DEPARTMENT OF MATHEMATICS

College of the Sciences and Mathematics

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West Chester University
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Department of Mathematics (http://www.wcupa.edu/mathematics)
Dr. Glidden (pglidden@wcupa.edu), Chairperson
Dr. Kolpas (skolpas@wcupa.edu), Assistant Chairperson
Dr. Gallitano (ggallitano@wcupa.edu), Graduate Coordinator – Mathematics
Dr. Rieger (riefer@wcupa.edu), Graduate Coordinator – Applied Statistics
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Programs of Study

The Department of Mathematics offers the master of arts degree with options in mathematics and mathematics education, the master of science degrees with options in applied and computational mathematics and applied statistics, and a certificate in applied statistics.

Master of Arts in Mathematics

The M.A. in Mathematics at West Chester University is a thirty-three credit master’s program, eighteen credits of core courses and fifteen credits of electives, which offers great flexibility. Elective courses may be in mathematics education, statistics, computer science, pure mathematics, applied and computational mathematics, actuarial science, business, and others. By properly selecting their electives, our M.A. candidates may train for work in a large variety of fields, including, but not limited to, actuarial science, computer science, operations research, biomathematics, cryptography, teaching in a high school or a two-year college, research, economics, environmental mathematics, geophysical mathematics, air traffic control operations, photogrammetry, and many more. Upon completion of the M.A. in Mathematics, students are also well prepared to pursue a doctoral program in mathematics.

Master of Science in Applied and Computational Mathematics

The M.S. in Applied and Computational Mathematics program is designed to prepare students to join the workforce as a consulting mathematician or to pursue doctoral study in computational and industrial mathematics or other computationally-intensive field of study.

Master of Science in Applied Statistics

Vital to a wide variety of disciplines, applied statisticians have found employment in pharmaceutical research and development, government public policy, economic forecasting and analysis, psychometrics, public health research, and many other areas. The mission of the program in applied statistics is to train students to possess the skills necessary for immediate employment and/or provide a course of study that would make further (doctoral) study in statistics, biostatistics, biomathematics, or other related fields feasible. The program provides strong training in statistical analysis and programming, design of scientific studies, and the ability to communicate statistical concepts.

Programs

Master’s Programs in Mathematics

- M.A. in Mathematics (http://catalog.wcupa.edu/graduate/sciences-mathematics/mathematics/mathematics-ma)
- M.A. in Mathematics - Mathematics Education Option (http://catalog.wcupa.edu/graduate/sciences-mathematics/mathematics/mathematics-ma-mathematics-education-option) (no longer accepting new students)
- M.S. in Applied and Computational Mathematics (http://catalog.wcupa.edu/graduate/sciences-mathematics/mathematics/applied-computational-ms)
- M.S. in Applied Statistics (http://catalog.wcupa.edu/graduate/sciences-mathematics/mathematics/applied-statistics-ms)

Certificate in Mathematics


Accelerated Bachelor’s to Master’s

- B.A. to M.A. in Mathematics (http://catalog.wcupa.edu/undergraduate/sciences-mathematics/mathematics/mathematics-ba)

Admissions

All applicants to one of West Chester University’s graduate programs will be held to the graduate admissions requirements (http://catalog.wcupa.edu/general-information/admissions-enrollment/graduate-admissions). When applicable, additional requirements for admission into specific department program(s) may be listed below.

Admission to the M.A. in Mathematics Program

Mathematics Education Option

In addition to meeting the basic admission requirement of the University, applicants must have a bachelor’s degree with a mathematics major or related field. Applicants must schedule an interview with the graduate coordinator prior to enrollment. Deficiencies, as determined by the graduate coordinator, may be removed by successfully completing appropriate course(s). Applicants must submit scores for the general section of the Graduate Record Examination (GRE).

