## Faculty

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## Degrees and Programs

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The *Mathematics and Physics Department* provides courses for future data scientists and mathematicians for teacher education, pre-medicine, general education, and programs in other departments. A common goal of each course is that students will develop problem-solving skills based on mathematical reasoning and understanding, not merely rote memorization.

The biomathematics major is an attractive way to prepare for medical or dental school. The major provides excellent preparation for graduate study leading to a Master's Degree in Public Health with emphasis in statistical analysis. A growing area of biological research uses sophisticated mathematics to study genetics, population fluctuations, and metabolic functions. This major provides entry to such graduate programs as biomathematics, biostatistics, mathematical biology, and biometrics.

Data science is a fast-evolving interdisciplinary field centered on machine learning and obtaining, organizing, and analyzing data. The data science major includes courses in data science, mathematics, statistics, and business to prepare students for employment in a variety of industries, including entertainment, healthcare, technology, and political and social sciences. The degree also provides a background for graduate study in data science or related fields.

The engineering program prepares students to either immediately join the work force or to complete additional studies leading to a baccalaureate degree in engineering. The degree is designed to be comparable to the first two years of a traditional engineering program and prepares the student for entry into a 4-year engineering school of their choice.

## Major in Mathematics, B.A.

*A minimum of 50.5 hours (at least 17.5 upper-division hours)*

➤ ***Required Core Courses (31.5 hours):***

| | | |
|---|---|---|
| MATH 131+132 | Calculus I, II | 4+4 |
| MATH 265 | Elementary Linear Algebra | 4 |
| MATH 267 | Multivariable Calculus | 5 |
| MATH 269 | Elementary Differential Equations | 4 |
| MATH 275 | Logic and Sets | 4 |
| MATH 385 | Mathematical Modeling | 4 |
| MATH 390+490 | Junior + Senior Seminar | 0.5+1 |
| SCIE 290 | Sophomore Seminar | 1 |

➤ ***Required Core Electives (15 hours):***

| | |
|---|---|
| At least 3 hours additional MATH courses | 3 |
| At least 12 hours from the following:<br>Additional upper-division MATH or STAT courses | 12 |

➤ ***Required Cognate Courses (4 hours):***

| | | |
|---|---|---|
| INFS 115 | Intro to Computer Programming | 4 |

All core and cognate courses should be chosen in consultation with the major advisor. Students should consider the recommendations described below:

## Recommended Courses

*Applied Mathematics*

A focus on applied mathematics is a path to careers in medicine, government, business, and industry in such areas as computational biology, operations research, and applied statistics. Recommended courses: INFS 470, MATH 462 + MATH 462L, STAT 322.

a minor or second major in an applied field such as Biology, Business Administration, or Psychology.

*Mathematics Education*

A focus on mathematics education is a major component in a program of studies leading to the California Teaching Credential in secondary school mathematics. Recommended courses: MATH 341, MATH 350, MATH 451, PHYS 111.

*Actuarial Certification*

Actuarial certification can lead to careers in the insurance and investment industry, where actuaries use a broad knowledge of statistics, finance, and business. Recommended courses for students interested in preparing for the national examinations for actuarial certification: STAT 322, INFS 470.

## Major in Biomathematics, B.S.

*A minimum of 87.5 hours (25.5 upper-division hours)*

➤ *Required Core Courses (74.5 hours):*

| | | |
|---|---|---|
| BIOL 121+122+123 | Biological Foundations I, II, III | 5+5+5 |
| BIOL 222 | Introduction to Research Methods | 2 |
| CHEM 111+111L | General Chemistry I + Lab | 4+1 |
| CHEM 112+112L | General Chemistry II + Lab | 4+1 |
| CHEM 113+113L | General Chemistry III + Lab | 4+1 |
| INFS 115 | Intro to Computer Programming | 4 |
| MATH 131+132 | Calculus I, II | 4+4 |
| MATH 265 | Elementary Linear Algebra | 4 |
| MATH 267 | Multivariable Calculus | 5 |
| MATH 269 | Elementary Differential Equations | 4 |
| MATH 275 | Logic and Sets | 4 |
| MATH 385 | Mathematical Modeling | 4 |
| MATH 390+490 | Junior + Senior Seminar | 0.5 + 1 |
| MATH 462+462L | Bioinformatics + Lab | 4 |
| SCIE 290 | Sophomore Seminar | 1 |
| STAT 322 | Statistical Methods | 3 |

