techniques. Topics will include laboratory safety and protocol, substrate cleaning, thermal oxidation, photolithography, diffusion, metallization, process integration, and device testing. Prerequisite: MATH 381 or permission of instructor.

MATS/GEOL 395. Geologic Perspectives in Materials Science. 3 credits.
A one-semester course which emphasizes the commonalities between the geological sciences and materials science. Course includes topics from mineralogy, crystallography, sedimentology, structural geology, and more. Prerequisites: courses in geological sciences and/or materials science.

MATS/GEOL 396. X-ray Characterization of Solid Materials. 3 credits.
Covers fundamental principles and theory behind two powerful, X-ray based, technologies: X-ray Diffraction and Energy Dispersive Analysis of X-rays (EDS). Students will collect and analyze data from a single crystal Gandolfi X-ray camera, automated powder diffraction system (focusing goniometer), and EDAX system (EDS). Prerequisite: GEOL 280, MATS/PHYS 275 or ISAT 302.

MATS/ISAT 430. Materials Science in Manufacturing. 3 credits.
This course is the study of engineering materials used in the fabrication of products including metals, polymers, ceramics, composites and elastomers. Topics include physical, mechanical and electrical properties of materials, elements of strength of materials, failure criteria, and materials selection. Prerequisites: ISAT 211 and permission of the instructor.

MATS/ISAT 431. Manufacturing Processes. 3 credits.
This course provides an introduction to the processes used for fabricating parts, such as machining, grinding, and casting and sheet-metal fabrication, including both traditional and nontraditional processes. Topics include interaction of materials, processing and design, economics of manufacturing, design for improved processing. Manufacturing processes for metals, plastics and composites are addressed. Prerequisite: ISAT 430 or permission of the instructor.

MATS/ISAT 432. Selection and Use of Engineering Materials. 3 credits.
This course deals with the interplay between engineering product specification, design, economics, environment, energy, materials selection, fabrication route, manufacturing cost and product service requirements. Students will be taught how to perform design projects that involve understanding of the behavior of materials and selection of materials for a specific function. Prerequisite: ISAT 211 or permission of the instructor.

MATS/ISAT 436. Micro-Nanofabrication and Applications. 3 credits.
This course examines processes used in the manufacture of microelectronic devices (VLSI) integrated circuits, optoelectronic devices, flat panel displays), microelectromechanical devices (micromotors, microactuators), data storage media (magnetic and optical disks, including CDs), optical fibers and some sensors and transducers. Principles of operation of semi-conductor and other devices are also studied. Prerequisite: Junior standing in ISAT, PHYS 150, or permission of the instructor.

MATS 498R. Undergraduate Materials Science Research. 1-3 credits, repeatable to 6 credits.
Research in a selected area of materials science arranged with and approved by a faculty research adviser. Prerequisite: Study proposal must be approved by research adviser and director of Center for Materials Science prior to registration.

Mathematics

Department of Mathematics and Statistics

**MATH 105. Quantitative Literacy and Reasoning.** 3 credits. Offered fall and spring.
Topics such as geometry, computing, algebra, number theory, history of mathematics, logic, probability, statistics, modeling and problem solving intended to give students insight into what mathematics is, what it attempts to accomplish and how mathematicians think.

**MATH 107**-**108. Fundamentals of Mathematics I-II.** 3 credits each semester.
Offered fall and spring.

These courses, along with MATH 207, form a sequence that covers the topics of sets, logic, numeration systems, development of real numbers, number operations, number theory, geometry, measurement, algebra, functions, probability and data analysis. Sequence is required for early childhood, elementary or middle school teacher licensure. Prerequisite for MATH 107: MATH 155, MATH 156 or sufficient score on the Mathematics Placement Exam. Prerequisite for MATH 108: MATH 107 with a grade of “C-” or better.

**MATH 135. Elementary Functions.** 4 credits. Offered spring.
Algebraic, exponential, logarithmic and trigonometric functions; matrices and matrix solutions to systems of linear equations; vectors. Not open to students who have previously earned credit in MATH 155, 156, 205 or 225, except with the consent of the department head.

**MATH 155. College Algebra.** 3 credits. Offered fall and spring.
Polynomial, rational, exponential and logarithmic functions and applications, systems of equations and inequalities, sequences. Prerequisite: Demonstration of proficiency in algebra at an intermediate level. A test is required to determine placement in MATH 155 or MATH 156. Not open to students who have previously earned credit in MATH 135, 156, 205, 231, 222 or 225.

