MASTER OF STATISTICS (MSTAT) DEGREE

Program Learning Outcomes for the MStat Degree

Upon completing the MStat degree, students will be able to:

1. Master fundamental theory in probability and statistics.
2. Become familiar with a broad range of statistical methods for applications.
4. Develop effective communication skills as a professional statistician.

Requirements for the MStat Degree

The MStat degree is a non-thesis master’s degree. For general university requirements, please see Non-Thesis Master’s Degrees (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures/non-thesis-masters-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/).

Students pursuing the MStat degree must complete:

- A minimum of 30 credit hours to satisfy degree requirements.
- A minimum of 30 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 24 graduate semester credit hours must be taken at Rice University.
- A minimum of 24 graduate semester credit hours must be taken in standard or traditional courses (with a course type of lecture, seminar, laboratory, lecture/laboratory).
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A maximum of 2 courses (6 graduate semester credit hours) from transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies (p. 3) tab.
- The requirements of one area of specialization (see below for areas of specialization). The MStat degree program offers five areas of specialization:
  - A minimum overall GPA of 2.67 or higher in all Rice coursework.
  - A minimum program GPA of 2.67 or higher in all Rice coursework that satisfies requirements for the non-thesis master’s degree.

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program’s academic advisor, or where applicable, the department or program’s Director of Graduate Studies. Course substitutions must be formally applied and entered into Degree Works by the department or program’s Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Core Requirements</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credit Hours Required for the MStat Degree</td>
<td>30</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>STAT 518</td>
<td>PROBABILITY</td>
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<tr>
<td>STAT 519</td>
<td>STATISTICAL INFERENCE</td>
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<td>STAT 605</td>
<td>R FOR DATA SCIENCE</td>
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<td>STAT 615</td>
<td>REGRESSION AND LINEAR MODELS</td>
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<tr>
<td>STAT 616</td>
<td>ADVANCED STATISTICAL METHODS</td>
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Area of Specialization

Select a minimum of 2 courses (or up to 5 courses) from any of the following Areas of Specialization:

Bioinformatics, Statistical Genetics, and Biostatistics

- STAT 545 GLM & CATEGORICAL DATA ANALYSIS
- STAT 553 BIOSTATISTICS
- STAT 623 PROBABILITY IN BIOINFORMATICS AND GENETICS

Biostatistics

- STAT 525 BAYESIAN STATISTICS
- STAT 541 MULTIVARIATE ANALYSIS
- STAT 542 SIMULATION
- STAT 545 GLM & CATEGORICAL DATA ANALYSIS
- STAT 552 APPLIED STOCHASTIC PROCESSES

Economics

- STAT 525 BAYESIAN STATISTICS
- STAT 532 FOUNDATIONS OF STATISTICAL INFERENCE I
- STAT 541 MULTIVARIATE ANALYSIS
- STAT 545 GLM & CATEGORICAL DATA ANALYSIS
- STAT 552 APPLIED STOCHASTIC PROCESSES

Economics, Economics, and Finance

- STAT 525 BAYESIAN STATISTICS
- STAT 530 CAUSAL ANALYSIS
- STAT 532 FOUNDATIONS OF STATISTICAL INFERENCE I
- STAT 541 MULTIVARIATE ANALYSIS
- STAT 545 GLM & CATEGORICAL DATA ANALYSIS
- STAT 552 APPLIED STOCHASTIC PROCESSES

Financial Statistics and the Statistics of Risk

- STAT 525 BAYESIAN STATISTICS
- STAT 530 CAUSAL ANALYSIS
- STAT 532 FOUNDATIONS OF STATISTICAL INFERENCE I
- STAT 541 MULTIVARIATE ANALYSIS
- STAT 545 GLM & CATEGORICAL DATA ANALYSIS
- STAT 552 APPLIED STOCHASTIC PROCESSES

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STAT 553  BIOSTATISTICS
STAT 581 / CAAM 581  MATHEMATICAL PROBABILITY I
STAT 613  STATISTICAL MACHINE LEARNING

Elective Requirements
Select up to 9 credit hours of remaining coursework from approved electives in a targeted area of interest to reach 30 total credit hours.\(^2\)^\(^4\)

Total Credit Hours 30

Footnotes and Additional Information
1 These courses are normally completed by the end of the first 2 semesters.
2 Students are allowed to choose either a broad-based or specialized program of study. Depending on the student’s selected specialization, the mix of required, specialization-specific and elective courses will be jointly determined by the student and the graduate advisor. Students will meet with their advisor during the first year of the program to select an individualized plan of study, with periodic tune-ups as the program progresses.
3 Students may be asked to take specific courses outside the department, depending on the incoming background of the student, and career objectives. Area of specialization and elective coursework will be chosen between the MStat student and the advisor. See below for typically approved coursework.
4 Credit hours earned for engineering practicum, thesis, seminar, independent study courses, or similar variable credit hour courses may not be applied toward MStat degree requirements.