➤ *Required Core Electives (13 hours):*

*At least 13 hours from the following courses:* 13
*(Include at least 4 hours of DTSC or MATH and two BIOL courses)*

| | |
|---|---|
| BIOL 320 | Cell and Molecular Biology (4) |
| BIOL 328 | Animal Behavior (4) |
| BIOL 331 | Marine Science (4) |
| BIOL 338 | Field Biology (3) |
| BIOL 348 | Systems Physiology (5) |
| BIOL 354 | Genetics (4) |
| BIOL 430 | Neurobiology (4) |
| BIOL 469 | Immunology (4) |
| CHEM 371+371L | Organic Chemistry I + Lab (3+1) |
| CHEM 372+372L | Organic Chemistry II + Lab (3+1) |
| DTSC 323L | Statistical Methods in Data Sci Lab (1) |
| DTSC 420 | Machine Learning (3) |
| DTSC 425 | Legal and Ethical Aspects of Data (2) |
| MATH 350 | Overview of Abstract Algebra (4) |
| MATH 423 | Overview of Real Analysis (4) |

*Recommended Cognate Courses:*

| | |
|---|---|
| CHEM 373+373L | Organic Chemistry III + Lab (3+1) |
| CHEM 481 | Biochemistry I (4) |
| PHYS 111+112+113 | General Physics I, II, III (4+4+4) |

## Major in Data Science, B.S

*A minimum of 77 hours (33 upper-division hours)*

➤ *Required Core Courses (65 hours):*

| | | |
|---|---|---|
| DTSC 101 | Intro to Data Science | 4 |
| DTSC 201 | Fundamentals of Data Science | 4 |
| DTSC 215 | Frmwrks & Libs for Data Science | 4 |
| DTSC 323L | Statistical Methods in Data Science Lab | 1 |
| DTSC 420 | Machine Learning | 3 |
| DTSC 425 | Legal and Ethical Aspects of Data | 2 |
| DTSC 490 | Senior Seminar | 1 |
| DTSC 494 | Internship | 1 |
| INFS 115 | Intro to Computer Programming | 4 |
| INFS 240 | Introduction to GIS | 2 |
| INFS 320 | Business Intelligence | 3 |
| INFS 380 | Database Analysis and Design | 3 |
| MATH 131+132 | Calculus I, II | 4+4 |
| MATH 265 | Elementary Linear Algebra | 4 |
| MATH 267 | Multivariable Calculus | 5 |
| MATH 269 | Elementary Differential Equations | 4 |
| MATH 275 | Logic and Sets | 4 |
| MATH 385 | Mathematical Modeling | 4 |
| SCIE 290 | Sophomore Seminar | 1 |
| STAT 322 | Statistical Methods | 3 |

➤ *Required Core Electives (12 hours):*
*At least 12 hours from the following:*
Upper-division MATH courses.
Upper-division DTSC courses.

| | | |
|---|---|---|
| GLBH 422 | Metrics Literacy | 4 |

Repeat DTSC 494 for additional credit.

Many of the core and elective courses for this major carry pre-requisites. All courses should be chosen and sequenced in consultation with the major advisor.