**MATH 156. College Algebra.** 3 credits. Offered fall and spring.
Covers same topics as MATH 155. MATH 156 will meet five times a week for students requiring more instructional time. Prerequisites: Demonstration of proficiency in algebra at an intermediate level. A test is required to determine placement in MATH 155 or MATH 156. Not open to students who have previously earned credit in MATH 135, 156, 205, 231, 222 or 225.

**MATH 167. Topics in Mathematics.** 1-3 credits. Offered on demand.
Topics or projects in mathematics which are of interest to the lower-division student. May be repeated for credit when course content changes. Topics or projects selected may dictate prerequisites. Students should consult the instructor prior to enrolling for this course.

**MATH 205. Introductory Calculus I.** 3 credits. Offered fall and spring.
Topics from differential and integral calculus with applications to the social, behavioral or life sciences and business or management. Prerequisite: One of MATH 135, MATH 155, MATH 156 or sufficient score on the mathematics placement exam. Not open to mathematics or physics majors or to students who have already earned credit in MATH 220 or MATH 235. Not recommended for chemistry majors.

**MATH 205E. Introductory Calculus I with Laboratory.** 4 credits. Offered on demand.
Topics from differential and integral calculus, including a laboratory component stressing data collection, data analysis, and applications to environmental issues. Prerequisite: Demonstration of strong preparation in algebra. Not open to mathematics or physics majors or to students who have already earned credit in MATH 205, MATH 231 or MATH 235. Not recommended for chemistry majors. Sufficient score on the Mathematics Placement Exam.

**MATH 206. Introductory Calculus II.** 3 credits. Offered on demand.
Topics from integral calculus with applications to the social, behavioral or life sciences and business or management. Prerequisite: MATH 205. Not open to mathematics or physics majors or to students who have already earned credit in MATH 226. Not recommended for chemistry majors.

**MATH 207. Fundamentals of Mathematics III.** 3 credits. Offered fall and spring.
A continuation of topics listed in the MATH 107-108 description will be covered. The MATH 107-108 sequence fulfills the requirements for licensure of prospective early childhood, elementary or middle school teachers. Prerequisite: MATH 108.

**MATH 220. Elementary Statistics.** 3 credits. Offered fall and spring.
Descriptive statistics, frequency distributions, sampling, estimation and testing of hypotheses, regression, correlation and an introduction to statistical analysis using computers. Prerequisite: MATH 105 or sufficient score on the Mathematics Placement Exam.

**MATH/CS 227-228. Discrete Structures I-II.** 3 credits each semester.
MATH/CS 227 offered spring; MATH/CS 228 offered fall.
An introduction to discrete mathematics structures including functions, relations, sets, logic, matrices, elementary number theory, proof techniques, basics of counting, graphic theory, discrete probability, digital logic, finite state machines, integer and floating point representations. Prerequisite for MATH/CS 227: MATH 159, MATH 156 or sufficient score on the Mathematics Placement Exam. Prerequisite for MATH/CS 228: MATH/CS 227.

