

Course Descriptions

LTCY 444. READING IN THE SECONDARY GRADES. (3) The principles, psychology, and methodologies for teaching the general and the specialized reading skills in the secondary grades.

MATH / MA – MATHEMATICS
DEPARTMENT OF MATHEMATICS (MATH)
DEPARTMENT OF ACADEMIC SUPPORT (MA)

Courses numbered below 136 are not applicable toward a major or minor in mathematics. A student who has earned credit for the listed course with a grade of "C" or better may not subsequently receive credit for the courses following in parentheses: MATH 117 (MATH 116); MATH 118 (MATH 116 and 117); MATH 119 (MATH 116 and 118); MATH 136 (MATH 116, 117, 118, and 119); MATH 137 (MATH 116, 117, 118, 119, and 136); MATH 310 (MATH 109); MATH 382 (MATH 109 and 183); STAT 301 (MATH 109 and 183).

MATH 109 / MA 109C. GENERAL MATHEMATICS. (3) Terminal course for non-science majors suggested for the student who has satisfactorily completed minimum high school mathematics requirements and needs no further work in algebra. Topics include sets, introduction to probability and statistics, geometry, and consumer mathematics. *GEN ED D-II | QR*

MATH 116 / MA 116C. COLLEGE ALGEBRA. (3) Prerequisites: Math ACT score of 22 or better or Math SAT score of 510 or better or a score of 14 or better on the WKU Math Placement Exam or a score of 14 or better on the KYOTE or a score of 50 or better on the COMPASS (College Algebra domain) or DMA 096C with a grade of C or better. Graphing and problem solving are integrated throughout the study of polynomial, absolute value, rational, radical, exponential, and logarithmic functions. (Graphing calculator required.) *GEN ED D-II | QR*

MATH 117 / MA 117C. TRIGONOMETRY. (3) Prerequisites: Four years of high school mathematics including Algebra I and II and geometry, and satisfactory score on Math Placement Exam; or MATH 116 with a grade of C or better. Unit circle; trigonometric functions and graphs; trigonometric identities and equations; right triangle trigonometry; laws of sines and cosines; DeMoivre's Theorem; vectors and applications of trigonometry. (Graphing calculator required.) *GEN ED D-II | QR*

MATH 118. COLLEGE ALGEBRA AND TRIGONOMETRY. (5) Prerequisites: High school Algebra I and II and geometry, and a satisfactory score on the Math Placement Exam; or DMA 096C or MATH 096 with a grade of A. (Students who have completed DMA 096C or MATH 096 are urged to substitute MATH 116-117 for MATH 118.) Real number system, algebraic manipulations, and solutions of equations and inequalities, absolute value, exponential and logarithmic functions, trigonometry, systems of equations, complex numbers. (Graphing calculator required.) (course fee MATH 118-002) *GEN ED D-II | QR*

MATH 119. FUNDAMENTALS OF CALCULUS. (4) Prerequisites: Four years of high school mathematics, including Algebra I and II and geometry, and satisfactory score on Math Placement Exam; or MATH 116 or MATH 118, with a grade of C or better. An introduction to calculus designed for non-science and non-technical majors. Applications are directed toward the management sciences and related areas. Not accepted for credit toward a mathematics major or minor. (Graphing calculator required.) *GEN ED D-II | QR*

MATH 121. COMPUTATIONAL PROBLEM SOLVING. (4) Prerequisite: Enrollment in the Gatton Academy of Mathematics and Science in Kentucky. Students will tackle problems ranging from elementary to advanced, using mathematical methods, algorithmic techniques, and computational methods. This course is taught jointly by mathematics and computer science faculty; it is equivalent to CS 121.

MATH 127. APPLIED GEOMETRY. (3) Prerequisites: MATH 116 / 116E with a grade of C or better, or Math ACT and MPE scores that qualify student for MATH 117. Euclidean geometry with historical applications, including tilings, fractals, circular and spiral designs, celestial themes, special topics in linear algebra, and the origins of perspectives.