## Minor in Data Science

*A minimum of 24 hours (6 upper-division hours)*

➤ ***Required Core Courses (18 hours):***

| | | |
|---|---|---|
| DTSC 101 | Intro to Data Science | 4 |
| DTSC 201 | Fundamentals of Data Science | 4 |
| DTSC 215 | Frmwrks & Libs for Data Science | 4 |
| INFS 115 | Introduction to Computer Programming | 4 |
| DTSC 425 | Legal and Ethical Aspects of Data | 2 |

➤ ***Required Core Electives (6 hours):***

*At least 6 hours (4 upper division) from the following:*

| | | |
|---|---|---|
| DTSC 323L | Statistical Methods in Data Science Lab | 1 |
| DTSC 420 | Machine Learning | 3 |
| GLBH 422 | Metrics Literacy | 4 |
| INFS 240 | Introduction to GIS | 2 |
| INFS 380 | Database Analysis and Design | 3 |
| MATH 267 | Multivariable Calculus | 5 |
| MATH 275 | Logic and Sets | 4 |
| MGMT 228 | Principles of Information Systems | 4 |
| STAT 322 | Statistical Methods | 3 |

## Minor in Mathematics

*A minimum of 27 hours (6 upper-division hours)*

Take at least 27 hours (6 upper-division) chosen from any non-service MATH courses. STAT 322 may also apply to the minor.

## Teaching Credential

Students desiring to enter a program of studies leading to a California teaching credential in mathematics should complete a major that prepares them to complete the recommended courses for the Mathematics Education focus such as Data Science or Biomathematics. Students will need to pass the mathematics portion of the CSET exam one quarter prior to doing full-time student teaching. Students are invited to discuss the program with their major advisor in the Mathematics Department.

Those who plan to teach at the secondary level should consult with the credential analyst in the Education Department and should become acquainted with the specific requirements for admission to and successful completion of the Teacher Education Program as outlined in the section entitled “Education” in this catalog.

## Major in Engineering, A.S.

*A minimum of 78 hours*

➤ ***Required Core Courses (59 hours):***

| | | |
|---|---|---|
| ENGR 105 | Introduction to Engineering | 3 |
| ENGR 131 | Engineering Drawing | 3 |
| ENGR 211+212+213 | Engineering Mechanics | 3+3+3 |
| ENGR 216 | Circuit Analysis | 4 |
| INFS 115 | Computer Programming | 4 |
| MATH 131+132 | Calculus I,II | 4+4 |
| MATH 265 | Elementary Linear Algebra | 4 |
| MATH 267 | Multivariable Calculus | 5 |
| MATH 269 | Elementary Differential Equations | 4 |
| PHYS 111+112+113 | General Physics I, II, III | 4+4+4 |
| PHYS 265 | Calculus Applications for Physics | 3 |

➤ ***Required Cognate Courses (19 hours):***

| | | |
|---|---|---|
| CHEM 111+112+113 | General Chemistry | 5+5+5 |
| COMM 105 | Communication and Public Speaking | (4) |

***Recommended Cognate Courses:***

| | | |
|---|---|---|
| ENGL 102 | College English | (4) |

## Astronomy

Lower-Division Course:

**ASTR 115** **5 W**
**Astronomy**

An introduction for the general student to the basic elements of astronomy. Topics include models of the solar system, stars and their processes, clusters, galaxies, cosmology, and relevant physics topics such as light, spectroscopy, nuclear reactions, and relativity. Emphasizes the development of scientific ideas and models for the structure and contents of the universe and the effects of those ideas on western civilization. Laboratory activities emphasize personal observations of various astronomical objects, as weather permits. Four lectures and one evening laboratory per week. Prerequisite: MATH 096 or equivalent.

## Data Science

Lower-Division Courses:

**DTSC 101** **4 F**
**Introduction to Data Science**

A hands-on, exploratory introduction to data and problem solving with data. An overview of various data types and elementary techniques for uncovering relationships among data. Programming software is used to manipulate data, visualize data, and develop simple scripts to answer a variety of questions related to real data sets.

