MATHEMATICAL STATISTICS (MTHSTAT)

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).

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).

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.

Last Taught: Spring 2021, UWinteriM 2021, Fall 2020, Summer 2020.

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: NS, QLB

Last Taught: Spring 2021, Fall 2020, Summer 2020.

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: BUS ADM 210(P), ECON 210(P), MTHSTAT 215(P), PSYCH 210(P), SOCIOL 261(P), or consent of instructor.
Last Taught: Spring 2021.

MTHSTAT 278 Discrete Probability and Statistics for Elementary Education Majors
3 cr. Undergraduate.
Random experiments; histograms; sample spaces; equally likely outcomes for random experiments; permutations; combinations; binomial, geometric, hypergeometric distributions; expectation; conditional probabilities; max likelihood estimation & inference.
Prerequisites: grade of C or better in Math 176(P) or cons instr.
Course Rules: Math 278 and MthStat 278 are jointly offered; they count as repeats of one another.
Last Taught: Fall 2016, Fall 2009, Fall 2008, Fall 2007.

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.

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 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 2021, Fall 2020.

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 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.

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: jr st; MthStat 361(P).
Course Rules: Not recom for grad students in math.

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: jr st; MthStat 361(P).
Course Rules: Not recom for grad students in math.

MTHSTAT 369G 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: jr st; MthStat 361(P).
Course Rules: Not recom for grad students in math.
MTHSTAT 461 Data Analysis and Graphing Using SAS-I
2 cr. Undergraduate.
Introduction to SAS language programming. Procedures for handling raw data, SAS data, and parametric and nonparametric univariate data analysis; procedures for graphical display. Offered first half of sem.
Prerequisites: MthStat 215(P), 362(P), 465(P), 467(P), Bus Adm 210(P), or Econ 210(P).
Course Rules: Does not count toward math sci major.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 462 Data Analysis and Graphing Using SAS-II
2 cr. Undergraduate/Graduate.
Continuation of MthStat 461. Procedures GLM, LIFEREG, LIFETEST, LOGISTIC, PROBIT and advanced GRAPHING. Offered second half of sem.
Prerequisites: jr st; MthStat 461(P) or cons instr.
Course Rules: U cr does not count toward math sci major.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 462G Data Analysis and Graphing Using SAS-II
2 cr. Undergraduate/Graduate.
Continuation of MthStat 461. Procedures GLM, LIFEREG, LIFETEST, LOGISTIC, PROBIT and advanced GRAPHING. Offered second half of sem.
Prerequisites: jr st; MthStat 461(P) or cons instr.
Course Rules: U cr does not count toward math sci major.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 465 Introductory Mathematical Statistics for Social Sciences and Education
3 cr. Undergraduate/Graduate.
Probability distributions; parameter estimation and confidence intervals; hypothesis testing; applications.
Prerequisites: jr st; Math 211(P) or 232(P).
Course Rules: Not open for cr to students w/cr in MthStat 467, 362, or for grad cr in math. Not open for cr toward major in math except in School of Education.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 465G Introductory Mathematical Statistics for Social Sciences and Education
3 cr. Undergraduate/Graduate.
Probability distributions; parameter estimation and confidence intervals; hypothesis testing; applications.
Prerequisites: jr st; Math 211(P) or 232(P).
Course Rules: Not open for cr to students w/cr in MthStat 467, 362, or for grad cr in math. Not open for cr toward major in math except in School of Education.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 467 Introductory Statistics for Physical Sciences and Engineering Students
3 cr. Undergraduate/Graduate.
Concepts of probability and statistics; probability distributions of engineering applications; sampling distributions; hypothesis testing, parameter estimation; experimental design; regression analysis.
Prerequisites: jr st; Math 233(P).
Course Rules: Not open for cr for Math majors or students with cr in MthStat 362 or 465.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 467G Introductory Statistics for Physical Sciences and Engineering Students
3 cr. Undergraduate/Graduate.
Concepts of probability and statistics; probability distributions of engineering applications; sampling distributions; hypothesis testing, parameter estimation; experimental design; regression analysis.
Prerequisites: jr st; Math 233(P).