Approved Electives
Depending on the student’s interest, up to 15 credit hours of area of specialization and elective requirements may be chosen from the following typically approved coursework, in conjunction with the MStat advisor.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>DSCI 515</td>
<td>DATA SCIENCE CONSULTING</td>
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<tr>
<td>DSCI 535 / COMP 549</td>
<td>APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS</td>
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</tr>
<tr>
<td>STAT 502 / COMP 502 / ELEC 502</td>
<td>NEURAL MACHINE LEARNING I</td>
<td></td>
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<tr>
<td>STAT 503 / POLI 503</td>
<td>TOPICS IN METHODS AND DATA ANALYSIS</td>
<td></td>
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<tr>
<td>STAT 509 / PSYC 502</td>
<td>ADVANCED PSYCHOLOGICAL STATISTICS I</td>
<td></td>
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<tr>
<td>STAT 510 / PSYC 503</td>
<td>ADVANCED PSYCHOLOGICAL STATISTICS II</td>
<td></td>
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<tr>
<td>STAT 514 / BIOE 514</td>
<td>INTRODUCTION TO BIOSTATISTICS</td>
<td></td>
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<tr>
<td>STAT 532 &amp; STAT 533</td>
<td>FOUNDATIONS OF STATISTICAL INFERENCE I and FOUNDATIONS OF STATISTICAL INFERENCE II</td>
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<tr>
<td>STAT 549</td>
<td>FUNCTIONAL DATA ANALYSIS</td>
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<tr>
<td>STAT 550</td>
<td>NONPARAMETRIC FUNCTION ESTIMATION</td>
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Approved Electives outside Statistics

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<thead>
<tr>
<th>Code</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOE 539</td>
<td>APPLIED STATISTICS FOR BIOENGINEERING AND BIOTECHNOLOGY</td>
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<tr>
<td>BUSI 521 / ECON 505</td>
<td>FINANCIAL ECONOMICS I</td>
<td></td>
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<tr>
<td>BUSI 522</td>
<td>CORPORATE FINANCE</td>
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<td>BUSI 523</td>
<td>EMPIRICAL METHODS IN FINANCE</td>
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<tr>
<td>CAAM 502</td>
<td>ANALYSIS II</td>
<td></td>
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<tr>
<td>CAAM 519</td>
<td>COMPUTATIONAL SCIENCE I</td>
<td></td>
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<tr>
<td>CAAM 536 / CEVE 555</td>
<td>NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS</td>
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<tr>
<td>CAAM 554</td>
<td>ITERATIVE METHODS FOR SYSTEMS OF EQUATIONS AND UNCONSTRAINED OPTIMIZATION</td>
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<tr>
<td>CAAM 560</td>
<td>OPTIMIZATION THEORY</td>
<td></td>
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<tr>
<td>CAAM 564</td>
<td>NUMERICAL OPTIMIZATION</td>
<td></td>
</tr>
<tr>
<td>CAAM 567</td>
<td>SIGNAL RECOVERY: THEORY AND SIMULATION</td>
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<tr>
<td>CAAM 571</td>
<td>LINEAR AND INTEGER PROGRAMMING</td>
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<tr>
<td>CEVE 678 / MECH 678</td>
<td>APPLIED STOCHASTIC MECHANICS</td>
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</tr>
<tr>
<td>CEVE 679 / MECH 679</td>
<td>APPLIED MONTE CARLO ANALYSIS</td>
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</table>
CHBE 615  APPLICATION OF MOLECULAR SIMULATION AND STATISTICAL MECHANICS

