

STATISTICS: STATISTICS AND DATA SCIENCE, M.S.

This is a named option (formally documented sub-major) professional program in the Statistics M.S (<http://guide.wisc.edu/graduate/statistics/data-science-ms/>). Data science is the study of extracting knowledge from data. Our MS Statistics: Statistics and Data Science option combines a background in statistical theory, methods and practice related to data science with communication skills to train a new generation of leaders who will use data effectively for planning and decision making.

Data science concepts enable students to translate vague questions about complex data into pragmatic analysis steps using statistical thinking. We build from basic methods that compare groups and relate measurements, to more complicated models that depend on the way data are gathered. In practice, planning and decision making involve choices about how to analyze data and communicate findings. These concepts will be grounded at key points with projects that involve real data and/or realistic simulated data.

Students may also be interested in the MS Data Science (<https://guide.wisc.edu/graduate/statistics/data-science-ms/#text>) professional program, offered by the Department of Statistics in cooperation with Department of Computer Sciences. The MS Data Science program is designed for students who are primarily interested in entering the data science profession, and teaches key computational and statistical skills that may be applied to a variety of industries.

ADMISSIONS

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	March 1
Spring Deadline	October 15
Summer Deadline	This program does not admit in the summer.
GRE (Graduate Record Examinations)	Not Required.
English Proficiency Test	Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (https://grad.wisc.edu/apply/requirements/#english-proficiency).

Other Test(s) (e.g., GMAT, MCAT)	n/a
Letters of Recommendation Required	3

Students with questions regarding the programs admission rules and standards should visit our application website (<https://stat.wisc.edu/graduate-studies/data-science-option/>).

The MS Statistics: Statistics and Data Science program is intended for three types of students:

- MS Statistics: Statistics and Data Science for VISP students: Students from the Visiting International Student Program (Stat VISP or Math VISP) who have completed some degree requirements at UW-Madison as VISP undergraduates. They may request transfer of up to 15 credits from their VISP coursework.
- MS Statistics: Statistics and Data Science for workforce students: Students coming with 5 or more years in the workforce who have worked extensively with data and are seeking a well-rounded training. Some students may be part-time students (6-8 credits per semester) if they remain in the workforce.
- MS Statistics: Statistics and Data Science for other general students: Students who have BS degrees or expected to obtain BS degrees prior to the first semester as MS Statistics: Statistics and Data Science students.

REQUISITES FOR ADMISSION

Course Requirements - Prerequisite Courses

Code	Title	Credits
Students admitted to the MS Statistics: Statistics and Data Science program are expected to have courses equivalent to the UW-Madison courses listed below.		

<i>4 semesters of calculus:</i>		
MATH 221	Calculus and Analytic Geometry 1	
MATH 222	Calculus and Analytic Geometry 2	
MATH 234	Calculus--Functions of Several Variables	
MATH 421	The Theory of Single Variable Calculus (or another advanced analysis course)	

<i>Linear algebra:</i>		
MATH 340	Elementary Matrix and Linear Algebra	

<i>It is highly recommended that students also have:</i>		
STAT 303	R for Statistics I	
STAT 304	R for Statistics II	
STAT/MATH 309	Introduction to Probability and Mathematical Statistics I	
STAT/MATH 310	Introduction to Probability and Mathematical Statistics II	

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM INFORMATION

Students enrolled in this program are not eligible to receive tuition remission from graduate assistantship appointments at this institution.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

NAMED OPTION REQUIREMENTS

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	Yes

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement 30 credits

Minimum Residence Credit Requirement 16 credits

Minimum Graduate Coursework Requirement 15 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) Requirement Policy: <https://policy.wisc.edu/library/UW-1244> (<https://policy.wisc.edu/library/UW-1244/>)

Overall Graduate GPA Requirement 3.00 GPA required. This program follows the Graduate School's policy: <https://policy.wisc.edu/library/UW-1203> (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade Requirements Students may only have one core course (STAT 601, STAT 610, or STAT 615) with a grade below B.

Assessments and Examinations None.

Language Requirements No language requirements.