Mathematics Option

In addition to meeting the basic admission requirements of the University, applicants must have a bachelor’s degree in mathematics or a related field. Applicants must schedule an interview with the graduate coordinator prior to enrollment. A full treatment of calculus along with an advanced undergraduate course in modern algebra, linear algebra, differential equations, and geometry is recommended. Deficiencies in these areas may be removed by successfully completing appropriate courses. Applicants must submit scores for the general section of the GRE.
Admission to the M.S. Applied and Computational Mathematics Program

In addition to meeting the general requirements for admission to a graduate program at West Chester University, applicants must have successfully completed the undergraduate calculus sequence, as well as courses in differential equations and linear algebra. Applicants must submit two letters of reference addressing their academic ability, and complete an in-person interview with the Graduate Coordinator.

Admission to the M.S. Applied Statistics Program

In addition to meeting the basic admission requirements of the University, applicants must have knowledge of calculus and linear algebra. Deficiencies, as determined by the program director, may be removed by successfully completing appropriate course(s). Borderline candidates for admission may be required to present GRE scores at the discretion of the program director.

Admission to the Certificate Option in Applied Statistics

In addition to meeting the basic admission requirements of the University, applicants must have at least one undergraduate level (or higher) course in statistics. Deficiencies, as determined by the program director, may be removed by successfully completing an appropriate course.

Policies

All graduate students are held to the academic policies and procedures (http://catalog.wcupa.edu/graduate/academic-policies-procedures) outlined in the graduate catalog. Students are encouraged to review departmental handbooks for program tips, suggested course sequences, and explanations of procedures. When applicable, additional policies for specific department program(s) may be listed below.

Requirements for the M.A. in Mathematics Degree

In addition to completing the course requirements, candidates must either pass a comprehensive examination or submit a thesis.

Requirements for the M.S. in Applied and Computational Mathematics Degree

The electronic portfolio is developed cumulatively as the student progresses through curriculum of the program and must be submitted prior to graduation for approval by a faculty committee.

Requirements for the M.S. in Applied Statistics Degree

Students must achieve a grade of B- or better in the following foundational courses: STA 504*, or STA 505, STA 511, and STA 512. Per University policy, students may only repeat at most two total courses and must maintain an overall GPA of 3.0 or higher to remain in good academic standing (*STA 504 is a 4 credit alternative and will increase the curriculum to 33 credits.).