Course Rules: Not open for cr for Math majors or students with cr in MthStat 362 or 465.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 469 Biostatistics
3 cr. Undergraduate/Graduate.
Simple distributions, estimation and hypothesis testing, simple regression, analysis of variance, nonparametric methods in biology. Demography and vital statistics and bioassay and clinical trials.
Prerequisites: jr st; an elementary stats course.
Course Rules: Not allowed as part of core curric for Math majors. Not open for cr to students with cr in MthStat 569 & not open for grad cr in Math.
Last Taught: Fall 1987, Fall 1986.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 469G Biostatistics
3 cr. Undergraduate/Graduate.
Simple distributions, estimation and hypothesis testing, simple regression, analysis of variance, nonparametric methods in biology. Demography and vital statistics and bioassay and clinical trials.
Prerequisites: jr st; an elementary stats course.
Course Rules: Not allowed as part of core curric for Math majors. Not open for cr to students with cr in MthStat 569 & not open for grad cr in Math.
Last Taught: Fall 1987, Fall 1986.
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: jr st; 6 cr 300-level or above in Math or MthStat; 2.5 gpa in the major; cons supervising faculty member.
Course Rules: One cr earned for academic work based on 40 hrs in internship. May be retaken to 6 cr max.
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 dept & assoc dean approval. In exceptional circumstances,  
can be offered in one add'l sem.  
Prerequisites: jr st; MATH 234(P); MTHSTAT 362(P).  
Course Rules: May be retaken w/chg in topic.  
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: jr st; MthStat 362(P); Math 234(P) or 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: jr st; MthStat 362(P); Math 234(P) or 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: jr st; MthStat 467(P) or 362(P).  
Last Taught: Fall 2020.  
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: jr st; MthStat 467(P) or 362(P).  
Last Taught: Fall 2020.  
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: jr st; MthStat 362(P).  
Last Taught: Spring 2021.  
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: jr st; MthStat 362(P).  
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: jr st; MthStat 362(P).  
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  
statistics.  
Prerequisites: jr st; MthStat 362(P) or cons instr.  
Last Taught: Fall 2020.  
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  
statistics.  
Prerequisites: jr st; MthStat 362(P) or cons instr.  
Last Taught: Fall 2020.  
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: jr st; MthStat 362(P); Math 234(P) or 240(P).  
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: jr st; MthStat 362(P); Math 234(P) or 240(P).  
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 597G Actuarial Statistics II  
3 cr. Undergraduate.  
Credibility theory, ratemaking, and reserving.  
Prerequisites: jr st; MATH 234(P); MTHSTAT 362(P).  
Course Rules: Counts as a repeat of MTHSTAT 597.  
Current Offerings: https://catalog.uwm.edu/course-search/
MTHSTAT 761 Mathematical Statistics I
3 cr. Graduate.
Probability and distribution theory; point and interval estimation; testing hypotheses; large sample inference; nonparametric inference; sequential analysis.
Prerequisites: grad st; Math 522(C) or 622(C).
Last Taught: Fall 2020, Fall 2019, Fall 2018, Fall 2017.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 762 Mathematical Statistics II
3 cr. Graduate.
Continuation of MthStat 761.
Prerequisites: grad st; MthStat 761(P).
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; MTSTAT 362(P) or MTSTAT 467(P); or consent of instructor.
Course Rules: No credit for students with credit in MTHSTAT 563.
Last Taught: Fall 2020.
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 MTSTAT 467(P); or consent of instructor.
Course Rules: No credit for students with credit in MTHSTAT 564.
Last Taught: Spring 2021.
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; MTSTAT 362(P) or MTSTAT 467(P); or consent of instructor.
Course Rules: No credit for students with credit in MTHSTAT 566.
Last Taught: Fall 2020.
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 2021.
Current Offerings: https://catalog.uwm.edu/course-search/

MTHSTAT 863 Hypothesis Testing
3 cr. Graduate.
Exponential families; uniformly most–powerful tests; least favorable priors; unbiased tests; invariant tests; applications to exponential families and the general linear hypothesis.
Prerequisites: grad st; MthStat 762(P).
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 w/chg in topic to 24 cr max.
Current Offerings: https://catalog.uwm.edu/course-search/