REQUIRED COURSES

Code	Title	Credits
Required Courses:		11
STAT 601	Statistical Methods I	4
STAT 610	Introduction to Statistical Inference	4
STAT 615	Statistical Learning	3
Professional Skills Courses:		6
STAT 605	Data Science Computing Project	3
STAT 628	Data Science Practicum	3
or STAT 678	Introduction to Statistical Consulting	
Students who are able to demonstrate equivalent prior coursework and/or experience may request to substitute a required course (STAT 601, STAT 605, STAT 610, STAT 615, STAT 628) with a Statistics-taught course numbered 600 or above with advisor approval. Substitutions are not guaranteed and will be reviewed on a case-by-case basis.		
13 elective credits:		13
<i>Students may count up to 3 credits of Statistics undergraduate electives including:</i>		
STAT 303	R for Statistics I	
STAT 304	R for Statistics II	
STAT 305	R for Statistics III	
STAT 349	Introduction to Time Series	
STAT 351	Introductory Nonparametric Statistics	
STAT 405	Data Science Computing Project	
STAT 411	An Introduction to Sample Survey Theory and Methods	
STAT 421	Applied Categorical Data Analysis	
STAT 433	Data Science with R	
STAT 436	Statistical Data Visualization	
STAT 443	Classification and Regression Trees	
STAT 451	Introduction to Machine Learning and Statistical Pattern Classification	
STAT 453	Introduction to Deep Learning and Generative Models	
STAT 456	Applied Multivariate Analysis	
STAT 461	Financial Statistics	

STAT/ COMP SCI 471	Introduction to Computational Statistics
STAT 479	Special Topics in Statistics
STAT 575	Statistical Methods for Spatial Data
<i>Students may count up to 1 elective course (up to 4 credits) of coursework numbered 500 or above taught outside of Statistics with advisor approval from the following courses: MATH/ISYE/OTM/STAT 632; COMP SCI 540, 577, 640, 726, 838. Students are not guaranteed a seat in an elective course taught from outside of the Statistics department. They must obtain departmental permission to enroll.</i>	
<i>Student must have at least 3 credits of coursework numbered 600 or above taught within Statistics including the following:</i>	
STAT 606	Computing in Data Science and Statistics
STAT 609	Mathematical Statistics I
STAT/B M I 641	Statistical Methods for Clinical Trials
STAT/B M I 642	Statistical Methods for Epidemiology
STAT 679	Special Topics in Statistics (may be repeated with different topic titles)
STAT 701	Applied Time Series Analysis, Forecasting and Control I
STAT/MATH 709	Mathematical Statistics
STAT/MATH 710	Mathematical Statistics
STAT 732	Large Sample Theory of Statistical Inference
STAT/B M I 741	Survival Analysis Theory and Methods
STAT 760	Multivariate Analysis I
STAT 761	Decision Trees for Multivariate Analysis
STAT/B M I 768	Statistical Methods for Medical Image Analysis
STAT 771	Statistical Computing
STAT 772	Linear Randomized Algorithms for Data Science
STAT/ECON/ GEN BUS 775	Introduction to Bayesian Decision and Control I
STAT/MATH 803	Experimental Design I
STAT 809	Non Parametric Statistics
STAT 811	Sample Survey Theory and Method
STAT 834	Empirical Processes and Semiparametric Inference
STAT 840	Statistical Model Building and Learning
STAT 841	Nonparametric Statistics and Machine Learning Methods
STAT 849	Theory and Application of Regression and Analysis of Variance I
STAT 850	Theory and Application of Regression and Analysis of Variance II
STAT 860	Estimation of Functions from Data

STAT/B M I 877	Statistical Methods for Molecular Biology
STAT 992	Seminar
<i>To reach the minimum of 13 credits for electives, students may also count the following courses:</i>	
STAT 303	R for Statistics I
STAT 304	R for Statistics II
STAT 305	R for Statistics III
STAT/ COMP SCI 403	Internship Course in Comp Sci and Data Science (1 credit maximum allowed)
STAT 627	Professional Skills in Data Science
STAT 699	Directed Study (2 credits maximum allowed)

GRADUATE AND UNDERGRADUATE COURSES WITH SIMILAR TOPICS

Courses that cover the same or similar topic at the undergraduate- and graduate-level may both be used towards the MSDS requirements, but if both courses are to be used, the undergraduate level course must be completed first. Please note that this policy does not preclude students from taking just the undergraduate or just the graduate version of a topic.

These combinations would include STAT 349 and STAT 701, STAT 351 and STAT 809, STAT 405 and STAT 605, STAT 411 and STAT 732, STAT 456 and STAT 760, STAT 443 and STAT 761, STAT 451 and STAT 615, and STAT/COMP SCI 471 and STAT 771. This will also apply to special topics courses that have similar topics between the undergraduate and graduate level.

Students in this program may not take courses outside the prescribed curriculum without faculty advisor and program director approval. Students in this program cannot enroll concurrently in other undergraduate or graduate degree programs.