Faculty

Professors

Gail M. Gallitano (ggallitano@wcupa.edu) (1992)
Graduate Coordinator, Mathematics
B.S., Monmouth College; M.S., Farleigh Dickinson University; M.A., M.Ed., Ed.D., Columbia University
Robert J. Gallop (rgallop@wcupa.edu) (2001)
B.S., Pennsylvania State University; M.S., Ph.D., Drexel University
Peter L. Glidden (pglidden@wcupa.edu) (1995)
Chairperson, Mathematics
B.A., College of Wooster; M.A., Ph.D., Columbia University
Lisa E. Marano (lmarano@wcupa.edu) (2002)
Mathematics
B.A., Rider University; M.S., Ph.D., Lehigh University
James McLaughlin (jmclaughlin2@wcupa.edu) (2005)
B.S., University of Ulster; M.S., Queen’s University Belfast; Ph.D., University of Illinois
Viorel Nitica (vnitica@wcupa.edu) (2001)
B.S., M.S., University of Bucharest; Ph.D., Pennsylvania State University
Scott Parsell (sparsell@wcupa.edu) (2009)
B.S., Massachusetts Institute of Technology; M.S., Ph.D., University of Michigan
Randall H. Riegler (rriegler@wcupa.edu) (2000)
B.A., Bowdoin College; M.S., Ph.D., University of North Carolina
Lin Tan (ltan@wcupa.edu) (1989)
B.S., M.A., Zhejian University; M.S., Ph.D., University of California, Los Angeles
Associate Professors
Andreas Aristotelous (aaristotel@wcupa.edu) (2016)
B.S., University of Cypress; M.S., Florida Institute of Technology; Ph.D., University of Tennessee, Knoxville
Brian Bowen (bbowen@wcupa.edu) (2010)
B.S.Ed., West Chester University; M.Ed., Ph.D., University of Delaware
Michael J. Fisher (mfisher@wcupa.edu) (2008)
B.S., Millersville University; M.S., Ph.D., Lehigh University
Shiv K. Gupta (sgupta@wcupa.edu) (1985)
B.S., M.S., Delhi University; M.S., University of Wisconsin; Ph.D., Case Western Reserve University
Daniel Robert Ilaria (dilaria@wcupa.edu) (2011)
B.A., Drew University; Ed.M., M.S., Ph.D., Rutgers University
Clifford A. Johnston (cjohnston@wcupa.edu) (1992)
B.S.E., Mansfield University; M.A., Ph.D., Temple University
Allison Kolpas (akolpas@wcupa.edu) (2011)
Assistant Chairperson, Mathematics
B.A., Revelle College; M.A., Ph.D., University of California, Santa Barbara
Scott McClintock (smclintoc@wcupa.edu) (2007)
B.S., San Jose State University; M.S., M.A., Ph.D., University of Kentucky
Mark A. McKibben (mmckibben@wcupa.edu) (2013)
B.S., M.S., Ph.D., Ohio University
Assistant Professors
Andrew Crossett (acrossett@wcupa.edu) (2012)
B.A., Canisius College; M.A., Ph.D., Carnegie Mellon University
Kim Johnson (kjohnson2@wcupa.edu) (2013)
B.S., M.S.Ed., Millersville University; Ph.D., Pennsylvania State University
Premalatha Junius (pjunius@wcupa.edu) (2014)
B.S., M.S., University of Madras; M.A., Ph.D., University of Northern Colorado
Chuan Li (cli@wcupa.edu) (2016)
B.S., University of Science and Technology of China; M.S., Ohio University; Ph.D., University of Tennessee Knoxville
Kathleen M. McAneny (kmcaneny@wcupa.edu) (2014)
B.A., M.A., West Chester University of Pennsylvania; Ph.D., University of Delaware
MAT 500. Fundamentals of Applied Mathematics. 3 Credits.
This course is designed to provide an intensive review of the core concepts essential to the study of applied mathematics. Topics include the main theorems of differential and integral calculus; techniques and theorems of vector analysis; sequences and power series; complex arithmetic and elementary complex valued functions; first order, second order, and systems of linear differential equations; matrix algebra and vector spaces. The computer algebra systems Matlab and Mathematica will be introduced as computational tools for these topics. Typically offered in Fall, Spring & Summer.

MAT 503. History Of Mathematics. 3 Credits.
Contact department for more information about this course.

MAT 513. Linear Algebra. 3 Credits.
Vectors, vector spaces, determinants, linear transformations, matrices, and bilinear and quadratic forms.
Pre / Co requisites: MAT 513 requires prerequisite of MAT 512.

MAT 514. Theory Of Numbers. 3 Credits.
Contact department for more information about this course.

MAT 515. Algebra I. 3 Credits.
Elements of abstract algebra, groups, commutative ring theory, modules, and associative algebras over commutative rings. Offered in fall of odd-numbered years.

MAT 516. Algebra II. 3 Credits.
A continuation of MAT 515. Vector spaces, representation theory, and Galois theory.
Pre / Co requisites: MAT 516 requires prerequisite of MAT 515. Typically offered in Spring.

MAT 517. Topics In Algebra. 3 Credits.
Contact department for more information about this course.
Repeatable for Credit.

MAT 521. Discrete Mathematics & Graph Theory. 3 Credits.
Contact department for more information about this course.

MAT 532. Geometry I. 3 Credits.
This course is a rigorous introduction to geometry from a transformational point of view, emphasizing Euclidean, hyperbolic, and/or projective geometry. Other topics such as Spherical geometry, symplectic geometry, or Affine geometry may be included if time permits.

MAT 533. Geometry II. 3 Credits.
A study of geometry using calculus as our main tool. The course covers the basics of differential geometry: parameterizations, tangent spaces, curvature, geodesics; leading to Stokes theorem and the Gauss-Bonnet theorem. Several examples will be studied in depth, including the sphere and the projective plane (which were introduced in the first course).

