

MATHEMATICAL STATISTICS (MTHSTAT)

Mathematical Statistics Courses

MTHSTAT 194 First-Year Seminar

3 cr. Undergraduate.

Specific topics are announced in the Schedule of Classes each time the class is offered.

Prerequisites: none.

Course Rules: Open only to freshman. Students may earn cr in just one L&S First-Year Sem (course numbers 192, 193, 194).

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 199 Independent Study

1-3 cr. Undergraduate.

For further information, consult dept chair.

Prerequisites: 2.0 GPA; consent of instructor, department chair, and Assistant Dean for Student Academic Services.

Course Rules: May be retaken to 6 cr max.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 215 Elementary Statistical Analysis

3 cr. Undergraduate.

Elementary probability theory; descriptive statistics; sampling distributions; basic problems of statistical inference including estimation; tests of statistical hypothesis in both one- and two- sample cases.

Prerequisites: completion of GER Quantitative Literacy Part A (QL-A) requirement, or Math Placement Level 30, or a grade of C or higher in any 100-level Math course (excluding MATH 194 or MATH 199) or MATH 111/PHILOS 111.

General Education Requirements: Math & Quantitative Reasoning

Last Taught: Fall 2025, Summer 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 215X Elementary Statistical Analysis

3 cr. Undergraduate.

Elementary probability theory; descriptive statistics; sampling distributions; basic problems of statistical inference including estimation; tests of statistical hypothesis in both one- and two- sample cases.

Prerequisites: completion of GER Quantitative Literacy Part A (QL-A) requirement, or Math Placement Level 30, or a grade of C or higher in any 100-level Math course (excluding MATH 194 or MATH 199) or MATH 111/PHILOS 111.

General Education Requirements: Math & Quantitative Reasoning

Last Taught: Fall 2025, Summer 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 216 Introduction to Statistical Computing and Data Science

3 cr. Undergraduate.

Introduction to hands-on data analysis, performed on large, complex and realistic data sets, using a scientific programming language like R.

Prerequisites: MTHSTAT 215(P), IND ENG 367(P), BUS ADM 210(P), ECON 210(P), PSYCH 210(P), SOCIOL 261(P), or KIN 270(P); or consent of instructor.

Last Taught: Fall 2025, Spring 2025, Spring 2024, Fall 2023.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 299 Ad Hoc:

1-6 cr. Undergraduate.

Course created expressly for offering in a specified enrollment period. Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add'l sem.

Prerequisites: none; add'l prereqs may be assigned to specific topic.

Course Rules: May be retaken w/chg in topic.

Last Taught: Summer 2004.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 361 Introduction to Mathematical Statistics I

3 cr. Undergraduate/Graduate.

Probability spaces; discrete and continuous, univariate and multivariate distributions; moments; independence, random sampling, sampling distributions; normal and related distributions; point and interval estimation.

Prerequisites: junior standing or consent of instructor, and MATH 212(P) or MATH 233(P).

Course Rules: Not recommended for graduate students in math, or students not planning to take MTHSTAT 362.

Last Taught: Fall 2025, Spring 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 361G Introduction to Mathematical Statistics I

3 cr. Undergraduate/Graduate.

Probability spaces; discrete and continuous, univariate and multivariate distributions; moments; independence, random sampling, sampling distributions; normal and related distributions; point and interval estimation.

Prerequisites: junior standing or consent of instructor, and MATH 212(P) or MATH 233(P).

Course Rules: Not recommended for graduate students in math, or students not planning to take MTHSTAT 362.

Last Taught: Fall 2025, Spring 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 362 Introduction to Mathematical Statistics II

3 cr. Undergraduate/Graduate.

Testing statistical hypothesis; linear hypothesis; regression; analysis of variance and experimental designs; distribution-free methods; sequential methods.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 361 (P).

Course Rules: Not recommended for graduate students in math.

Last Taught: Fall 2025, Spring 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 362G Introduction to Mathematical Statistics II

3 cr. Undergraduate/Graduate.

Testing statistical hypothesis; linear hypothesis; regression; analysis of variance and experimental designs; distribution-free methods; sequential methods.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 361 (P).

Course Rules: Not recommended for graduate students in math.

Last Taught: Fall 2025, Spring 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 489 Internship in Mathematical Statistics, Upper Division

1-6 cr. Undergraduate.

Application of advanced principles of mathematical statistics in a business, organizational, educational, governmental, or other appropriate setting.

