprise
MGMT 721  General Business Law
MGMT 734  Technology Entrepreneurship
MGMT 733  Operation Strategy & Leadership, and others

NOTE: Courses vary. Some listed courses may not be offered every year, and others may be offered that satisfy the requirements with pre-approval. Students should consult with their academic advisors before enrolling.

MBA students receive priority registration, so PSM students will only be permitted to register on a space available basis. Management courses are NOT open for web registration for non-MBA students. PSM students must get approval from an MBA program associate before the registrar will process their registration.

Contact MBA Program Associate, Maria Sanchez Johnson, with your desire to register for a class. Ms. Johnson will verify the course offering and class meeting times.

(713) 348-5246
maria.johnson@rice.edu

Ms. Johnson will sign your registration form, or she will direct you to obtain a signature from the course professor.

It is very important to ATTEND THE FIRST CLASS of a management course, whether you are registered or not. Some professors are very strict and will not allow a student to enroll if he/she has not attended the first class.
OTHER REGULATIONS

Failure to follow the deadlines listed in the “Rice PSM Internship Requirements” will result in the student being put on probation and a letter stating this will be put into the student file. If the required documentation is not submitted within two weeks, the PSM Office, after consultation with the faculty, can terminate the student from the program.

All graduate students are expected to maintain continuous enrollment, unless official leave of absence has been granted. The procedure for obtaining a leave of absence is outlined in the General Announcements.

Problems or conflicts may arise during a student’s graduate education. Students should take responsibility for informing the appropriate faculty of any such problems. All parties involved should work together amicably with the goal of resolving the problem informally if at all possible. When attempts to resolve a problem informally do not meet with success, the grievance procedure outlined in the General Announcements will be adopted.

The advising faculty of all five programs forms the Oversight Committee of the PSM program and meets at least once a year to review the progress of the students, discuss student feedback, and reviewing the curriculum of each track to implement updates where needed. Students’ performance is monitored every semester to ensure successful completion of each student’s degree requirements.

PLAGIARISM

At all universities in the U.S. including Rice University, plagiarism is considered academic misconduct. Students are expected to avoid plagiarism, either intentional or accidental. As described in Rice’s Honor Code, plagiarized work can result in a failing course grade, expulsion, rejection of a paper submitted for publication, denial of an advanced degree, or loss of job. It is increasingly serious now that the Internet has made plagiarism easier than ever before. The Rice Honor Code is taken very seriously and all accusations of plagiarism go before the Rice Honor Council, made up of representatives from the student body and the faculty. Check out the Honor Council's web site to learn more.

View how to recognize plagiarism and avoid it at engr.rice.edu or rcel.rice.edu.

HONOR SYSTEM

The honor system, one of the oldest and proudest traditions at Rice, is administered by the Honor Council, whose student members are elected each year by the student body. Adopted by
a student vote in 1916, the honor system has remained essentially the same since that time but for changes in the procedures and membership of the Honor Council.

Students take all written examinations and complete any specifically designated assignments under the honor system. By committing themselves to the honor system, all students accept responsibility for assuring the integrity of the examinations and assignments conducted under it. The Honor Council is responsible for investigating reported violations and for conducting a hearing when the facts warrant. The Office of Student Judicial Programs, which reviews the results of the investigations and hearings, considers the council’s recommendations when issuing penalties.

The Honor Council conducts an ongoing program to acquaint new students and faculty with the honor system. The Honor Code and other related information and resources are located at the homepage of the Honor Council: http://honor.rice.edu/

**CODE OF CONDUCT**

The Office of Student Judicial Programs oversees the judicial system and enforces the Code of Student Conduct, which governs the administration of student order and discipline and participates in title IX investigations. The Code of Student Conduct applies to all students, including undergraduate, graduate, and transfer students; those enrolled in professional and Continuing Studies programs; and visiting students, Visiting Post Baccalaureates, second degree students, and auditors, from the time they arrive on campus for orientation until their degree is conferred or they have permanently left Rice. Organizations also are subject to this Code. All enrolled students also are subject to Rice University policies, rules, and regulations. Alleged violations of university or college rules are handled in accordance with the Code of Student Conduct. Students may appeal decisions as described in the Code of Student Conduct. Rice retains ultimate authority in all matters of discipline and over all actions that affect its educational function or the safety and wellbeing of members of the university community.

The Code of Student Conduct and other related information and resources are located at: www.students.rice.edu/students/Conduct.asp
After Rice’s grievance process has been exhausted and documented, students may also pursue an external complaints process.