MAT 535. Topology. 3 Credits.
Contact department for more information about this course.

MAT 536. Algebraic Topology. 3 Credits.
Contact department for more information about this course.

MAT 541. Advanced Calculus. 3 Credits.
For students with background deficiencies in analysis. Ordinary and uniform limits; sequences of functions; and the Riemann integral. Typically offered in Summer.

MAT 543. Topics in Differential Equations. 3 Credits.
An advanced topics course. Existence and uniqueness theorems, stability theory, singular points, regular singular points, Sturm separation theorem, and the "method of Liapunov.

MAT 545. Real Analysis I. 3 Credits.
A rigorous study of real-valued functions of real variables.
Typically offered in Fall.

MAT 546. Real Analysis II. 3 Credits.
Continuation of MAT 545.
Pre / Co requisites: MAT 546 requires prerequisite of MAT 545. Typically offered in Spring.

MAT 548. Industrial Mathematics - Continuous Models. 3 Credits.
This course is designed to provide a survey of mathematical concepts, techniques, and numerical algorithms used to study real-world continuous mathematical models. Application areas include population dynamics, climatology, feedback and control systems, traffic flow, diffusion, fluids and transport, and epidemiology. Computer software packages such as Matlab, Mathematica, and Maple will be used in the analysis of the problems.
Pre / Co requisites: MAT 548 requires prerequisite of MAT 500. Typically offered in Fall.

MAT 549. Industrial Mathematics - Discrete Models. 3 Credits.
This course is designed to provide a survey of mathematical concepts, techniques, and numerical algorithms used to study real-world discrete mathematical models. Applications include forestation, particle dynamics, image processing, genetics, queues, efficient call and traffic routing, and optimal scheduling. Computer software packages such as Matlab, Mathematica, and Maple will be used in the analysis of the problems.
Pre / Co requisites: MAT 549 requires prerequisite MAT 500. Typically offered in Spring.

MAT 550. Fundamentals of Computational Mathematics. 3 Credits.
This course provides an overview of deterministic operations research methodology including linear, integer, nonlinear, and dynamic programming, and classical optimization problems. The computer algebra system MATLAB and other software will be used as an investigative tool in analyzing the problems that arise.
Pre / Co requisites: MAT 550 requires prerequisite of MAT 500. Typically offered in Fall.

MAT 553. Stochastic Modeling. 3 Credits.
This course introduces topics in stochastic optimization and control (including Markov chains, queueing theory, reliability theory, inventory theory, and forecasting), discrete-event and Monte Carlo simulation, and stochastic differential equations. Applications are drawn from manufacturing, finance, logistics, and service systems. The computer algebra systems MATLAB and other software will be used as an investigative tool in analyzing these models.
Pre / Co requisites: MAT 553 requires prerequisite of MAT 500. Typically offered in Spring.

MAT 554. Scientific Computing. 3 Credits.
This case-study driven course will illustrate the use of computational tools in multiple science and engineering domains. The focus is on using MATLAB and appropriate numerical methods (including solutions of linear and nonlinear algebraic equations, solutions of ordinary and partial differential equations, finite elements, linear programming, optimization algorithms, and fast-Fourier transforms) to assist in investigating mathematical models of phenomena in the physical, ecological, and financial realms.
Pre / Co requisites: MAT 554 requires prerequisite of MAT 500. Typically offered in Fall.

MAT 555. Industrial Practicum - Continuous Models. 3 Credits.
This is a case study, team problem-solving based course focused on solving real-world problems that can be modeled using continuous mathematics techniques and that emanate from industry. Ideally, the problems would be obtained from partnerships with local industry and they will ordinarily focus on topics arising in optimization, financial mathematics, and other stochastic models.
Pre / Co requisites: MAT 555 requires prerequisites of MAT 548, MAT 549, and one of MAT 552, MAT 553 or MAT 554. Typically offered in Fall.
MAT 556. Industrial Practicum - Discrete Models. 3 Credits.
This is a case study, team problem-solving based course focused on solving real-world problems that can be modeled using discrete mathematics techniques and that emanate from industry. Ideally, the problems would be obtained from partnerships with local industry and they will ordinarily focus on topics arising in the biological, natural, and physical sciences. Pre / Co requisites: MAT 556 requires prerequisites of MAT 548, MAT 549, and at least one of the following: MAT 552, MAT 553, or MAT 554. Typically offered in Spring.