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School’s Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

NAMED OPTION-SPECIFIC POLICIES

PRIOR COURSEWORK

Graduate Work from Other Institutions

With program approval, students are allowed to count no more than 9 credits of graduate coursework from other institutions toward the graduate degree credit and graduate coursework (50%) requirements. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

UW–Madison Undergraduate

With program approval, up to 7 credits from a UW–Madison undergraduate degree are allowed to count toward minimum graduate degree credits.

Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

UW–Madison University Special

With program approval, up to 15 statistics credits completed at UW–Madison while a University Special student numbered 300 or above are allowed to count toward minimum graduate degree and graduate residence credit requirements. Of these credits, those numbered 700 or above may also count toward the minimum graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

PROBATION

Students are required to follow all of the requirements listed in the program handbook (<https://stat.wisc.edu/graduate-studies/data-science-option/>) for maintaining satisfactory academic program. In particular, students must maintain a 3.0 GPA and have a minimum grade of B for any course used to satisfy program requirements. Students who do not make satisfactory academic progress for multiple semesters may be dismissed from the program.

ADVISOR / COMMITTEE

Students are required to communicate with their advisor near the beginning of each semester to discuss course selection and progress.

CREDITS PER TERM ALLOWED

15 credits

TIME LIMITS

Students are expected to complete the program in 2 semesters (if coming from the Statistics VISP program) or 3–4 semesters. Students who wish to pursue the program part time must receive permission from the program chair.

GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
 - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employeedisabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)

- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

Students should contact the department chair or program director with questions about grievances. They may also contact the L&S Academic Divisional Associate Deans, the L&S Associate Dean for Teaching and Learning Administration, or the L&S Director of Human Resources.

OTHER

n/a

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

PROGRAM RESOURCES

Students in the Statistics: Statistics and Data Science, M.S. program are encouraged to participate in program specific professional development events and work directly, one-on-one, with advisors as well. Information about events and resources will be made available to currently enrolled students via email.

PEOPLE

Faculty:

- Cecile Ane (<https://stat.wisc.edu/staff/ane-cecile/>), Professor
- Joshua Cape (<https://stat.wisc.edu/staff/cape-joshua/>), Assistant Professor
- Richard Chappell (<https://stat.wisc.edu/staff/chappell-rick/>), Professor
- Peter Chien (<https://stat.wisc.edu/staff/chien-peter/>), Professor
- Jessi Cisewski-Kehe (<https://stat.wisc.edu/staff/cisewski-kehe-jessi/>), Assistant Professor
- Deshpande, Sameer (<https://skdeshpande91.github.io/>), Assistant Professor
- Nicolas Garcia Trillos (<https://stat.wisc.edu/staff/trillos-nicolas-garcia/>), Assistant Professor
- Yinqiu He (<https://stat.wisc.edu/staff/he-yinqiu/>), Assistant Professor
- Hyunseung Kang (<https://stat.wisc.edu/staff/kang-hyunseung/>), Associate Professor
- Sunduz Keles (<https://stat.wisc.edu/staff/keles-sunduz/>), Professor
- Bret Larget (<https://stat.wisc.edu/staff/larget-bret/>), Professor
- Keith Levin (<https://stat.wisc.edu/staff/levin-keith/>), Assistant Professor

Wei-Yin Loh (<https://stat.wisc.edu/staff/loh-wei-yin/>), Professor

Michael Newton (<https://stat.wisc.edu/staff/newton-michael/>), Professor

Vivak Patel (<https://stat.wisc.edu/staff/patel-vivak/>), Assistant Professor

Alejandra Quintos (<https://stat.wisc.edu/staff/quintos-alejandra/>),
Assistant Professor

Garvesh Raskutti (<https://stat.wisc.edu/staff/raskutti-garvesh/>), Associate Professor

Karl Rohe (<https://stat.wisc.edu/staff/rohe-karl/>), Professor

Kris Sankaran (<https://stat.wisc.edu/staff/sankaran-kris/>), Assistant
Professor

Jun Shao (<https://stat.wisc.edu/staff/shao-jun/>), Professor

Miaoyan Wang (<https://stat.wisc.edu/staff/wang-miaoyan/>), Assistant
Professor

Yahzen Wang (<https://stat.wisc.edu/staff/wang-yazhen/>) (chair), Professor

Brian Yandell (<https://stat.wisc.edu/staff/yandell-brian/>), Professor

Chunming Zhang (<https://stat.wisc.edu/staff/zhang-chunming/>), Professor

Yiqiao Zhong (<https://stat.wisc.edu/staff/zhong-yiqiao/>), Assistant
Professor

Jun Zhu (<https://stat.wisc.edu/staff/zhu-jun/>), Professor