MAT - MATHEMATICS

MAT 120 Statistics (3 Credit Hours)
This course is an introduction to decision-making in which students will learn how to apply methods of statistical analysis and interpret the results. Students are exposed to basic concepts of counting and estimation with confidence intervals. Topics include descriptive statistics, probability, binomial and normal distributions. Additional topics may include an introduction to hypothesis testing and the Student's t-distribution. Students will learn to use a statistical software package for performing statistical analysis.
May be repeated for credit.
Academic Level: Undergraduate
Students cannot enroll who have a major in Aquaculture Aquarium Science, Biochemistry, Pre-Pharmacy, Biological Sciences, Chemistry, Data Science, Environmental Science, Environmental Studies, Laboratory Science, Marine Affairs, Marine Entrepreneurship, Mar Sci Mar Bio, Mar Sci Oceanography, Medical Biology, Medical Biology, Med Bio Pre-Physician Asst, Applied Mathematics, Pharmacy Science 2+4, Pharmacy Science, Sustainability Business or Sustainability Business.
Students cannot enroll who have a concentration in Marine Biology or Oceanography.

MAT 150 Statistics for Life Sciences (3 Credit Hours)
In this course, students apply principles of research design and statistics to analyze and interpret data and draw conclusions about experimental situations relevant to the sciences. Topics include random sampling, graphic and numeric descriptive data analysis, the normal distribution, hypothesis testing, t-tests, analysis of variance, correlation, and regression. Students will use statistical software to examine data graphically and perform statistical analyses.
May be repeated for credit. *Equivalent to MAT 1500.*
Academic Level: Undergraduate

MAT 151 Statistics for Environmental Sciences (3 Credit Hours)
In this course, students apply principles of research design and statistics to analyze and interpret data and draw conclusions about experimental situations, with a focus on applications in the environmental sciences. Topics include random sampling, graphic and numeric descriptive data and analysis, the normal distribution, hypothesis testing, t-tests, analysis fo variance, correlation, and regression. Students will use statistical software to examine data graphically and perform statistical analyses.
Academic Level: Undergraduate
Enrollment is limited to students with a major in Environmental Science, Environmental Studies, Sustainability Business or Sustainability Business.

MAT 180 Precalculus (3 Credit Hours)
This course focuses on the study of functions. It provides a foundation for the study of calculus and also serves as a foundation for future studies in the physical, natural, and health sciences. Topics include graphical, numerical, and algebraic analysis of polynomial, rational, exponential, logarithmic, and trigonometric functions, and their applications.
May be repeated for credit.
Academic Level: Undergraduate

MAT 190 Calculus I (4 Credit Hours)
This course is a study of the differential calculus of functions of a single variable, with an introduction to integral calculus. Topics include limits, continuity, derivatives of elementary functions, definite and indefinite integrals, techniques of differentiation and integration, and the applications of these concepts for modeling and problem solving.
May be repeated for credit. *Equivalent to MAT 210.*
Academic Level: Undergraduate

MAT 195 Calculus II (4 Credit Hours)
This course is a continuation of MAT 190 and is a study of integral calculus of functions of a single variable, with techniques and applications for modeling and problem solving. Topics include techniques of integration, differential equations, infinite sequences, and infinite series.
May be repeated for credit.
Academic Level: Undergraduate

MAT 200 Calculus III (4 Credit Hours)
The focus of this course is the study of multivariable calculus. Major topics include vectors, lines, planes, limits, continuity, derivatives, and integrals of vector valued functions. Other topics may include: sequences and series; polar, cylindrical, spherical and surface integrals; the theorems of Green and Stokes. A variety of applications will also be investigated. Technology will be used to investigate concepts and solve problems.
Academic Level: Undergraduate

MAT 202 Series & Multivariate Calculus (3 Credit Hours)
This course combines content from Calculus 2 and Calculus 3 in a traditional calculus sequence. Topics include sequences and series, convergence; limits, continuity, derivatives and integrals of real valued functions of several variables, change of variables, transformations, polar, cylindrical, and spherical coordinates, vector fields.
Academic Level: Undergraduate