**DTSC 201** **4 S**
**Fundamentals of Data Science**

A follow up to the introductory course DTSC 101 with an emphasis on data collection, data cleaning, estimation, prediction, and inference. Programming software is used to write more involved functions and scripts for deeper analysis of real data sets. Prerequisite: DTSC 101.

**DTSC 215** **4 F**
**Frameworks and Libraries for Data Scientists**

An overview of a variety of frameworks and libraries for Python used in data science. Emphasizes tools for data processing and modeling, data visualization, and data mining and understanding their accompanying documentation. Frameworks may include Jupyter Notebooks, Pandas, or SciKit. Libraries may include NumPy, Matplotlib, or Scrapy. Prerequisite: INFS 115. Recommended STAT 222.

Upper-Division Courses:

**DTSC 323L** **1 W**
**Statistical Methods in Data Science Lab**

A lab course applying statistical methods that may include multiple and logistic regression, analysis of variance, decision trees, splines, and LASSO using programming software (e.g., R., Python). Prerequisite: DTSC 201 or INFS 115. Corequisite: STAT 322 (prior or concurrent). Recommended DTSC 215. Even years.

**DTSC 420** **3 W**
**Machine Learning**

An introduction to the theory and algorithms pertaining to classification, regression, and clustering. Topics may include perceptrons, support vector machines, linear regression, logistic regression, ridge regression, tree models, neural networks, the nearest neighbor algorithm, principal component analysis, and k-means clustering. Programming software is used to implement selected algorithms and apply them to real data sets. Prerequisites: DTSC 215, DTSC 323L. Odd Years.

**DTSC 425** **2 F**
**Legal and Ethical Aspects of Data**

This course provides an introduction to critical ethical issues surrounding data and society. It blends social and historical perspectives on data with ethics, policy, and case examples to help students develop a workable understanding of current ethical issues in data science. Ethical and policy-related concepts addressed include: challenges inherent in data analytics and privacy, data and discrimination, ethical frameworks for organizational use of data, and the ethical ramifications of the use of artificial intelligence in data science. Odd years.

**DTSC 485** **1-4 Arr**
**Special Topics in Data Science**

Study of a selected topic not covered in the curriculum. Repeatable for credit under different subtitles. Pre-Requisite: Permission of the Instructor.

**DTSC 490** **1 S**
**Senior Seminar**

Topics of current interest in data science. Under supervision of departmental faculty, each student will prepare and present a paper on a topic of interest. Prerequisite: DTSC 420, DTSC 425.

**DTSC 494** **1 F, W, S**
**Internship**

*See BUAD 494.*

**DTSC 495** **1-3 Arr**
**Independent Study**

Qualified students may, with the approval of the department chair, undertake a directed data science problem suited to their background and experience. Repeatable to a maximum of 4 credits.

## Engineering

Lower-Division Courses:

**ENGR 105 3 F**
**Introduction to Engineering**

A survey of engineering as a profession: the main divisions; the work, functions and personal characteristics of the engineer; application of the sciences in engineering; design tools used by engineers; computer methods, basic skills for engineering problem-solving. Two lectures and one laboratory per week.

**ENGR 131 3 W**
**Engineering Drawing**

Principles of and practice in engineering drawing. Applications to technical problems of CAD drafting techniques, orthographic, and pictorial views. Two lectures and one laboratory per week.

**ENGR 211+212+213 3+3+3 F+W+S**
**Engineering Mechanics I,II,III**

Statics and dynamics. Detailed analysis of equilibrium, kinetics and kinematics of particles and rigid bodies. Examples and problems relate to real engineering applications. Prerequisites: MATH 131+132. Corequisite: PHYS 111.

**ENGR 216 4 S**
**Circuit Analysis**

Introductory circuit analysis for engineering and physics students. Circuit variables and parameters; Kirchhoff's laws and network solution; equivalent circuits, network theorems; natural and complete response; sinusoidal steady-state, phasors and impedance; frequency characteristics; power and power factor. Three lectures and one laboratory per week. Prerequisite: MATH 131+132.