MATH 136. CALCULUS I. (4) Prerequisites: Four years of high school mathematics, including Algebra II, geometry, and trigonometry, and satisfactory score on Math Placement Exam and Math Placement Trig Exam; or MATH 117 or MATH 118, with grade of C or better. A course in one-variable calculus including topics from analytic geometry. Limits, derivatives, integration, and applications of polynomial, rational, trigonometric, and transcendental functions. Includes lecture and recitation. *GEN ED D-II | QR*

MATH 137. CALCULUS II. (4) Prerequisites: MATH 136 with a grade of C or better. A second course in one-variable calculus including topics from analytic geometry. Methods of integration, sequences and series, polar and parametric functions. Includes lecture and recitation.

MATH 142. CALCULUS WITH APPLICATIONS FOR LIFE SCIENCES. (5) Prerequisites: Four years of high school mathematics, including Algebra I and II, geometry, and a course that includes trigonometry, and satisfactory Math ACT and math placement scores; or MATH 117 or MATH 118, with a grade of C or better. Exponential and logarithmic functions, derivatives, integration, first order differential equations, and systems of linear equations, with major emphasis on applications in life sciences. *GEN ED D-II | QR*

MATH 183. INTRODUCTORY STATISTICS. (3) Prerequisite: Satisfactory score on Math ACT and MPE, or COMPASS or KYOTE; or DMA 096C with a grade of C or better. Introduction to elementary probability theory. The analysis of data by means of frequency distributions and the statistics which describe them. The binomial and normal probability distributions. Statistical inference. Emphasis is on applied real world problems. Not accepted for credit toward a mathematics major or minor. *GEN ED D-II | QR*

MATH 205. NUMBER SYSTEMS AND NUMBER THEORY FOR TEACHERS. (3) Prerequisites: Completion of general education math course with a grade of C or better; for students in early grades (K-5), middle grades (5-9) or SPED teacher certification programs only. Development of conceptual understanding of elementary place value, operations on whole numbers and integers, number theory, basic algebra, and functions.

MATH 206. FUNDAMENTALS OF GEOMETRY FOR TEACHERS. (3) Prerequisites: Completion of general education math course and MATH 205 with grades of C or better; for students in the early grades (K-5), middle grades (5-9) or SPED teacher certification programs only. Conceptual development of fundamental concepts of geometry and measurement.

MATH 237. MULTIVARIABLE CALCULUS. (4) Prerequisites: MATH 137 with a grade of C or better. Topics in real-valued functions of several variables including directional derivatives, implicit functions, gradient, Taylor's Theorem, maxima, minima, and Lagrange multipliers. Differential calculus of vector-valued functions including chain rule and Inverse Function Theorem. Multiple integrals, line integrals, surface integrals, Stokes' and Green's Theorems.

MATH 275. INTRODUCTORY TOPICS IN MATHEMATICS. (1-3) Prerequisites: MATH 136 and permission of instructor. Varied topics selected to give students an early introduction to interesting mathematical problems or applications not found in the foundation sequence.

MATH 295. INTRODUCTION TO RESEARCH METHODOLOGY. (1) Prerequisite: Ogden Research Scholar, or 3.2 grade point average at the end of freshman year or OCSE faculty member recommendation. To familiarize Ogden Research Scholars and other interested students with the fundamentals of choosing a research topic, performing a bibliographical search on a subject, classification of instruments, data taking, data reduction, professional ethics and related topics. The common points of research methodology in the different scientific areas will be emphasized, with examples drawn from various disciplines. Computers will be utilized. (Course does not count toward any major or minor.) Equivalent to BIOL 295, CHEM 295, CS 295, GEOL 295, and PHYS 295.

MATH 304. FUNCTIONS, APPLICATIONS AND EXPLORATIONS. (3) Prerequisite: MATH 136 with a grade of C or better, or permission of instructor. In-depth study of mathematical topics used in teaching pre-calculus and transition-to-calculus courses at the middle and secondary school level. Modeling with linear, exponential, and trigonometric functions; curve fitting; discrete and continuous models.