MAT 570. Math Models In Life, Phys & Soc Sciences. 3 Credits.
Contact department for more information about this course.

MAT 575. Complex Analysis I. 3 Credits.
Contact department for more information about this course.

MAT 583. Operations Research & Applied Mathematics. 3 Credits.
Contact department for more information about this course. Typically offered in Fall & Spring.

MAT 595. Topics in Mathematics. 1-3 Credits.
Topics announced at time of offering. Consent: Permission of the Department required to add. Repeatable for Credit.

MAT 599. Independent Study. 1-3 Credits.
Contact department for more information about this course.

MAT 609. Thesis I. 3 Credits.
Conduct literature search, develop thesis proposal and begin research under the guidance of a mathematics department faculty member.

MAT 610. Thesis II. 3-6 Credits.
Contact department for more information about this course.

MTE

MTE 501. Fundamental Concepts of Mathematics I. 3 Credits.
Selected topics that reflect the spirit and the content of the modern elementary school mathematics programs. Logic, sets, functions, number systems, integers, number theory, rational numbers, and problem solving, including estimations and approximations, proportional thinking, and percentages. Typically offered in Fall & Spring.

MTE 502. Fundamental Concepts of Mathematics II. 3 Credits.
A continuation of MTE 501. The real number system, probability, statistics, geometry, measurement (including the metric system), and problem solving. Pre / Co requisites: MTE 502 requires prerequisite of MTE 501. Typically offered in Fall & Spring.

MTE 507. Foundations of Secondary Mathematics Education. 3 Credits.
Research methods in mathematics education; forces which have shaped mathematics education; classroom implications of 20th-century learning theorists; assessment in the classroom; methods of organizing for instruction; cultural and gender considerations. Typically offered in Summer.

MTE 508. Jr. High School Math - Curriculum, Instruction, and Assessment. 3 Credits.
This course will focus on the curricula, methods of instruction, and assessment techniques used to teach mathematics in a junior high school setting. Course topics will include elementary school mathematics from the perspective of a secondary school teacher, junior high school mathematics, algebra I, and general/consumer mathematics. Teachers will also explore strategies that can be used to integrate the calculator, computer, and new CD-ROM technologies into the mathematics classroom. Pre / Co requisites: MTE 508 requires prerequisite of MTE 507. Typically offered in Spring.

MTE 510. Algebra for the Elementary Teacher. 3 Credits.

MTE 512. Sr. High School Math - Curriculum, Instruction and Assessment. 3 Credits.
This course will focus on the curricula, methods of instruction, and assessment techniques used to teach mathematics in a senior high school setting. Course topics will include geometry, algebra II, trigonometry, precalculus, and discrete mathematics. Teachers will also explore strategies that can be used to integrate the scientific and graphing calculator, computer, and the new CD-ROM technologies into the mathematics classroom. Pre / Co requisites: MTE 512 requires prerequisite of MTE 507. Typically offered in Spring.

MTE 530. Geometry for the Elementary Teacher. 3 Credits.
Basic concepts in geometry. Euclidean geometry and postulativest systems. Pre / Co requisites: MTE 530 requires prerequisite of MTE 501. Typically offered in Fall.

MTE 553. Teaching Children Mathematics I. 3 Credits.
In-depth treatment of strategies, methods, and materials for teaching the following concepts in an elementary classroom: place value; addition, subtraction, multiplication, and division of whole numbers; measurement; elementary number theory; geometry; fractions; and integers. Pre / Co requisites: MTE 553 requires prerequisites of two mathematics courses. Typically offered in Fall, Spring & Summer.