MAT 212 Discrete Mathematics (3 Credit Hours)
This course examines the fundamentals of discrete mathematics. Topics may include graphs and trees, algorithmic complexity, growth of functions, finite-state and Turing machines, recursion, basic set theory, proof techniques and combinatorics. Applications include computer science, biology, chemistry, sociology and linguistics.
Academic Level: Undergraduate

MAT 220 Linear Algebra (3 Credit Hours)
This course provides a comprehensive introduction to linear algebra, focusing on theoretical concepts and practical applications. Students will explore key topics such as vector spaces, linear transformations, systems of linear equations, matrix operations, eigenvalues and eigenvectors, orthogonality, the Gram-Schmidt process, and singular value decomposition. Throughout the course, GNU Octave will be used as the primary computational tool, providing an open-source alternative to MATLAB. However, students will learn MATLAB syntax, ensuring they are equipped with the skills to use either software in professional or academic settings.
May be repeated for credit.
Academic Level: Undergraduate

MAT 225 Computer Programming with MAT LAB (3 Credit Hours)
This course focuses on the fundamental concepts of computer programming and the development of computer programs using Matlab programming environment. The overall objectives are to learn essential computer programming concepts and to apply these concepts in computer-based problem solving. The course includes the fundamentals of flow-charting, decision structures, sequential execution, repetition, subroutines, functions, user interface design, and data structures. There will be some emphasis on the development of computer programs that handle numerical data. The course incorporates mathematical topics such as matrix algebra, polynomial interpolation, linear and non-linear algebraic systems, correlation and regression, time series, gradient vectors, and contour plots to illustrate programming concepts. This course progresses from the development of simple concept-driven programs to more complicated programs that read, manipulate, display, and store data. MAT 225 is appropriate for mathematics and science majors and minors; MAT 525 includes advanced programming work for graduate students.
Academic Level: Undergraduate

MAT 240 Geometry (3 Credit Hours)
This course studies the theorems and constructions in Euclidean geometry in two dimensions. Extensive use of geometric software is used to create rigorous and dynamic constructions illustrating these theorems. Students will also learn to write traditional proofs of geometric theorems. Topics include the classical triangle centers, the nine-point circle, and the theorems of Ceva and Menelaus. Some inversions in circles and hyperbolic geometry will be explored as well.
Academic Level: Undergraduate

MAT 315 Applied Mathematics with Differential Equations (3 Credit Hours)
This course offers a comprehensive introduction to the theory of ordinary differential equations and their applications across various disciplines. Key topics include linear first and second-order equations, methods of undetermined coefficients, variation of parameters, series solutions, Laplace transforms, numerical solutions, and linear systems of equations. Students will also explore the practical applications of these equations in physics, engineering, biology, and other fields. Additionally, the course provides preliminary overviews of partial differential equations and non-linear dynamical systems.
Academic Level: Undergraduate

MAT 321 Applied Statistics (3 Credit Hours)
This course focuses on the applications of probability and statistics with an emphasis on statistical analysis and interpretation. Topics include probability and probability distributions, inference for categorical data (proportion test, chi-square test, odds ratio), analysis of variance for completely randomized design, factorial design, and randomized complete block design. R programming language will be used in this course.
Academic Level: Undergraduate

MAT 323 Applied Regression Analysis (3 Credit Hours)
This course focuses on the fundamental concepts of regression analysis. Topics include simple linear regression, multiple regression, model building, variable screening, regression pitfalls, residual analysis, and some special topics in regression (time permits). R programming language will be used in this course.
Academic Level: Undergraduate