MATH 305. INTRODUCTION TO MATHEMATICAL MODELING. (3) Prerequisites: MATH 137 with a grade of C or better. Theory and computer implementation of mathematical models. Deterministic, stochastic, discrete, continuous, and matrix models. Introduction to advanced topics such as linear algebra, differential and difference equations, probability, stochastic processes, and dynamical systems.

MATH 306. APPLIED AND COMPUTATIONAL LINEAR ALGEBRA. (3) Prerequisites: Math placement eligibility above MATH 116 or MATH 116 with a grade of C or better, and MATH 183 or another college-level 3-hour statistics course with a grade of C or better; or MATH 136 or MATH 142 with grade of C or better. Basic concepts and computational techniques of matrix and linear algebra. Practical methods using computer software for small-to-large data sets. Applications in economics, finance, informatics, statistics, and social, engineering, physical and biological sciences. Computer assignments are required. Not accepted for credit toward a mathematics major or minor.

MATH 307. INTRODUCTION TO LINEAR ALGEBRA. (3) Prerequisites: MATH 136 and either EE 180 or PHIL 215, all with a grade of C or better. Systems of linear equations, matrix algebra, vector spaces, inner product spaces, linear transformations, eigenvectors, quadratic forms.

MATH 308. RATIONAL NUMBERS AND DATA ANALYSIS FOR TEACHERS. (3) *Prerequisites:* Completion of MATH 206 with a grade of C or better; for students in the early grades (K-5), middle grades (5-9) or SPED teacher certification programs only. Conceptual development of rational number system, including operations with and relationships among fractions, decimals, and percents; elementary probability and statistics.

MATH 310. INTRODUCTION TO DISCRETE MATHEMATICS. (3) *Prerequisites:* MATH 137 with a grade of C or better. Introduction to discrete topics. Development of skills in abstraction and generalization. Set theory, functions and relations, mathematical induction, elementary propositional logic, quantification, truth tables, validity; counting techniques, pigeonhole principle, permutations and combinations; recurrence relations and generating functions; elementary graph theory, isomorphisms, trees.

MATH 315. THEORY OF NUMBERS. (3) *Prerequisites:* MATH 307 with a grade of C or better. A study of the arithmetic of the integers, divisibility, prime numbers, factorization, diophantine equations, congruences, quadratic residues.

MATH 317. INTRODUCTION TO ALGEBRAIC SYSTEMS. (3) *Prerequisites:* MATH 307 and MATH 310 with grades of C or better. Introduction to groups, rings, polynomial rings, integral domains, and fields.

MATH 323. GEOMETRY I. (3) *Prerequisites:* MATH 307 with a grade of C or better. Beginning with a re-examination of elementary Euclidean geometry, the course includes a study of absolute plane geometry and the parallel postulate, which leads to an axiomatic treatment of hyperbolic geometry and related topics.

MATH 331. DIFFERENTIAL EQUATIONS. (3) *Prerequisites:* MATH 137 with a grade of C or better. Methods of solution of differential equations, existence and nature of solutions, Laplace transform method, infinite series and numerical solutions, and applications.

MATH 337. ELEMENTS OF REAL ANALYSIS. (3) *Prerequisites:* MATH 237, 307, 310 with a grade of C or higher. Basic concepts and techniques of real analysis, including proofs by induction and contradiction, the number system, functions of real variables, sets, series and sequences, cardinality, continuity, convergence, elementary topology.

MATH 350. ADVANCED ENGINEERING MATHEMATICS. (3) *Prerequisite:* MATH 331 or equivalent. Special topics in Laplace transforms, linear algebra and complex analysis. Designed for engineering students.

MATH 370. APPLIED TECHNIQUES IN MATHEMATICS. (3) *Prerequisites:* MATH 237, MATH 331 with grades of C or higher. Matrices, systems of ordinary differential equations, complex variables, and at least one of the topics from Fourier analysis, numerical analysis, or optimization (linear programming, Lagrange multipliers).