CHBE 682 / BIOE 682  SYSTEMS BIOLOGY OF HUMAN DISEASES

COMP 504  GRADUATE OBJECT-ORIENTED PROGRAMMING AND DESIGN

COMP 506  COMPILER CONSTRUCTION FOR GRADUATE STUDENTS

COMP 522  MULTI-CORE COMPUTING

COMP 530  DATABASE SYSTEM IMPLEMENTATION

COMP 533  INTRODUCTION TO DATABASE SYSTEMS

COMP 536 / ELEC 510  SECURE AND CLOUD COMPUTING

COMP 540  STATISTICAL MACHINE LEARNING

COMP 543  GRADUATE TOOLS AND MODELS - DATA SCIENCE

COMP 544  FUNCTIONAL PROGRAMMING

COMP 546 / ELEC 546  INTRODUCTION TO COMPUTER VISION

COMP 554 / ELEC 554  COMPUTER SYSTEMS ARCHITECTURE

COMP 557 / ELEC 557  ARTIFICIAL INTELLIGENCE

COMP 571  BIOINFORMATICS: SEQUENCE ANALYSIS

COMP 573  PROFESSIONAL DEVELOPMENT FOR BIOMEDICAL INFORMATICS

COMP 582 / ELEC 512  GRADUATE DESIGN AND ANALYSIS OF ALGORITHMS

COMP 614  COMPUTER PROGRAMMING FOR DATA SCIENCE

ECON 523  DYNAMIC OPTIMIZATION

ECON 547  ADVANCED TOPICS IN ENERGY ECONOMICS

ECON 579  TOPICS IN ECONOMETRICS II

EEPS 651  GEOPHYSICAL DATA ANALYSIS: INVERSE METHODS

ELEC 513 / COMP 513  COMPLEXITY IN MODERN SYSTEMS

ELEC 515  MACHINE LEARNING FOR RESOURCE-CONSTRAINED PLATFORMS

ELEC 531  STATISTICAL SIGNAL PROCESSING

ELEC 535  INFORMATION THEORY

ELEC 571  IMAGING AT THE NANOSCALE

ELEC 575  LEARNING FROM SENSOR DATA

ELEC 578  INTRODUCTION TO MACHINE LEARNING

ELEC 591  GRADUATE ELECTRICAL ENGINEERING RESEARCH PROJECTS-VERTICALLY INTEGRATED PROJECTS

ELEC 677  SPECIAL TOPICS

ENGI 501  WORKPLACE COMMUNICATION FOR PROFESSIONAL MASTER'S STUDENTS IN ENGINEERING

ENGI 610 / NSCI 610  MANAGEMENT FOR SCIENCE AND ENGINEERING

ENGI 779 / MGMT 779  BUSINESS AND URBAN ANALYTICS

INDE 571  PROBABILITY AND STATISTICAL INFERENCE

INDE 577  DATA SCIENCE AND MACHINE LEARNING

INDE 597  TOPICS IN INDUSTRIAL ENGINEERING

MATH 517  COMPLEX ANALYSIS

MGMT 595  DATA ANALYSIS

MGMT 597  DATA ANALYSIS II

MGMT 616  ENERGY MARKET ORGANIZATION

MGMT 621  NEW ENTERPRISES

MGMT 638  MACHINE LEARNING FOR FINANCIAL MARKETS

MGMT 642  FUTURES AND OPTIONS I

MGMT 645  PORTFOLIO MANAGEMENT

MGMT 648  APPLIED FINANCE

MGMT 650  FUTURES AND OPTIONS II

MGMT 652  MERGERS AND ACQUISITIONS

MGMT 656  ENERGY DERIVATIVES

MGMT 689  DECISION MODELS

PHYS 521  QUANTUM MECHANICS I

PHYS 526  STATISTICAL PHYSICS

PHYS 551  BIOLOGICAL PHYSICS

PHYS 572  FUNDAMENTALS OF QUANTUM OPTICS

PHYS 600  ADVANCED TOPICS IN PHYSICS

PSYC 637  META-ANALYSIS IN PSYCHOLOGICAL RESEARCH

Policies for the MStat Degree

Department of Statistics Graduate Program Handbook

For more detailed information regarding the MStat degree program policies, please see Statistics department's Graduate Handbook, which can be found here: https://gradhandbooks.rice.edu/2022_23/Statistics_Graduate_Handbook.pdf

Program Restrictions and Exclusions

Students pursuing this degree should be aware of the following program restriction:

- Courses comprising the 30-credit hour requirement shall not be taken or completed on a pass/fail grading basis.

- Credit hours earned for engineering practicum, thesis, seminar, independent study courses, or similar variable credit hour courses may not be applied toward MStat degree requirements.

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the MStat degree should be aware of the following departmental transfer credit guidelines:
• No more than 2 courses (6 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards the degree.
• Requests for transfer credit will be considered by the program director on an individual case-by-case basis.

Additional Information
For additional information, please see the Statistics website: https://statistics.rice.edu/academics/graduate/master-statistics

Opportunities for the MStat Degree
Fifth-Year Master's Degree Option for Rice Undergraduate Students
In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:
• must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
• should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
• more information on this Undergraduate - Graduate Concurrent Enrollment opportunity, including specific information on the registration process can be found here (https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Statistics (MStat) degree. For additional information, students should contact their undergraduate major advisor and the MStat program director.

Additional Information
For additional information, please see the Statistics website: https://statistics.rice.edu/academics/graduate/master-statistics