MTE 555. Teaching Children Mathematics II. 3 Credits.
A continuation of the strategies and methods for teaching the topics covered in MTE 553 extended to real numbers, deeper concepts of geometry in the plane and space, percents, proportional thinking and algebra. Pre / Co requisites: MTE 555 requires prerequisite MTE 553; field clearances. Typically offered in Fall, Spring & Summer.

MTE 560. Teaching Algebra In The Secondary School. 3 Credits.
Contact department for more information about this course. Typically offered in Fall & Spring.

MTE 561. Calculus For Teachers. 3 Credits.
Contact department for more information about this course. Typically offered in Fall & Spring.

MTE 567. Teaching Geometry In Secondary School. 3 Credits.
Contact department for more information about this course. Typically offered in Fall & Spring.

MTE 568. Seminar For Second School Math Tchr. 3 Credits.
Selected topics of current interest in secondary school mathematics for the in-service teacher. Repeatable for Credit.

MTE 595. Topics in Mathematics Education. 1-3 Credits.
Topics announced at time of offering. Consent: Permission of the Department required to add.

MTE 599. Independent Study. 1-3 Credits.
Contact department for more information about this course.

MTE 604. Research Seminar. 3 Credits.
This course will focus on the study of research in mathematics education. Contemporary topics of research will be discussed and perused. Students will be expected to report on a topic of research of their choosing. In addition, empirical study and design will be discussed along with data analysis and the reporting of results.

MTE 610. Thesis. 3-6 Credits.
Contact department for more information about this course.

STA

STA 501. Methodologies in Applied Statistics. 3 Credits.
This course will teach the commonly used statistical techniques that are most likely to be encountered in graduate research. Topics will include t-tests, multiple linear regression, ANOVA, chi-squared tests and power/sample size calculations.

STA 504. Mathematical Statistics I with Calculus Review. 4 Credits.
A rigorous treatment of probability spaces and an introduction to the estimation of parameters. This course will also review relevant calculus topics. Typically offered in Fall.

STA 505. Mathematical Statistics I. 3 Credits.
A rigorous treatment of probability spaces and an introduction to the estimation of parameters. Typically offered in Fall.
STA 506. Mathematical Statistics II. 3 Credits.
Continuation of STA 505. Correlation, sampling, tests of significance, analysis of variance, and other topics.
Pre / Co requisites: STA 506 requires a prerequisite of STA 505 or STA 504.
Typically offered in Fall.

STA 507. Introduction to Categorical Data Analysis. 3 Credits.
Data-driven introduction to statistical techniques for analysis of data arising from medical and public health studies. Contingency tables, logistic regression survival models, non parametric methods and other topics.
Pre / Co requisites: STA 507 requires prerequisites of STA 511 and STA 512 or permission of instructor.

STA 510. Statistical Methods for Research. 3 Credits.
This course will provide the tools and methods for designing a research project, conducting the research, managing and manipulating a dataset, and finally analyzing data. This course is for students not enrolled in the Applied Statistics Graduate Degree Program. It requires no prior course in statistics or computer science. Topics covered will include: 1. Research Design 2. Basic Statistics 3. Introductory statistical programming using SAS and Excel 4. Statistical Analysis (including t-tests, linear regression, ANOVA, and chi-squared tests) 5. Writing a final report, including graphics, summarizing the results.

STA 511. Intro Stat Computing & Data Management. 3 Credits.
Course will give students the ability to effectively manage and manipulate data, conduct statistical analysis and generate reports and graphics, primarily using the SAS Statistical Software package.
Typically offered in Fall.

STA 512. Principles of Experimental Analysis. 4 Credits.
Course provides technology-driven introduction to regression and other common statistical multivariable modeling techniques. Emphasis on interdisciplinary actions.
Pre / Co requisites: STA 512 requires prerequisite: STA 511 or permission of instructor.
Typically offered in Spring.

STA 513. Intermediate Linear Models. 4 Credits.
Rigorous mathematical and computational treatment of linear models.
Pre / Co requisites: STA 513 requires prerequisites of STA 505 or STA 504, STA 506, STA 511, and STA 512 or permission of instructor.