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MATH 231. Calculus with Functions I. 4 credits. Offered fall and spring.
MATH 232 and MATH 233 form a sequence that combines first-semester calculus with algebra and trigonometry. The sequence is designed for students whose pre-calculus skills are not strong enough for MATH 235. Calculus material in MATH 231 includes limits and derivatives of algebraic functions and their applications. Prerequisite: MATH 155, MATH 156 or sufficient score on the Mathematics Placement Exam. MATH 231-232 together are equivalent to MATH 235 for all prerequisites. Not open to students who have already earned credit in MATH 235.
MATH 232. Calculus with Functions II. 4 credits. Offered fall and spring.
A continuation of MATH 231. Calculus topics include limits and derivatives of transcendental functions, the theory of integration and basic integration techniques. Prerequisite: MATH 231 with a grade of “C-” or better. MATH 231-232 together are equivalent to MATH 235 for all prerequisites. Not open to students who have already earned credit in MATH 235.
MATH 235*-236. Calculus I-II. 4 credits each semester. Offered fall and spring.
Differential and integral calculus of functions of one variable. Sequences and infinite series. Prerequisite for MATH 235: Sufficient score on the Mathematics Placement Exam. Prerequisite for MATH 236: MATH 232 or MATH 235 with grade of “C-” or better. MATH 235 is not open to students who have already earned credit in MATH 232.
MATH 237. Calculus III. 4 credits. Offered fall and spring.
Vectors. Multivariate calculus. Prerequisite: MATH 236 with grade of “C-” or better.
MATH 238. Linear Algebra with Differential Equations. 4 credits. Offered fall and spring.
Matrices; determinants; vector spaces; linear transformations; eigenvectors and eigenvalues; separable, exact and linear differential equations; and systems of linear differential equations. Prerequisite: MATH 236. Not open to students who have already earned credit in MATH 238.
MATH 245. Discrete Mathematics. 3 credits. Offered fall and spring.
Logic, set theory, relations and functions, mathematical induction and equivalent forms, recurrence relations, and counting techniques. Prerequisite or corequisite: MATH 236.
Programming in a high-level computer language. Applications of numerical algorithms to problems basic to areas such as mathematics, the sciences and economics and finance. Prerequisite: MATH 236 or corequisite MATH 238 and consent of instructor. This course is not open to students who have previously earned credit in MATH/VSC 449.
MATH/PHYS 265. Introduction to Fluid Mechanics. 4 credits. Offered spring of even years.
Introduces the student to the application of vector calculus to the description of fluids. The Euler equation, viscosity and the Navier-Stokes equation will be covered. Prerequisites: MATH 237 and PHYS 260.
MATH 280. SAS Programming and Data Management. 3 credits. Offered fall.
Use of statistical software to manage, process and analyze data. Writing of statistical programs to perform simulation experiments. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH 285. Data Analysis. 4 credits. Offered on demand.
Topics include experimental and survey design, distributions, variation, chance, sampling variation, computer simulation, bootstrapping, estimation and hypothesis testing using real data generated from classroom experiments and large databases. Prerequisite: MATH 206, MATH 238 or permission of instructor. Not open to students who have already earned credit in MATH 220 or MATH 318.
MATH 297. Undergraduate Research. 1-4 credits. Offered on demand.
Students pursue research in a selected area of mathematics and/or statistics. Student must make arrangements with a supervising instructor prior to registration. Course may be repeated.
MATH 300. Linear Algebra. 3 credits. Offered fall and spring.
Vector spaces, linear transformations, matrices, determinants, systems of linear equations, and eigenvalues and eigenvectors. Prerequisite or corequisite: MATH 237 or permission of the instructor.
MATH 304. Principles of Algebra. 3 credits. Offered fall and spring.
Algebraic structures, number systems, matrices, groups, rings, factors and solutions to equations, graph theory. Prerequisite: MATH 207.
MATH 305. Principles of Geometry. 3 credits. Offered fall and spring.
Finite geometries, geometric transformations, constructions, geometry of inversion, projective geometry and non-Euclidean geometry. Prerequisite: MATH 207.
MATH 306. Principles of Analysis. 3 credits. Offered fall and spring.
Sequences, discrete calculus and difference equations, derivatives and integrals, concepts of differential equations and applications. Prerequisite: MATH 207.
Descriptive statistics, measures of central tendency and dispersion, correlation, probability, probability distributions and statistical inference. Prerequisite: MATH 207.
MATH 310. Elementary Theory of Numbers. 3 credits. Offered every third semester as of fall 2013.
Properties of integers and prime numbers, divisibility, congruence, residues and selected topics. Prerequisite: MATH 245 or consent of the instructor.
MATH 315. The Real Number System. 3 credits. Offered every third semester as of fall 2013.
A development of the real number system through a systematic approach to the natural numbers, integers, rationals and irrationals. Prerequisite: MATH 245 or consent of the instructor.
MATH 318. Introduction to Probability and Statistics. 4 credits. Offered fall and spring.
Descriptive statistics, counting, probability axioms, discrete and continuous univariate random variables, expected values of random variables and sums of independent random variables, sampling distributions and the Central Limit Theorem, single and two-sample inference for proportions and means, chi-square test of independence, simple linear regression, and correlation. Prerequisite: MATH 236.
MATH 321. Analysis of Variance and Experimental Design. 3 credits. Offered fall and spring.
Introduction to basic concepts in statistics with applications of statistical techniques including estimation, test of hypothesis, analysis of variance and topics in experimental design. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH 322. Applied Linear Regression. 3 credits. Offered fall and spring.
Introduction to basic concepts and methods in regression analysis and the application of these models to real-life situations. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH 324. Applied Nonparametric Statistics. 3 credits. Offered spring.
Methods of analyzing data from non-normal populations including binomial tests, contingency tables, use of ranks, Kolmogorov-Smirnov type statistics and selected topics. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH 325. Survey Sampling Methods. 3 credits. Offered fall.
Theory and practice of sampling including stratified random samples, discussion of simple random samples, cluster sampling, estimating sample size, ratio estimates, subsampling, two-stage sampling and analysis of sampling error. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH 326. Statistical Quality Control. 3 credits. Offered on demand.
Uses and concepts of probability and sampling procedures. Acceptance sampling by attributes and variables, Shewhart concepts of process control, control chart process capability studies, reliability and life testing. Design of sampling plans. Prerequisite: MATH 318.
MATH 327. Categorical Data Analysis. 3 credits. Offered fall.
Exact inference for population proportions, comparison of population proportions for independent and dependent samples, two- and three-way contingency tables, Chi-square goodness-of-fit tests and Poisson and logistic regression. Prerequisite: MATH 220 or MATH 318 or equivalent.
MATH/FIN 328. Time Series Analysis. 3 credits. Offered fall and spring.
Regression and exponential smoothing methods for forecasting nonseasonal and seasonal time series, stochastic processes, Box-Jenkins’ autoregressive and moving average models. Prerequisites: MATH 238 and MATH 318.
MATH 336. Elementary Differential Equations. 3 credits. Offered on demand.
Development of techniques for obtaining, analyzing and graphing solutions to differential equations, with emphasis on first and second order equations. Prerequisite: MATH 237.
MATH 337. Methods of Applied Calculus. 4 credits. Offered every third semester as of spring 2014.
Laplace transforms, power series and their application to differential equations. Vector differential and integral calculus; parametric curves; coordinate systems; line, surface and volume integrals; and gradient, divergence and curl including the theorems of Green, Stokes and Gauss. Prerequisites: MATH 237 and MATH 239.