## Mathematics

Service Courses:

*(Not applicable to a major or minor in this department)*

**MATH 095+096 (WEB) 4+4 F, W, S**
**Basic Algebra I, II**

Basic concepts and techniques of algebra for students without recent experience in algebra.

MATH 095 includes integers, algebraic expressions, first degree equations and inequalities, simple rational expressions and proportions, integer exponents, scientific notation, functions, graphs, and solutions of linear equations and systems.

MATH 096 includes factoring, functions, rational and radical expressions, integer exponents and square roots, complex numbers, and solutions of quadratic and rational equations. Prerequisite: MATH 095.

**MATH 106 (WEB) 4 F, W, S**
**College Algebra**

Begins with a quick review of basic algebra, including rational exponents and radicals, complex numbers, linear and quadratic equations, and inequalities. Also includes polynomial and rational functions, composition and inverse of functions, exponentials and logarithms, systems of equations, and arithmetic and geometric progressions. Other topics may include further study of polynomials and/or linear programming. Prerequisite: MATH 096 or equivalent.

**MATH 113 (WEB) 2 F, W, S**
**Trigonometry**

A study of the six trigonometric functions and their relationships to one another, as well as the study of applications involving these six functions. Included are degree and radian measure, right triangle trigonometry, graphs of the trigonometric functions, inverse trigonometric functions, fundamental identities, addition identities, double-angle and half-angle identities, solutions of trigonometric equations, law of cosines, law of sines, and vector triangles. Prerequisite: MATH 096 or equivalent.

**MATH 115 2 F**
**Essential Algebra and Trigonometry for Scientists**

A preparation for calculus for students with a background in algebra and trigonometry. Includes operations on algebraic expressions, complex numbers, trigonometric identities, and graphs of polynomial, rational, logarithmic, exponential, and trigonometric functions. Prerequisite: MATH 096 or equivalent.

**MATH 211+212 3+3 F+W**
**Foundations of School Mathematics I, II**

A two-quarter sequence covering the logic and structure underlying school mathematics. Concepts, procedures, problem-solving and applications at concrete, pictorial, and abstract levels. Must be taken in sequence. Prerequisite: MATH 096 or equivalent.

MATH 211 includes problem-solving techniques, sets, logic and deductive reasoning, the arithmetic of whole numbers, fractions, decimals, integers, rational and real numbers, ratio and proportion, and percent.

MATH 212 includes geometry, measurement, and basic probability.

Lower-Division Courses:

**MATH 131+132 4+4 W+S**
**Calculus I, II**

A two-quarter standard sequence in single-variable calculus. Must be taken in sequence. Prerequisite: Knowledge of algebra and trigonometry at the level provided by MATH 106 and 113.

MATH 131 focuses on differential calculus and its applications. Includes limits, all derivative tools (including transcendental functions), maximizing/minimizing applications, related rates, L'Hospital's rule, and antiderivatives. Graphing calculators and mathematical software tools are used extensively.

MATH 132 focuses on integral calculus and its applications. Includes the fundamental theorems, general substitutions, integration by parts, applications to geometry and physics, differential equations, growth models, infinite series, and Taylor expansions.

**MATH 265** **4 W**
**Elementary Linear Algebra**

Matrix algebra and determinants, applications to solving systems of linear equations, vector spaces, linear transformations, eigenvalues, and eigenvectors. Prerequisite: MATH 131.

**MATH 267** **5 S**
**Multivariable Calculus**

Vector functions and functions of more than one variable, solid analytic geometry, parametric curves and surfaces, partial derivatives, gradients, multiple integrals, line and surface integrals, divergence, curl, and Stokes' Theorem. Prerequisite: MATH 132.

