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).
General Education Requirements: NS
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: satisfaction of Quantitative Literacy Part A GER.
General Education Requirements: QLB, NS
Last Taught: Summer 2025, Spring 2025, Fall 2024, Summer 2024.
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: Spring 2025, Spring 2024, Fall 2023, Spring 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: Spring 2025, Fall 2024.
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: Spring 2025, Fall 2024.
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: Spring 2025, Fall 2024.
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: Spring 2025, Fall 2024.
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: Summer 2025, Spring 2025, Summer 2024, Fall 2023.
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 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 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 2024, Fall 2023.
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 2024, Fall 2023.
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 2024, Fall 2023, Fall 2022, Fall 2021.
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; MTSTAT 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 2024, Fall 2023, Fall 2022, Fall 2021.
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/