Prerequisites: junior standing or consent of instructor; 6 cr 300-level or above in MATH or MTHSTAT; 2.5 GPA in the major; consent of supervising faculty member.

Course Rules: One cr earned for academic work based on 40 hrs in internship. May be retaken to 6 cr max.

Last Taught: Fall 2025, Summer 2025, Spring 2025, Summer 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 499 Ad Hoc:

1-6 cr. Undergraduate.

Course created expressly for offering in a specified enrollment period. Requires only department and associate dean approval. In exceptional circumstances, can be offered in one additional semester.

Prerequisites: junior standing or consent of instructor; additional prerequisites may be assigned to a specific topic.

Course Rules: May be retaken with change in topic.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 560 Data Preparation and Exploration

3 cr. Undergraduate.

Data preparation, including data cleaning, imputation of missing data, detection of outliers, feature selection, data transformations, and data exploration.

Prerequisites: junior standing or consent of instructor; MTHSTAT 362(P).

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 562 Design of Experiments

3 cr. Undergraduate/Graduate.

Latin squares; incomplete block designs; factorial experiments; confounding; partial confounding; split-plot experiments; fractional replication.

Prerequisites: junior standing or consent of instructor; MTHSTAT 362(P); and MATH 234(P) or MATH 240(P).

Last Taught: Fall 2008, Fall 2006.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 562G Design of Experiments

3 cr. Undergraduate/Graduate.

Latin squares; incomplete block designs; factorial experiments; confounding; partial confounding; split-plot experiments; fractional replication.

Prerequisites: junior standing or consent of instructor; MTHSTAT 362(P); and MATH 234(P) or MATH 240(P).

Last Taught: Fall 2008, Fall 2006.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 563 Regression Analysis

3 cr. Undergraduate/Graduate.

Straight line, polynomial and multiple regression; multiple and partial correlation; testing hypotheses in regression; residual analysis.

Prerequisites: junior standing or consent of instructor; and MTHSTAT 467(P) or MTHSTAT 362(P).

Last Taught: Fall 2025, Fall 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 563G Regression Analysis

3 cr. Undergraduate/Graduate.

Straight line, polynomial and multiple regression; multiple and partial correlation; testing hypotheses in regression; residual analysis.

Prerequisites: junior standing or consent of instructor; and MTHSTAT 467(P) or MTHSTAT 362(P).

Last Taught: Fall 2025, Fall 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 564 Time Series Analysis

3 cr. Undergraduate/Graduate.

Autocorrelation; spectral density; linear models; forecasting; model identification and estimation.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Spring 2025, Spring 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 564G Time Series Analysis

3 cr. Undergraduate/Graduate.

Autocorrelation; spectral density; linear models; forecasting; model identification and estimation.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Spring 2025, Spring 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 565 Nonparametric Statistics

3 cr. Undergraduate/Graduate.

Sign, rank and permutation tests; tests of randomness and independence; methods for discrete data and zeroes and ties; power and efficiency of nonparametric tests.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Spring 2012, Spring 2010.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 565G Nonparametric Statistics

3 cr. Undergraduate/Graduate.

Sign, rank and permutation tests; tests of randomness and independence; methods for discrete data and zeroes and ties; power and efficiency of nonparametric tests.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Spring 2012, Spring 2010.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 566 Computational Statistics

3 cr. Undergraduate/Graduate.

Basics of programming and optimization techniques; resampling, bootstrap, and Monte Carlo methods; design and analysis of simulation studies.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Fall 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 566G Computational Statistics

3 cr. Undergraduate/Graduate.

Basics of programming and optimization techniques; resampling, bootstrap, and Monte Carlo methods; design and analysis of simulation studies.

Prerequisites: junior standing or consent of instructor, and MTHSTAT 362(P).

Last Taught: Fall 2025.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 568 Multivariate Statistical Analysis

3 cr. Undergraduate/Graduate.

Multivariate normal distribution; Wishart distribution; Hotelling's T₂; multivariate normal distribution; multivariate analysis of variance; classification problems.

Prerequisites: junior standing or consent of instructor; MTHSTAT 362(P); and MATH 234(P) or MATH 240(P).

Last Taught: Spring 2025, Spring 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 568G Multivariate Statistical Analysis

3 cr. Undergraduate/Graduate.

Multivariate normal distribution; Wishart distribution; Hotelling's T₂; multivariate normal distribution; multivariate analysis of variance; classification problems.