MATH 371. ADVANCED COMPUTATIONAL PROBLEM SOLVING. (3) *Prerequisite:* CS 180 with a grade of C or better. *Prerequisite or corequisite:* MATH 136. *Special requirement:* Enrollment in the Gatton Academy of Mathematics and Science or Honors Program eligibility at WKU. Problem-solving tools and techniques, with an emphasis on mathematical reasoning, algorithmic techniques, and computational methods. Techniques and tools are applied to (research) areas of interest to enrolled students, in the context of a project involving program design and implementation. The course is taught jointly by mathematics and computer science faculty. Equivalent to CS 371.

MATH 382. PROBABILITY AND STATISTICS I. (3) *Prerequisite:* MATH 310 with a grade of C or better. *Prerequisite or corequisite:* MATH 237. Axioms and laws of probability; discrete and continuous probability distributions; multivariate distributions; random variables; expectation; moment generating functions; Central Limit Theorem.

MATH 398. SEMINAR. (1) *Prerequisites:* MATH 237 with a grade of C or better. Students will work on a topic of interest under the direction of a mathematics faculty member, who will set the requirements for the course. Mathematics majors could have the opportunity to continue this work in MATH 498. (May be repeated for up to a total of 3 hours credit.)

MATH 403. GEOMETRY FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS. (3) *Prerequisites:* MATH 206 with a grade of C or better or MATH 212 with a grade of C or better. (For students in the early grades (K-4) teacher certification program or students pursuing middle grades (5-8) certification with a mathematics emphasis.) Both formal and informal methods are used to explain the basic concepts of Euclidean geometry. Emphasis is given to the investigative approach, organizational skills, and problem solving.

MATH 405. NUMERICAL ANALYSIS I. (3) *Prerequisites:* MATH 237 or 307 or 310, and CS 180 or CS 146 all with grades of C or better. Computer arithmetic, roots of equations, polynomial approximation and interpolation, numerical differentiation and integration. Computer solutions of problems will be required. Equivalent to CS 405.

MATH 406. NUMERICAL ANALYSIS II. (3) *Prerequisites:* MATH 237, 307, 331, and either MATH 405 or CS 405 all with grades of C or better. The solution of linear systems by direct and iterative methods, matrix inversion, the calculation of eigenvalues and eigenvectors of matrices. Initial and boundary value problems in ordinary differential equations. Computer solution of problems will be required.

MATH 409. HISTORY OF MATHEMATICS. (3) *Prerequisite:* Six hours of approved mathematics courses at the 300 and / or 400 level or permission of instructor. History of mathematics from ancient times through the development of calculus, with emphasis on famous problems. Provides knowledge and appreciation useful in the classroom. This course cannot be accepted as part of the 35-hour requirement for the non-certifiable mathematics major. Term papers will be required.

MATH 411. PROBLEM SOLVING FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS. (3) *Prerequisites:* MATH 308 with a grade of C or better or permission of instructor. Integrates concepts developed in algebra, geometry, logic, statistics, probability, and elementary number theory. Students are encouraged to use problem-solving strategies, models, and technologies, and to create problems of their own.

MATH 413. ALGEBRA AND TECHNOLOGY FOR MIDDLE GRADES TEACHERS. (3) *Prerequisites:* MATH 117 or 136, with a grade of C or better. The use of graphing calculators and computer software to explore algebraic ideas including patterns, functions, equations, inequalities, linear programming, curve fitting, and practical applications of algebra and technology.

MATH 415. ALGEBRA AND NUMBER THEORY. (3) *Prerequisites:* MATH 315 or 317 with a grade of C or better. An integrated survey of modern algebra and number theory. Topics include number systems, divisibility, congruences, groups and their application to number theory.

MATH 417. ALGEBRAIC SYSTEMS. (3) *Prerequisites:* MATH 317 with a grade of C or better. Theory of groups.

