ECON 488. Senior Capstone Seminar in Economics. 3 credits.
This course is a writing-intensive seminar offering a student the opportunity to integrate many of his/her undergraduate studies in economics. Its substantive content will emphasize applying the methods of theoretical and empirical analyses employed by all economists. The seminar will be structured so as to contain embedded assessment measures of the learning objectives specified by the department of economics, including those related to command of basic economic theory and of quantitative methods used in quantifying empirical relationships and testing hypothesis. Prerequisites: Senior standing and completion of each of the following courses with a grade of at least “C”: ECON 331, ECON 332 and ECON 385.

ECON 490. Special Studies in Economics. 1-3 credits each semester.
Designed to give capable students in economics an opportunity to complete independent study under faculty supervision. Admission by recommendation of the instructor and written permission of the director of economics prior to registration. May not be used toward fulfillment of the 400-level requirement for a major in economics.

ECON 499. Honors. 6 credits.
Year course. See catalog section “Graduation with Honors.”

Education

College of Education

EDUC 100. The Study of the Future: An Interdisciplinary Approach. 3 credits.
Introduces the students to an interdisciplinary study of the future within the context of education. Various topic areas, such as population, science/technology, lifestyle, economics, international relations, energy and religion will be explored in terms of future trends and how education responds to these trends and their impacts.

EDUC 300. Foundations of American Education. 3 credits.
A study of the practices and issues that affect American education. Consideration is given to such topics as philosophical approaches to education, history of American education, and the organizational and cultural aspects of schools which influence educational practices.

EDUC 310. Teaching in a Diverse Society. 3 credits.
This course will examine how personal and professional values, attitudes, beliefs and behaviors affect teaching and learning. The pre-service teachers will develop an understanding of similar and unique characteristics of students in grades K-12, including culture, heritage, language and learning abilities. Corequisites: MIED 311 and READ 312 for middle students. EDUC 312 for special education students.

EDUC/EXED 312. Field Experience in Special Education and Diversity. 1 credit.
Students devote 30 clock hours to activities in school and nonschool settings that emphasize diversity of individuals and families. Corequisite: EDUC 310.

EDUC 370. Instructional Technology. 3 credits.
This course introduces educators to the concept of content knowledge, pedagogical knowledge and technological knowledge acting together as one unit to provide successful learning opportunities with educational technology. Learners will develop competencies that will enable them to appropriately select and integrate technology into the teaching and learning process.

EDUC 381. Field Experience in English as a Second Language. 3 credits.
The course provides supervised field experiences in working with English as a Second Language students, NK-12. Preservice teachers will demonstrate competencies developed in the English as a Second Language endorsement program and in consultation with a field supervisor. Prerequisite: Completion of ESL minor requirements.

EDUC 401. Problems in Education. 1-3 credits.
Workshop experiences for the development and training of teachers. Prerequisites: EDUC 360 and permission of the program coordinator.

EDUC 418. School Discipline and Classroom Management. 1 credit.
Theory and practices in classroom management and discipline, including specific models and the various legal aspects will be examined.

EDUC 430. General Education Curriculum K-12 Overview. 1 credit.
This course will provide an overview of curriculum in grades K-12. An understanding of objectives, content, materials and trends associated with curriculum will be addressed. Corequisites: READ 430, MATH 530 and EDUC 410.

EDUC 480. Student Teaching. 3-12 credits.
Enables students to apply, in the public school classrooms and the comprehensive child development programs, those skills and attitudes acquired in all components of teacher education. Under the guidance of university supervisors, students are provided activities designed to familiarize them with the classroom teacher’s role. Prerequisites: EDPSYC 100, EDPSYC 270, EDUC 360, appropriate methods courses and permission of the coordinator of field experiences.

EDUC 482. Professional Development, Partnership and Advocacy. 3 credits.
Students examine opportunities for professional development from professional associations, universities and other organizations across PreK-16. Strategies to build partnerships with colleagues, families and communities are presented. Important social and political issues affecting education of majority and minority students and models of advocacy for students and their families are presented.

EDUC 490. Special Topics in Education. 1-4 credits.
In-depth examination of selected topics which are of current importance in the field of education. Offered only with approval of School of Education director. May be repeated for credit when course content changes. Prerequisites: At least junior standing and consent of the instructor.

EDUC 499 A, B, C. Honors. 1-6 credits.
Independent research topic initiated and completed by qualified upper-division students. See catalog descriptions entitled “Graduation with Distinction” and “Graduation with Honors.”