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MATH 340. Mathematical Modeling I – Optimization. 3 credits. Offered fall of even years.
Linear and nonlinear optimization with an emphasis on applications in the sciences, economics and social sciences. Techniques studied include the simplex, Newton and Lagrange methods and Kuhn-Tucker theory. Software packages will be used to implement these methods. Prerequisites: MATH 238 or MATH 300; and MATH 318. Offered spring.

MATH/PHYS 341. Nonlinear Dynamics and Chaos. 3 credits. Offered spring.
Introducory study of nonlinear dynamics and chaos intended primarily for upper-level undergraduates in science and mathematics. Topics include stability, bifurcations, phase portraits, strange attractors, fractals and selected applications of nonlinear dynamics in pure and applied science. Computers may be utilized for simulations and graphics. Prerequisites: MATH 238 and MATH 248.

MATH/BIO 342. Mathematical Models in Biology. 3 credits. Offered spring.
Introduction to dynamical models (discrete and continuous time) applied to biology. Tools of mathematical analysis from linear and nonlinear dynamics will be taught, including stability analysis of equilibria, as well as appropriate use of software packages. Emphasis will be on model development and interpretation in the context of applications, including effective written and oral presentation. Prerequisites: MATH 232 or MATH 235 or equivalent.

MATH 353. Graph Theory. 3 credits. Offered every third semester as of fall 2014.
Graphs and their applications. Possible topics include trees, Euler paths and Hamiltonian circuits, planar graphs, digraphs, adjacency matrices, connectivity and coloring problems. Prerequisite: MATH 245 or consent of instructor. BIO 454/MATH 354. Introduction to Biometrics (3, 1, 4 credits). Offered spring.
This course discusses the role of statistics in biological research and interpretation of biological phenomena. The course will cover topics of sampling, correlation, regression analysis, tests of hypotheses, commonly observed distributions in natural populations, nonparametric tests, goodness-of-fit tests and ANOVA. In order to fully comprehend the statistical analysis of these publications, students will review approximately half a dozen publications from different fields of biology. Prerequisite: MATH 220 or MATH 318 or equivalent.

MATH 360. Complex Variables with Applications. 3 credits. Offered every third semester as of fall 2013.
Introduction to analytic properties of complex numbers, analytic functions, harmonic functions, mappings of elementary functions, contour integration, series, residues, and poles and conformal mappings. Emphasis on computations and applications to fluid and heat flow. Prerequisite: MATH 237.