MATH 421. PROBLEM SOLVING FOR SECONDARY TEACHERS. (3) *Prerequisites:* MATH 307 and 310 both with grades of C or better; or MATH 382 and 323 both with grades of C or better, or permission of instructor. Utilizes various techniques and technology to solve mathematical problems. Integrates concepts from algebra, geometry, trigonometry, probability, statistics, number theory, discrete mathematics, linear algebra, and calculus.

MATH 423. GEOMETRY II. (3) *Prerequisites:* MATH 323 with a grade of C or better or permission of instructor. An axiomatic development of hyperbolic geometry based on the hyperbolic parallel postulate and the absolute geometry developed in MATH 323, including an emphasis on contrasts with Euclidean geometry.

MATH 431. INTERMEDIATE ANALYSIS I. (3) *Prerequisites:* MATH 337 with a grade of C or better. Topics in analysis chosen from inverse and implicit function theorems, differentiation, integration, infinite series, series of functions, and elementary functional analysis.

MATH 432. INTRODUCTION TO MEASURE THEORY. (3) *Prerequisite:* MATH 431. Algebra of sets, axiom of choice, axioms for the real numbers, continuous functions, Borel sets, Lebesgue measure, Lebesgue integral.

MATH 435. PARTIAL DIFFERENTIAL EQUATIONS. (3) *Prerequisites:* MATH 237, 307, and 331 all with grades of C or better. Equations of first and second order; elliptic, hyperbolic and parabolic equations; Sturm-Liouville theory; applications to equations of mathematical physics using separation of variables and Fourier series.

MATH 439. TOPOLOGY I. (3) *Prerequisites:* MATH 317 with a grade of C or better, or permission of instructor. Introduction to topology including topics selected from: topological spaces, mappings, homeomorphisms, metric spaces, surfaces, knots, manifolds, separation properties, compactness and connectedness.

MATH 450. COMPLEX VARIABLES. (3) *Prerequisites:* MATH 237 with a grade of C or better. Complex number plane, analytic functions of a complex variable, integration, power series, calculus of residues, conformal representation, applications of analytic function theory.

MATH 470. INTRODUCTION TO OPERATIONS RESEARCH. (3) *Prerequisites:* MATH 237 and 307 with grades of C or better. Principles and techniques of operations research including linear programming, integer programming, quality theory, sensitivity analysis, and dynamic programming.

MATH 473. INTRODUCTION TO GRAPH THEORY. (3) *Prerequisites:* MATH 307 and MATH 310 with grades of C or better, or permission of the instructor. Fundamental concepts, key ideas and tools in graph theory, with an emphasis on proof methods, algorithms, and applications. Techniques and tools are applied to practical optimization problems and other areas of mathematics and computer science. Equivalent to CS 473.

Course Descriptions

MATH 475. SELECTED TOPICS IN MATHEMATICS. (1-3) *Prerequisite:* *Permission of instructor.* A consideration of special topics to acquaint the advanced undergraduate student with significant problems and developments of current interest in mathematics. Topics may vary each semester offered.

MATH 482. PROBABILITY AND STATISTICS II. (3) *Prerequisites:* *MATH 237 and MATH 382 with grades of C or better.* Multivariate probability distributions; sampling distributions, statistical inference; point and interval estimation, properties of estimators; hypothesis testing; regression and correlation; analysis of variance; non-parametric methods.

MATH 490. SEMINAR IN MIDDLE GRADES MATHEMATICS. (1) *Prerequisite/Corequisite:* *MATH 411.* Hands-on activities emphasize connections among various areas of mathematics; communicating mathematics effectively and applications of middle school mathematics. Papers and oral presentations are required.

MATH 497. SENIOR SEMINAR IN MATHEMATICAL ECONOMICS. (1) *Prerequisite or corequisite:* *Senior standing and admitted to the major in mathematical economics.* This course is designed to integrate the ideas and techniques students have encountered in their work in mathematics and economics. Students will study research articles and/or undertake independent investigations in mathematical economics. Equivalent to ECON 497.