Elementary Education

College of Education

ELED 308. Child Development: Birth Through Adolescence. 3 credits.
Skills for observing, recording and interpreting the behavior of children ages three through 12 will be developed so that adult intervention and guidance is appropriate and meaningful. Prerequisites: PSYCH 100 and admission to teacher education. Corequisites: ECED 372, ELED 310, ELED 311 and READ 366.

ELED 310. Diversity in Elementary Education with Service Learning. 3 credits.
This course guides students in critically examining their own perspectives regarding diversity in our society. Through this course, students will expand their awareness and understanding of individuals and groups apparently different from themselves. Students will explore pedagogical issues and practices in the classroom that embrace the whole community of learners and their families. Prerequisite: Admission to teacher education. Corequisites: ECED 372, ELED 308, ELED 311 and READ 366.

ELED 311. Practicum with a Focus on Learners and Learning. 3 credits.
This field experience and seminar support the study of child development and learning in an organized environment. Through direct observation and interactions with children in a classroom setting, candidates will examine and reflect on how children develop and learn. Candidates will explore how their own personal attitudes, assumptions and behaviors toward students and their families are influenced by class, cultural and linguistic backgrounds. Prerequisite: Admission to teacher education. Corequisites: ECED 372, ELED 308, ELED 310 and READ 366.

ELED 411. Practicum with a Focus on Curriculum Integration and Guiding Behavior. 3 credits.
This field experience provides candidates with a classroom of students and a mentor teacher with whom to practice the teaching of reading, math, science and social studies. The accompanying seminar explores the integration and construction of meaningful curriculum in elementary education contexts and supports students in their ongoing professional development. Prerequisite: ELED 311. Corequisites: READ 436, ELED 432, ELED 433 and ELED 434.

ELED 432. Children and Science. 3 credits.
This course is a study of content, processes, pedagogy and materials for teaching science in the elementary classroom. Knowledge of cognitive development as applied to the selection of content and methodology for elementary learners will be examined. Prerequisites: ELED 308, ECED 372, ELED 310, ELED 311 and READ 366. Corequisites: READ 436, ELED 411, ELED 433 and ELED 434.

ELED 433. Children and Mathematics: Number, Operations, Algebraic and Geometric Reasoning. 3 credits.
The first of two courses that provides students with knowledge, skills and understanding of design and implement for effective, developmentally appropriate mathematics instruction for grades PreK-8. Emphasis is on students’ mathematical learning and pre-numerical stages through the acquisition of advanced numerical processes and operations and connections to geometric and algebraic reasoning. Prerequisites: MATH 107, MATH 108, MATH 207 and READ 366. Corequisites: READ 436, ELED 411, ELED 432 and ELED 434.
ENGR 112. Introduction to Engineering I, 1, 2 credits. Offered fall, spring.

ENGR 112 is the first course in the engineering curriculum, its purpose is to introduce students to some of the overarching themes and culture in engineering and in our curriculum. Topics of coverage include professionalism, engineering and society, sustainable development, engineering fundamentals, systems approach in engineering problem solving, as well as creative problem solving practices.

ENGR 212. Statics and Dynamics (3,1), 4 credits. Offered fall, spring.

ENGR 212 provides the fundamental and governing principles of particles and rigid bodies for the analysis of these structures at rest (statics) and in motion (dynamics). Topics will include equilibrium of particles and rigid bodies, force and moment vectors, moments of inertia, kinematics of particles, work and energy. Prerequisites: PHYS 240/140L. Grade of “C-” or better in ENGR 112. Grade of “C-” or better in MATH 237.

ENGR 221. Management of Technology I: Product Development and Entrepreneurial Engineering, 3 credits. Offered spring.

ENGR 221 is the first of a two-course sequence introducing students to management of technology. The course will include general business functions (management, marketing, finance, accounting, and operations); systems analysis skills, and project management skills. Students will develop an understanding and appreciation for the importance of technology and innovation in organizations. Prerequisite: Grade of “C-” or better in ENGR 112.

ENGR 231. Engineering Design I, 2 credits. Offered fall.

This course is the first of six courses in the engineering design sequence. This course provides students with an overview of sustainable engineering design including history, concepts and practices; and an introduction to cognitive processes and interpersonal communication skills that lead to effective problem solving, idea generation and decision making; and basic technical design skills. Prerequisite: Grade of “C-” or better in ENGR 112.

ENGR 232. Engineering Design II, 2 credits. Offered spring.