MATH/PHYS 365. Computational Fluid Dynamics. 3 credits. Offered on demand.
Applications of computer models to the understanding of both compressible and incompressible fluid flows. Prerequisites: MATH 248, either MATH 238 or MATH 338, MATH/PHYS 285, and PHYS 340.

MATH/FIN 395. Mathematical Finance. 3 credits. Offered spring.
An overview of the role of mathematical concepts in financial applications.
Topics include continuous time finance, optimization, numerical analysis and applications in asset pricing. Prerequisites: MATH 237 and FIN 380.

MATH/FIN 405. Securities Pricing. 3 credits. Offered fall.
A quantitative treatment of the theory and method of financial securities pricing to include an examination of closed form pricing models such as the Black-Scholes and its various derivatives as well as numerical solution techniques such as binomial methods. Prerequisite: MATH 395.

MATH 410-411. Advanced Calculus. 3 credits each semester. MATH 410 offered fall; MATH 411 offered spring.
Limits, continuity, differentiability, sequences, series, integration and selected topics. Prerequisite for MATH 410: MATH 238 or MATH 300; and MATH 245 or consent of the instructor. Prerequisite for MATH 411: MATH 410.

MATH 415. History of Mathematics. 3 credits. Offered spring.
Topics in the history of mathematics spanning ancient times to the present. Prerequisite: MATH 245 or consent of the instructor.

MATH 421. Applied Multivariate Statistical Analysis. 3 credits. Offered fall.
Multivariate statistical methods with applications. Topics include canonical correlation, clustering, discriminant analysis, factor analysis, multivariate analysis of variance, multiple regression, multidimensional scaling and principal component analysis. Prerequisites: MATH 300 or MATH 238; and MATH 231 or MATH 232.

MATH 423. Stochastic Processes. 3 credits. Offered spring of odd years.
Sequences and classes of random variables. Applications to physical, biological, social and management sciences. Topics include Markov chains, branching processes, the Poisson process, queueing systems and renewal processes. Prerequisites: MATH 238 or MATH 300; and MATH 318.

MATH 424. Statistical Decision Theory. 3 credits. Offered spring of even years.
Development and use of probability and statistics for strategic decision making with applications. Topics include decision flow diagrams, analysis of risk and risk aversion, utility theory, Bayesian statistical methods, the economics of sampling, sensitivity analysis and collective decision making. Prerequisite: MATH 318.

MATH 426. Probability and Mathematical Statistics I. 3 credits. Offered fall.
Derivations and proofs of probability theorems, discrete and continuous univariate and multivariate random variables, conditional distributions, mathematical expectations, functions of random variables, moment generating functions, properties and derivation of estimators including the method of moments and maximum likelihood estimation. Prerequisite: MATH 318.

MATH 427. Probability and Mathematical Statistics II. 3 credits. Offered spring.
Limiting distributions, sampling theory and distributions, theory and applications of estimation and hypothesis testing. Prerequisite: MATH 426.

Experience in the design, data collection and analysis for a survey or experiment. Prerequisite: Consent of instructor.

MATH 430-431. Abstract Algebra. 3 credits each semester. MATH 430 offered fall and spring; MATH 431 offered spring.
An introduction to groups, rings and fields. Prerequisite for MATH 430: MATH 238 or MATH 300, and MATH 245 or consent of instructor. Prerequisite for MATH 431: MATH 430.

MATH 434. Advanced Linear Algebra. 3 credits. Offered spring.
A proof-based linear algebra course covering such topics as vector spaces, linear transformations and matrices, eigenvalues and eigenvectors, inner product spaces, and canonical forms. Prerequisites: MATH 245 and either MATH 238 or MATH 300.

MATH 435. Introduction to Topology. 3 credits. Offered fall.
Metric spaces, limits, continuous maps and homeomorphisms, connectedness, compact topological spaces and applications. Prerequisites: MATH 238 or MATH 300, and MATH 245 or consent of instructor.

MATH 440. Fourier Analysis and Partial Differential Equations. 3 credits. Offered fall.
Elementary applied partial differential equations, the heat equation, Laplace’s equation, the wave equation; Fourier series and boundary value problems. Both theory and problem-solving will be included. Prerequisites: MATH 228 or MATH 338.

MATH 441. Analysis and Dynamics of Differential Equations. 3 credits. Offered spring.
Analysis of qualitative properties and dynamics of linear and non-linear ordinary differential equations, including topics such as existence, uniqueness, phase portraits, stability and chaos, with applications to the sciences. Prerequisites: MATH 238, and MATH 245 or MATH 440 or consent of instructor.