MATH 498. SENIOR SEMINAR. (1-3) *Prerequisites:* *MATH 237 and MATH 317 with grades of C or better, and senior standing or permission of instructor.* Students will study articles in current mathematical journals or undertake independent investigations in mathematics. Written and oral presentations are required.

ME – MECHANICAL ENGINEERING DEPARTMENT OF ENGINEERING

ME 175. UNIVERSITY EXPERIENCE – MECHANICAL ENGINEERING. (2) *Prerequisite:* *For beginning college freshmen or transfer students with fewer than 24 semester hours of credit.* Transition to university experience. Topics include study skills, critical thinking skills, library education, exploration of majors and careers, degree programs, campus resources, and personal development, with special attention given to Mechanical Engineering. The design process is introduced through multiple projects during the laboratory sessions. *Course Fee*

ME 176. MECHANICAL ENGINEERING FRESHMAN DESIGN. (1) *Prerequisite:* *For transfer or change of major students who have earned at least 24 semester hours of credit or have completed a course equivalent to the basic topics of the generic WKU University Experience.* An introduction to Mechanical Engineering. The design process and basic professional tools are introduced through multiple projects. A replacement for ME 175 for transfer or change of major students. Permission of instructor only. *Course Fee*

ME 180. FRESHMAN DESIGN II. (3) *Prerequisites:* *ME 175 or 176, or permission of instructor, and MATH 136 with a grade of "C" or better.* A continuation of the engineering design process, with an emphasis on electromechanical design and the use of professional engineering tools. Virtual and rapid prototypes will be developed through a series of integrated projects. Basic concepts in engineering experimentation will be introduced. Requires a grade of "C" or better in MATH 136. *Course Fee*

ME 200. SOPHOMORE DESIGN. (3) *Prerequisites:* *ME 180 with a grade of "C" or better, EM 221.* Enhances design abilities through individual and team design projects, develops structured problem-solving techniques and written, oral and graphical communication skills.

ME 220. ENGINEERING THERMODYNAMICS I. (3) *Prerequisites:* *MATH 237, ME 200. Prerequisite or concurrent:* *MATH 331.* Fundamental principles of thermodynamics, first law, physical properties, ideal and real gases, second law, reversibility and irreversibility, and consequences of thermodynamic cycles.

ME 240. MATERIALS AND METHODS OF MANUFACTURING. (3) *Prerequisites:* *MATH 136 with a grade of C or better, CHEM 116 or 120. Corequisites:* *ME 241.* Introduction to the science of engineering materials including structures from the atomic to macroscopic scales, properties, strengthening mechanisms, phase diagrams and correlation between processing and properties. Introduction to manufacturing process selection and properties of materials.

ME 241. MATERIALS AND METHODS OF MANUFACTURING LAB. (1) *Prerequisites:* *MATH 136 with a grade of C or better; CHEM 116 or 120. Corequisite:* *ME 240.* Laboratory supporting ME 240. Experiments to develop understanding of materials science, engineering material properties and relationships between processing and properties. Exposure to manufacturing methods through experimentation and observation, including field trips to regional sites.

ME 285. ELEMENTS OF INDUSTRIAL AUTOMATION. (1) *Prerequisites:* *ME 180 with a "C" or better.* An introduction to PLC controls of industrial automation equipment, with emphasis on their impact on electromechanical design and safety. Elements of industrial networking will be introduced. *Course Fee*

ME 300. JUNIOR DESIGN. (2) *Prerequisites:* *ME 200, ME 344. Students must have satisfied the Mechanical Engineering Pre-Major requirements as shown in the iCAP system. Prerequisite or corequisite:* *ME 310.* Introduces the concept of design methodologies: Design for Assembly, Design for Manufacturing, etc. and applies these techniques to design projects. Written, oral, and graphical communication skills will continue to be developed, including skills in working with vendors for production of components to engineering specifications.