Prerequisites: junior standing or consent of instructor; MTHSTAT 362(P); and MATH 234(P) or MATH 240(P).

Last Taught: Spring 2025, Spring 2024.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 760 Data Preparation and Exploration

3 cr. Graduate.

Data preparation, including data cleaning, imputation of missing data, detection of outliers, feature selection, data transformations, and data exploration.

Prerequisites: graduate standing and MTHSTAT 362(P); or consent of instructor.

Course Rules: No cr for students with cr in MTHSTAT 560.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 763 Regression Analysis

3 cr. Graduate.

Introduction to linear statistical models and methods. Core topics include: simple and multiple linear regression, model checking, variable transformations, outlier diagnostics, variable selection, and generalized linear models such as logistic regression.

Prerequisites: graduate standing; MTHSTAT 362(P) or MTHSTAT 467(P); or consent of instructor.

Course Rules: No credit for students with credit in MTHSTAT 563.

Last Taught: Fall 2025, Fall 2024, Fall 2023, Fall 2022.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 764 Time Series Analysis

3 cr. Graduate.

Introduction to statistical models and methods for time series data analysis. Core topics include: exponential smoothing, ARIMA models, transfer functions and intervention models, state-space models, GARCH models.

Prerequisites: graduate standing; MTHSTAT 362(P) or MTHSTAT 467(P); or consent of instructor.

Course Rules: No credit for students with credit in MTHSTAT 564.

Last Taught: Spring 2025, Spring 2024, Spring 2023, Spring 2022.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 765 Nonparametric Statistics

3 cr. Graduate.

Nonparametric and smoothing statistical methods for data analysis. Core topics include: order statistics, rank tests, kernel density estimation, robust linear regression, kernel and spline smoothing for curve fitting, bootstrap inference.

Prerequisites: graduate standing and MTHSTAT 362(P) or consent of instructor.

Course Rules: No credit for students with credit in MTHSTAT 565.

Counts as repeat of MTHSTAT 869 topic Nonparametric and Smoothing Statistical Methods.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 766 Computational Statistics

3 cr. Graduate.

Introduction to statistical computer programming. Main topics include: basics of programming in R or similar language; optimization and root-finding algorithms; Monte Carlo numerical integration; random sample generation; bootstrap and permutation tests; comparative simulation studies.

Prerequisites: graduate standing; MTHSTAT 362(P) or MTHSTAT 467(P), or consent of instructor.

Course Rules: No credit for students with credit in MTHSTAT 566.

Last Taught: Fall 2025, Fall 2024, Fall 2023, Fall 2022.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 768 Multivariate Statistical Analysis

3 cr. Graduate.

Introduction to statistical models and methods for multivariate data analysis. Core topics include: multivariate random vectors and distributions, principal component analysis, canonical correlation analysis, factor analysis, classification and discrimination, clustering techniques, and multidimensional scaling.

Prerequisites: graduate standing; MTHSTAT 362(P) or MTHSTAT 467(P), or consent of instructor.

Course Rules: No credit for students with credit in MTHSTAT 568.

Last Taught: Spring 2025, Spring 2024, Spring 2023, Spring 2022.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 869 Advanced Topics in Mathematical Statistics:

3 cr. Graduate.

Specific topics and any additional prerequisites will be announced in the Timetable each time the course is offered.

Prerequisites: graduate standing and MTHSTAT 762(P).

Course Rules: Retakable with change in topic to 24 cr max.

Last Taught: Fall 2023, Fall 2021, Fall 2020, Spring 2019.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 871 Mathematical Statistics I

3 cr. Graduate.

Probability and distribution theory; point and interval estimation; testing hypotheses; large sample inference; nonparametric inference; sequential analysis.

Prerequisites: graduate standing and MATH 524(522)(C), MATH 624(622)(C), or MATH 724(C).

Course Rules: Previously MTHSTAT 761.

Last Taught: Fall 2024, Fall 2023, Fall 2022, Fall 2021.

Current Offerings: <https://catalog.uwm.edu/course-search/>

MTHSTAT 872 Mathematical Statistics II

3 cr. Graduate.

Continuation of MTHSTAT 871(761).

Prerequisites: graduate standing and MTHSTAT 871(761)(P).

Course Rules: Previously MTHSTAT 762.

Last Taught: Spring 2025, Spring 2024, Spring 2023, Spring 2022.

Current Offerings: <https://catalog.uwm.edu/course-search/>