MAT 340 Graph Theory w/Applications (3 Credit Hours)
Graph Theory comprises the underlying structure of social networks, which can be useful in understanding topics such as friendship networks and resource competition. Students will be exposed to an area of mathematics with many applications in everyday world, will learn to use computer software for solving problems, and will learn to relate Graph Theory to their own chosen fields of study. Students will work on both abstract and applied problems as they examine the beauty and usefulness of mathematics. A historical perspective on the development of Graph Theory will also be considered. This course will appeal to a wide audience. Advanced mathematical knowledge is not required.
Academic Level: Undergraduate

MAT 345 Math of Games and Puzzles (3 Credit Hours)
This course examines and analyzes games, puzzles, and toys from a mathematical perspective. Students will be introduced to advanced mathematical methods within the context of recreation. Meetings will combine discussion about readings, group work, and play in order to motivate and extend understanding of mathematics.
Academic Level: Undergraduate

MAT 370 Math Sciences Internship (3 Credit Hours)
An internship is a high impact learning experience where knowledge and theory from students' program of study are integrated with shadowing, volunteering, or paid employment with a private company, not-for-profit organization or government agency toward the intentional development of transferable knowledge, skills and abilities and practical application of professional competencies. The semester prior to the internship, Academic and Career Advising Center staff assist students with preparing their application materials and searching and applying for marine related internships within the local community, stateside or abroad, as well as in defining learning objectives, educational and career goals, and professional deliverables to be met throughout the course of training and practice. During the semester of the internship course, under the mentorship of a dedicated professional who has the education and/or background and expertise of the students' discipline of study, students immerse in a remote, hybrid or in-person professional setting. Through guidance, support and regular feedback from the mentor and internship course instructor, students strive to satisfactorily learn and practice their internship position and achieve their learning objectives. Students follow a course curriculum including: 40 contact hours at the host site per credit hour registered; participation in classes, meetings or workshops as scheduled by the course instructor; timely completion of homework assignments in support of student learning outcomes, professional readiness and career exploration; and end of semester evaluations. Internships culminate in a letter grade determined by the above criteria. Written pre-approval of the internship by the course instructor and Academic Director is required.
May be repeated for credit.
Academic Level: Undergraduate
Enrollment limited to students with the UG Internships attribute.

MAT 405 Intro to Numerical Analysis (3 Credit Hours)
Numerical analysis, an applied branch of mathematics and computer science, focuses on solving problems involving continuous variables. MAT 405 aims to teach students how to create, assess, and apply methods for computing approximate yet accurate solutions to numerical problems in mathematics, physics, biology, and data science. Topics covered include finding zeros of non-linear equations, approximation and interpolation, numerical differentiation and integration, evaluating initial value problems for ordinary differential equations, and methods for solving linear systems, emphasizing numerical error propagation and computational efficiency.
Academic Level: Undergraduate

MAT 480 Mathematics Research Seminar (3 Credit Hours)
This course is designed to create a scholarly atmosphere in which students and faculty engage in discussions and explorations of interesting mathematical topics. Students will produce a research paper and present the results of their research in seminar talks. Topics vary, depending upon the expertise of the instructor and the interest of participants.
May be repeated for credit.
Academic Level: Undergraduate

MAT 490 Topics in Mathematics (3 Credit Hours)
The goal of this course is to provide students an opportunity not offered in the regular curriculum for in- depth study of advanced topics in one of the following areas:geometry, algebra, analysis, probability, statistics, differential equations, numerical analysis, number theory, applied mathematics, mathematical biology, or one of mutual interest to student and faculty. Prerequisite: Permission of the instructor. Offered as needed.
May be repeated for credit.
Academic Level: Undergraduate

MAT 1500 Statistics for Life Sciences (3 Credit Hours)
In this course, students apply principles of research design and statistics to analyze and interpret data and draw conclusions about experimental situations relevant to the sciences. Topics include random sampling, graphic and numeric descriptive data analysis, the normal distribution, hypothesis testing, t-tests, analysis of variance, correlation, and regression. Students will use statistical software to examine data graphically and perform statistical analyses.
May be repeated for credit. *Equivalent to MAT 150.*
Academic Level: Undergraduate