This course is the second course in the engineering design sequence. This course provides instruction in sustainable engineering design concepts and hands-on practice; individual cognitive processes, thinking and concepts, and cognitive processes, thinking and concepts, and concept development as applied to the selection of content, methods, and technical project design skills. Prerequisite: Grade of “C-” or better in ENGR 112. Grade of “C-” or better in ENGR 231.

ENGR 280. Projects in Engineering, 1-4 credits. Offered fall, spring, summer.

Research projects, design projects, or special topics in engineering which are of interest to the lower-division student. May be repeated for credit when course content changes. Projects or topics selected may dictate prerequisites. Students should consult the instructor prior to enrolling in the course. Prerequisite: Permission of the instructor.

ENGR 298. Topics in Engineering, 3 credits.

This course is designed to provide students with the opportunity to explore engineering topics currently not covered in the standard curriculum. The specific topic of interest may dictate prerequisites. Students should consult the instructor prior to enrolling in the course.

ENGR 301. Engineering Bridge Course for Transfer Students, 3 credits. Offered fall, spring.

This course provides transfer students with an introduction to the JMU engineering program. The purpose is to familiarize our students with our curriculum and sustainability vision. The course will also provide design instruction while introducing transfer students to the specific software tools and machine tools they will use over the remainder of their curriculum. Prerequisite: Permission of the instructor.

ENGR 311. Thermal-Fluids I, 4 credits. Offered fall.

The first course of a two-part sequence focuses on the fundamental principles of thermodynamics, heat transfer, and fluid mechanics in a unified approach. Coverage includes the 1st law of thermodynamics, basic heat transfer, and fluid statics. Wide-ranging applications of these principles to thermal-fluid systems across engineering disciplines are emphasized. An included laboratory component provides reinforcement of course material through experiments and computational modeling. Prerequisites: PHYS 240/140L. Grade of “C-” or better in MATH 237. Grade of “C-” or better in MATH 238.

ENGR 312. Thermal-Fluids II, 4 credits. Offered spring.

The second of a two-part sequence focuses on the fundamental principles of thermodynamics, heat transfer and fluid mechanics in a unified approach. Builds on concepts covered in ENGR 311 and incorporates the 2nd law of thermodynamics, transient heat transfer and fluid motion. Applications of principles to thermal-fluid systems across engineering disciplines are emphasized. An included laboratory component provides reinforcement of course material through experiments and computational modeling. Prerequisite: Grade of “C-” or better in ENGR 311.

ENGR 313. Circuits and Instrumentation, 4 credits. Offered fall, spring.

This course presents the fundamentals of circuit analysis and measurement of physical phenomena. Circuit related topics include Ohm’s law, Kirchhoff’s laws, complex impedance analysis, Laplace techniques and an introduction to AC circuits. Instrumentation topics include A/D conversion and common instruments such as strain gauges, thermocouples and accelerometers. Laboratory investigations will provide exposure to common electronics laboratory equipment, tools and measurement techniques. Prerequisites: PHYS 250/150L. Grade of “C-” or better in MATH 238.

ENGR 314. Materials and Mechanics, 4 credits. Offered fall, spring.

This course explores the governing principles of materials science and mechanics of materials with an emphasis on materials selection in the engineering design process. Topics include process-structure-property relationships, crystalline structures, mechanical properties, strength of materials, mechanical design, failure mechanisms, and an introduction to materials processing. Prerequisites: PHYS 240/140L. Grade of “C-” or better in ENGR 212.

ENGR 322. Engineering Management II: Engineering Project Management, 3 credits. Offered fall.

This is the second of a two-course sequence introducing students to management of technology. The course will include general business functions (management, marketing, finance, accounting, and operations); systems analysis skills, and project management skills. Students will develop an understanding and appreciation for the importance of technology and innovation in organizations and the principles of entrepreneurial engineering. Prerequisite: Grade of “C-” or better in ENGR 221.

ENGR 331. Engineering Design III, 3 credits. Offered fall.

This course is third in the six-course developmental design sequence. This project-based course provides instruction in life-cycle analysis, sustainability (environmental, social, technical, economic), design and construction, failure analysis and problem solving. Prerequisite: Grade of “C-” or better in ENGR 212. Grade of “C-” or better in ENGR 232.

ENGR 332. Engineering Design IV, 3 credits. Offered spring.

This course is fourth in the six-course 10-credit developmental design sequence. This project-based course provides instruction in holistic design principles, aesthetics and human interface in design, structured and unstructured problem solving, collaborative design, writing and communications, product modeling, and analytical prototyping. Prerequisite: Grade of “C-” or better in ENGR 331.

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