STA 514. Modern Experimental Design. 3 Credits.
Focusing on recent journal articles, this course will investigate issues associated with design of various studies and experiments. Pharmaceutical clinical trials, case-controlled studies, cohort studies, survey design, bias, causality and other topics.
Pre / Co requisites: STA 514 requires prerequisites of STA 511 and STA 512 or consent of instructor.

STA 521. Statistics I. 3 Credits.
For nonmathematics majors. Emphasis on applications to education, psychology, and the sciences. Distributions, measures of central tendency and variability, correlation, regression and hypothesis testing, and other topics.

STA 531. Topics In Applied Statistics. 3 Credits.
Contact department for more information about this course.
Repeatable for Credit.

STA 532. Survival Analysis. 3 Credits.
This course will provide students with the knowledge and tools to conduct a complete statistical analysis of time to event data. Students will get experience using common methods for survival analysis, including Kaplan-Meier Methods, Life Table Analysis, parametric regression methods, and Cox proportional Hazard Regression. Additional topics include discrete time data, competing risks, and sensitivity analysis.

STA 533. Longitudinal Data Analysis. 3 Credits.
Introduction to the application and theory of models for clustered and longitudinal data. Course will address the analysis for both continuous and categorical response data. Course will be held in the statistics lab and use the statistical software package SAS. Other software such as R, HLM, SPSS, MIXORMIXREG may be introduced.
Pre / Co requisites: STA 533 requires prerequisites: STA 511, STA 512, STA 507 and STA 513 or permission of Director of M.S. Applied Statistics.

STA 534. Time Series. 3 Credits.
Time series analysis deals with the statistical study of random events ordered through time. This class will focus on the characteristics inherent in such processes such as repetitive cycles and deteriorating dependence. Course topics will include seasonal decomposition, exponential smoothing, and ARIMA models. Emphasis will be placed on real life data analysis and statistical communication. Data analysis will be done with a variety of programs such as SAS, R, and Excel.
Pre / Co requisites: STA 534 requires prerequisite of STA 511 and STA 512.

STA 535. Multivariate Data Analysis. 3 Credits.
Multivariate data typically consist of many records, each with readings on two or more variables, with or without an “outcome” variable of interest. Procedures covered in this course include multivariate analysis of variance (MANOVA), principal component analysis, factor analysis and classification techniques.
Pre / Co requisites: STA 535 requires prerequisite: STA 505, STA 506, STA 511, STA 512.

STA 536. Data Mining. 3 Credits.
LEC (0), LAB (0)
The purpose of this course is to give you an introduction to many of the modern techniques that are used to analyze a wide array of data sets. We will be applying these methods using the statistical programming language R.

STA 537. Advanced Statistical Programming Using SAS. 3 Credits.
This course will focus on skills and techniques considered essential to advanced SAS programming. The primary topics covered will be SAS SQL and SAS Macro Programming. Other advanced topics such as indices, efficient programming techniques, memory usage, graphics, and using best programming practices will also be covered.
Pre / Co requisites: STA 537 requires a prerequisite of STA 511.

STA 599. Independent Study. 1-3 Credits.
Individual exploration of a topic in statistics.
Typically offered in Fall, Spring & Summer.
Repeatable for Credit.

STA 601. Internship In Applied Statistics. 1-6 Credits.
In cooperation with a regional industrial company student will perform an internship in applied statistics.
Typically offered in Fall, Spring & Summer.

STA 609. Thesis I. 3-6 Credits.
Preliminary research under the guidance of a mathematics faculty member. Students must present oral preliminary findings before proceeding to STA 610.
Typically offered in Fall, Spring & Summer.
Repeatable for Credit.

STA 610. Thesis II. 3-6 Credits.
Research project under the guidance of the mathematics faculty.
Pre / Co requisites: STA 610 requires prerequisite of STA 609.
Typically offered in Fall, Spring & Summer.
Repeatable for Credit.