**MATH 269** **4 F**
**Elementary Differential Equations**

Ordinary differential equations balancing analytic techniques, qualitative methods, and basic modeling. Topics include eigenvalue methods for linear systems, Laplace transforms, phase plane, null-clines, equilibria, harmonic oscillator, and population models. Prerequisite: MATH 132. Recommended prerequisite: MATH 265.

**MATH 275** **4 S**
**Logic and Sets**

A bridge to upper-division mathematics, developing the student's ability to handle abstract concepts and careful proofs. Propositional and predicate logic, various types of proof, algebra of sets and functions, equivalency relations, and countable sets. Prerequisite: MATH 131.

Upper-Division Courses:

**MATH 341** **4 Arr**
**Geometries**

The development and history of Euclidean geometry, the axiomatic method and various axiom sets for Euclidean geometry, history of the parallel postulate and discovery of non-Euclidean geometry, neutral and hyperbolic geometry, philosophical implications. Prerequisite: MATH 275. Odd years.

**MATH 350** **4 F**
**Overview of Abstract Algebra**

An introduction to abstract algebra covering groups, rings, integral domains, and fields, with applications to polynomials, Galois Theory, and geometric constructions. Prerequisite: MATH 275. Even years.

**MATH 385** **4 S**
**Mathematical Modeling**

Mathematical modeling of problems selected from a variety of applied areas, including industry, biology, business, and the social sciences. Both deterministic and stochastic models are considered, with an emphasis on practical problem-solving. Includes exploration of the computer as a problem-solving tool. Prerequisites: MATH 269, 275. Recommended prerequisites: MATH 265 and INFS 115. Even years.

**MATH 390** **0.5 S**
**Junior Seminar**

Continued preparation of students for successful pursuit of opportunities in mathematics related fields of work and study. Includes mathematics problem solving in a variety of topics and contexts, investigating employment and further education opportunities for (bio) mathematics graduates, CV and résumé updating, continued major portfolio preparation, introduction to professional mathematics organizations/publications/PUC library resources, and identifying topics of interest for further study in senior seminar. Prerequisite: MATH 290. Graded S/F.

**MATH 423** **4 F**
**Overview of Real Analysis**

A course focusing on the fundamental definitions and theorems underlying single-variable calculus and related topics. Includes the completeness property of the reals, sequences, continuity, differentiation, Riemann integration, introduction to real point-set topology. Prerequisite: MATH 132, 275. Odd years.

**MATH 451** **4 Arr**
**History of Mathematics**

A survey of major developments in mathematics from antiquity to modern times. Involves historically relevant problem sets, class discussions, and presentations by students and teacher. Prerequisite: MATH 131. Even years.

**MATH 462 + 462L** **4 S**
**Bioinformatics + Lab**

This course is designed to give students both a theoretical background and a working knowledge of the techniques employed in bioinformatics. Emphasis will be placed on biological sequence (DNA, RNA, protein) analysis and its applications such as metagenomics and

phylogenetics. An optional lab will give students opportunities to explore online databases and data analysis tools in more depth.

The lab is required to be applicable to a major or minor in the Mathematics Department. Prerequisites: BIOL 111 and STAT 222. Lab Prerequisites: MATH 275 or INFS 115. Recommended prerequisites: DTSC 215. Odd years.

**MATH 485 1-4 Arr**
**Special Topics in Mathematics**

Study of a selected topic not covered elsewhere in the curriculum. Course content varies from year to year, with topics such as topology, differential geometry, chaos & fractals, and formal logic & Gödel's theorems. Repeatable for credit under different subtitles.

**MATH 490 1 S**
**Senior Seminar**

Continued preparation of students for successful pursuit of opportunities in mathematics related fields of work and study. Includes mathematics problem solving in a variety of topics and contexts, continued major portfolio preparation, and an in-depth study of a topic of interest in a field related to mathematics. Prerequisite: MATH 390.

**MATH 495 1-3 Arr**
**Independent Study**

Qualified students may, with the approval of the department chair, undertake a directed research problem suited to their background and experience. Repeatable to a maximum of 9 credits.