MATH/CS 448. Numerical Analysis. 3 credits. Offered every third semester as of fall 2014.
Study and analysis of algorithms used to solve nonlinear equations and systems of linear and nonlinear equations. Iterative methods for matrices and Newton-type methods. Numerical differential and integral calculus. Programming using a high-level language and/or software packages. Prerequisites: MATH 237, MATH 300 and MATH 248.

MATH/CS 449. Numerical Analysis for Differential Equations. 3 credits. Offered spring.
Study and analysis of numerical techniques to solve ordinary and partial differential equations, including Euler, Runge-Kutta, Picard, finite-difference and finite-element methods. Programming using a high-level language and/or software packages. Prerequisites: CS/MATH 448 and MATH 338.

MATH/CS 452. Design and Analysis of Algorithms. 3 credits. Offered spring.
An introduction to the analysis, design and theory of algorithms. Algorithms studied will be selected from searching, sorting and graph theory. Included are elements of counting, recurrence relations, direct and indirect proofs, recursion, complexity classes, language theory, decidability and undecidability. Prerequisites: MATH/CS 228 and CS 240.

MATH/FIN 465. Seminar in Actuarial Science. 1 credits.
Offered on demand.
Theory and application of contingency mathematics in the areas of life and health insurance and of annuities from both a probabilistic and deterministic approach. This class, together with MATH/FIN 466, helps students prepare for the professional actuarial examinations. Prerequisite: MATH 395 or consent of the instructor. Prerequisite or corequisite: MATH 426.

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MATH/FIN 485. Seminar in Actuarial Science I. 3 credits. Offered on demand. A continuation of MATH/FIN 485. Additional coverage of contingency mathematics in the areas of life and health insurance, annuities, pensions and risk theory from both probabilistic and deterministic approaches. The two-course sequence helps to prepare the student for the professional actuarial examinations. Prerequisite: MATH/FIN 485. Prerequisite or corequisite: MATH 427.

MATH 470. Connections in Mathematics. 3 credits. Offered spring. This course is a mathematics capstone course primarily for math majors with secondary education minors. It covers a variety of topics, each designed to develop the interconnectedness of advanced mathematics to the secondary curriculum. Prerequisite or corequisite: MATH 318, MATH 410, MATH 430, and MATH 475.

MATH 475. Fundamental Concepts of Geometry. 3 credits. Offered fall. Origin and development of Euclidean and other geometries including axiomatic systems, mathematical proof and special topics from incidence geometry. Prerequisite: MATH 245 or consent of instructor.

MATH 485. Selected Topics. 1-4 credits. Offered on demand. Topics in advanced mathematics or statistics which are not covered in the regularly offered courses. Offered only with approval of the department head; may be repeated for credit when course content changes. Prerequisites: Consent of the instructor.

MATH 497. Undergraduate Research. 1-4 credits. Offered on demand. Students pursue advanced research in a selected area of mathematics and/or statistics. Student must make arrangements with a supervising instructor prior to registration. Offered only with consent of the department head. Repeatable up to 6 credits.

MATH 499. Honors. 6 credits. Offered on demand. Year course.

Media Arts and Design

School of Media Arts and Design

SMAD 101. Introduction to Media Arts and Design. 3 credits. Study of the historical evolution of today’s media industries and career paths. Emphasis on contemporary issues affecting those industries and careers. Consideration given to emerging media, their required skills and social impacts. Prerequisite: Formal declaration for admission to the SMAD major.

SMAD 201. Fundamental Skills in Media Arts and Design I. 3 credits. Study of basic computer operating systems and the principles and practices of graphic production for digital and interactive media. Focus on tools and techniques used to create graphic content for diverse media delivery systems. Prerequisite: Admission to the SMAD major.

SMAD 202. Fundamentals Skills in Media Arts and Design II. 3 credits. Study of the aesthetic principles and practices of web development and production, and digital audio and video production. Focus on the technological requirements of producing content for the web and video. Prerequisite: Admission to the SMAD major. Prerequisite or corequisite: SMAD 201.

SMAD 210. News Reporting and Writing. 3 credits. The study and practice of the fundamentals of news writing, including news gathering techniques and news style. Emphasis on coverage of meetings, events and breaking stories. Consideration of writing across platforms including print, broadcast and online. Fulfills the College of Arts and Letters writing-intensive requirement for the major. Prerequisite: Admission to the major or permission of the instructor.