ME 310. ENGINEERING INSTRUMENTATION AND EXPERIMENTATION. (3) *Prerequisites:* *ME 285, EM 303. Prerequisite or corequisite:* *ME 347.* The use of sensors and instruments to measure the behavior of mechanical systems is explored in lectures and laboratory exercises. Application of sensors, calibration of systems, and methods of data collection and analysis are covered with an emphasis on uncertainty analysis. *Course Fee*

ME 321. ENGINEERING THERMODYNAMICS II. (3) *Prerequisites:* *ME 220, MATH 331.* Gas mixtures, air-water vapor mixtures. Air conditioning system design. Principles and design of energy conversion devices, power and refrigeration cycles. Principles of combustion, chemical equilibrium, one-dimensional gas dynamics. Nozzle design. Continuation of ME 220.

ME 325. ELEMENTS OF HEAT TRANSFER. (3) *Prerequisite:* *ME 330.* Discussion of basic physical laws of heat transfer including steady-state and transient heat flow, one, two, and three dimensional heat conduction in solids, free or forced convection in fluids, radiation and phase change. Analysis of heat exchangers.

ME 330. FLUID MECHANICS. (3) *Prerequisite:* *ME 220. Prerequisite or corequisite:* *MATH 331.* An introduction to the physical laws governing the mechanical behavior of liquids and gasses, with applications of conservation of mass, energy and momentum equations. Topics include fluid statics, internal and external fluid flow, flow measurement, scale modeling and similitude, hydraulic machinery analysis and pipe networks.

ME 344. MECHANICAL DESIGN. (3) *Prerequisite:* *EM 303. Prerequisite or corequisite:* *ME 240.* Fundamentals of design with methods of approximation. Introduction to optimum design considerations. Synthesis and problems on the design of various mechanical elements.

ME 347. MECHANICAL SYSTEMS LABORATORY. (1) *Prerequisite:* *ME 241. Prerequisites or corequisites:* *EM 303, MATH 331.* Implementation of fundamental principles and physical laws governing the response of mechanical system components to external forces and constraints. Students will learn to plan, conduct, and report on a variety of experiments and projects to measure the performance characteristics of mechanical systems.

ME 365. THERMAL SCIENCES FOR ELECTRICAL ENGINEERS. (3) *Prerequisite:* *PHYS 265 or MATH 331 (prerequisite or concurrent).* Theoretical background and analysis methods required to predict the thermal behavior of electronic components and systems. Topics include design and analysis methods of forced and buoyancy-driven systems, as well as conduction, natural and forced convection, and radiation heat transfer. (This course is not for Mechanical Engineering majors.)

ME 366. MECHANICS FOR ELECTRICAL ENGINEERS. (3) *Prerequisite:* *PHYS 255. Prerequisite or corequisite:* *MATH 237.* A combined course in statics and dynamics. Topics from statics include vector algebra, distributed and internal forces, trusses, frames, and beams. Topics from dynamics include kinematics/kinetics in various reference systems, work/energy, and impulse/momentum. (This course is not for civil or mechanical engineering majors.)

ME 400. MECHANICAL ENGINEERING DESIGN. (2) *Prerequisite:* *ME 300.* A formal introduction to product development methodologies and project management techniques, building upon experiences in previous design courses. Students will perform team design projects as well as complete the design specifications for their senior capstone project.

ME 412. MECHANICAL ENGINEERING SENIOR PROJECT. (3) *Prerequisites:* *ME 325, 400.* Students work in design teams to develop a robust solution to a complex system design problem. Focus will be on design-build-test of the proposed solution. Students expected to demonstrate all aspects of professional engineering practice.

ME 416. UK-DYNAMIC SYSTEMS ELECTIVE. (3) *Prerequisites:* *EM 313 and MATH 331.* Advanced special topics delivered in the program by UK faculty to acquaint the undergraduate student with significant problems and developments of current interest in the dynamic systems area of mechanical engineering. *Course Fee*