## Physics

Service Courses:

*(Not applicable to a major or minor in this department)*

**PHYS 105 5 S**
**Introduction to Physics**

Emphasizes the ideas and concepts of conventional topics in physics with illustrations from everyday living. Assumes no previous physics course. (Students who need this course to meet a curricular requirement may also need to register for PHYS 106L.) Prerequisite: MATH 096 or equivalent.

**PHYS 106L 1 S**
**Introduction to Physics Laboratory**

A laboratory emphasizing physical measurements for those curricula requiring an introductory physics course with laboratory. One laboratory per week. Prerequisite or corequisite: PHYS 105.

Lower-Division Courses:

**PHYS 111+112+113 4+4+4 F+W+S**
**General Physics I, II, III**

A three-quarter standard sequence introducing the fundamental natural phenomena of the physical universe, with an emphasis on fundamental principles and methods of physics. Suitable for preprofessional students and also acceptable as part of the general-education requirement in basic science. Three lectures and one laboratory per week. Must be taken in sequence. Prerequisite: Knowledge of algebra and trigonometry at the level provided by MATH 106 and 113.

PHYS 111: Newtonian mechanics, fluids, waves and vibrations, and sound.

PHYS 112: Kinetic theory, thermodynamics, electricity, and magnetism.

PHYS 113: Optics, atomic and nuclear physics, elementary particle physics, and special relativity.

**PHYS 265 3 S**
**Calculus Applications for Physics**

Derivations and applications of fundamental physical principles commonly covered in General Physics using differential and integral calculus. Completing the PHYS 111-112-113 General Physics sequence and this course will be considered equivalent to a Physics with Calculus sequence. Prerequisite: MATH 131 and Corequisite: PHYS 113.

Upper-Division Courses:

**PHYS 390 3 Arr**
**History and Philosophy of Science**
(See also PHIL 390)

The historical roots of modern science, the nature of scientific knowledge, its development and methodology, the impact of science on culture (and vice versa), and the influence of philosophical and theological concepts on science. Prerequisites: PHYS 105 or CHEM 101; PHIL 101 or demonstrated preparedness for course.

**PHYS 485 3 Arr**
**Issues in Science and Religion**
(See also PHIL 485)

The relationship and interaction between science and religion: epistemology, the methods, languages, scope and limitations of science and religion, problems of ethics and science. Prerequisites: PHYS 105, CHEM 101, or equivalent; PHIL 101 or demonstrated preparedness for course.

**PHYS 486 1-4 Arr**
**Special Topics in Physics**

Study of a selected topic not covered elsewhere in the curriculum. Course content varies from year to year, with topics

such as Solid State Physics, High Energy Physics, and Applied Optics. Repeatable for credit.

## Statistics

Lower-Division Course:

**STAT 222** **4 F, W, S**
**Introduction to Statistics**

Descriptive statistics, graphical methods, basic concepts of probability, normal probability distributions, central limit theorem, hypothesis tests involving means and proportions, confidence intervals, introduction to correlation and regression, and chi-square testing. Examples from a wide variety of disciplines, including business, the social sciences, and the life sciences, to prepare students with varying backgrounds and interests to become intelligent consumers and users of statistics. Prerequisites: MATH 096 (D- or above) or equivalent, ENGL 101.

Upper-Division Course:

**STAT 322** **3 W**
**Statistical Methods**

An intermediate course in applied statistics including multiple regression, analysis of variance, and nonparametric methods. Spreadsheets and statistical software are used to perform calculations. Prerequisite: STAT 222. Even years.

## Science

Lower-Division Course:

**SCIE 290** **1 W**

Preparation of math and science students for successful pursuit of internship/research, graduate school, and career opportunities. Discussions of discipline-specific career options and skills needed for obtaining a job or success at the next level of education. Includes resume writing and portfolio preparation. Relevant topics of interest presented by guest speakers. 1 credit S/F