SMAD 225. Photjournalism. 3 credits. The study of visual information gathering for print media including photjournalism. Emphasis on photographic techniques and print media layout. Consideration of new visual technologies including the use of computers for electronic photo editing and design. Students must provide their own cameras. Prerequisite: Admission to the SMAD major and SMAD 201 or permission of the instructor.

SMAD 231. Writing for New Media. 3 credits. Study of the principles and practices of writing for new media platforms. Emphasis on the nature of interactivity, narrative design, and the relationship between text, image, sound and video. Attention to the development of new media presentations designed to inform, persuade and entertain. Fulfills the College of Arts and Letters writing-intensive requirement for the major. Prerequisite: Admission to the SMAD major or permission of the instructor. SMAD 241. Introduction to Corporate Communication. 3 credits. Introduction to the study and practice of corporate communication. Students will explore the functions of a corporate communication department, the strategic planning process, and the various forms and techniques used in corporate media writing. Exercises in print, broadcast and interactive media writing will allow students to apply material in real and simulated situations and produce examples for portfolios. Fulfills the College of Arts and Letters writing-intensive requirement. Prerequisite: Admission to the SMAD major or permission of the instructor.

SMAD/KIN 243. Sport Communication Techniques: Broadcasting. 3 credits. Study and practice of broadcast and A/V techniques applied in a variety of sport settings. Prerequisite: KIN 242.

SMAD/KIN 244. Sport Communication Techniques: Writing and Reporting. 3 credits. Basic skills of sport writing and reporting are studied and applied. Students gain experience in a variety of sports and learn and apply skills in researching, interviewing, reporting, writing columns and features involving the world of sports. Prerequisite: KIN 242.

SMAD 250. Scriptwriting. 3 credits. The study of the principles and practices of writing scripts for commercial, non-commercial and corporate media applications. Emphasis on preparing dramatic and informational forms for broadcast or recording. Fulfills the College of Arts and Letters writing-intensive requirement for the major. Prerequisite: Admission to the SMAD major or permission of the instructor.

SMAD 251. Screenplay Writing. 3 credits. Introductory study of the principles and practices of screenwriting. Emphasis is placed on the basic narrative structures underlying cinematic story-telling and the development of a short film script. Fulfills the College of Arts and Letters writing-intensive requirement for the major. Prerequisite: Admission to the SMAD major or permission of the instructor.

SMAD 252. Principles of Advertising. 3 credits. Study of the principles and practices of advertising, including the process, planning, production and placement of commercial messages. Students will learn of the social impact, creative strategy, consumer use, message production and media placement strategies of advertising. Students get practical experience applying an integrated communication strategy. Prerequisite: SMAD 202 or permission of the instructor.

SMAD 253. Practicum in Media Arts and Design. 1 credit, repeatable to 3 credits. First year students and sophomores participating in co-curricular media activities may receive one hour of credit for fieldwork at The Breeze, WMRA-FM, the Madison Video Productions or other university-related media outlets. Students are limited to one practicum per semester. Application procedures will be available from the school prior to registration. Prerequisite: Permission of the instructor. SMAD 301. The Media Arts: Culture by Design. 3 credits. Study of how mediated communication molds perception and influences cultural change. Emphasis on how language and imagery, sound and music are combined in current media to create meaning. Consideration of emerging media and their implications for cultural design. Prerequisite: SMAD 201 and SMAD 202 or permission of the instructor.

SMAD 302. HD Video Production. 3 credits. Principles and practices of video production and editing. Focus on production planning, visual composition, lighting, recording sound and sequencing of shots. Emphasis on single camera videography, and editing for broadcast, non-broadcast and multimedia applications. Prerequisite: SMAD 202 or permission of the instructor.

SMAD 303. HD Post Production. 3 credits. Principles and practices of high definition video editing. Focus on the technical, aesthetics, and strategies of editing, multi-layer compositing, and transcoding required for effective program output and multi-format distribution. Prerequisite: SMAD 302 or permission of the instructor.

SMAD 304. Audio Production. 3 credits. Study of digital sound production and digital sound-for-picture production. Emphasis on advanced theories and applications. Prerequisite: SMAD 302. Corequisite or prerequisite: SMAD 303 or permission of the instructor.