teaching methods, curricula planning, implementation strategies, environmental arrangements and accommodation for all infants and toddlers, in collaboration with the primary caregiver. Students will learn to use technology to support children’s learning. Prerequisites: IECE 300 and IECE 301. Corequisites: IECE 320 and IECE 321.

IECE 420. Development of the Young Child. 3 credits. This course provides students with an understanding of the development of young children, ages four to nine years, with and without exceptionalities. Students will be introduced to and apply informal and formal assessment to be used in decision making and educational planning and delivery. Prerequisites: IECE 320, IECE 321 and IECE 322. Corequisites: IECE 421 and IECE 422.

IECE 421. Practicum in Development of the Young Child. 1 credit. This practicum is designed to support IECE 420 and IECE 421, by giving students experience in a preschool classroom. Students will observe young children, collect data, assist classroom teachers and interact appropriately with the individuals within the learning environment. Students will analyze the preschool environments for accessibility by all young children. Prerequisites: IECE 300, IECE 301, IECE 320 and IECE 322. Corequisites: IECE 420 and IECE 422.

IECE 422. Teaching Young Children. 3 credits. This course explores, analyzes, and evaluates curriculum and methodology related to the design and management of a nurturing, supportive, and challenging learning environment for children ages 3-8 years. Emphasis is on the physical environment, design and selection of curricular components, the role of play in the curriculum, skills for professional prevention and interaction, and use of technology to facilitate young children’s learning. Prerequisites: IECE 320, IECE 321 and IECE 322. Corequisites: IECE 420 and IECE 421.

IECE 423. Practicum: Teaching Young Children. 1 credit. This practicum is designed to give students the opportunity to practice knowledge and skills learned in IECE 422. Students will participate as a member of the teaching team, demonstrate professional behavior and interactions with young children and adults and support instruction in a preschool setting. Prerequisites: IECE 320, IECE 321 and IECE 322. Corequisites: IECE 420, IECE 421 and IECE 422.

IECE 460. Instructional Practices in Numeracy. 3 credits. This course provides students with the knowledge, skills, and understandings necessary to design and implement effective mathematics programs for young children, birth to age eight, with and without exceptionalities. Focus is on appropriate mathematical content, teaching strategies, and manipulative materials from a developmental perspective with special emphasis on adaptations designed to meet the needs of all children. Prerequisites: IECE 420, IECE 421, IECE 422 and IECE 423. Corequisites: IECE 461, IECE 462, IECE 464 and IECE 466.

IECE 461. Practicum in Primary Grades. 3 credits. This practicum allows students to develop educational decision-making skills through planning, implementing and evaluating appropriate activities for young children of diverse interests, needs, and abilities. Students apply strategies to assess learning, guide behavior, and collaborate with other service providers and families. Students engage in conversations designed to make connections between their experiences and IECE content. Prerequisites: IECE 420, IECE 421, IECE 422, IECE 423 and READ 386. Corequisites: IECE 460, IECE 462, IECE 464, IECE 468 and READ 438. IECE 462. Instructional Practices in Natural Sciences for Young Children. 3 credits. This course provides students with the knowledge, skills and understandings to design and implement effective natural science programs for all young children, birth to age eight. Focus is on appropriate science content, teaching strategies and materials from a developmental perspective with a special emphasis on adaptations designed to meet the needs of children with disabilities. Prerequisites: IECE 420, IECE 421, IECE 422 and IECE 423. Corequisites: IECE 460, IECE 461, IECE 464 and IECE 468.

IECE 464. Instructional Practices in Social Studies for Young Children. 3 credits. This course provides students with the knowledge, skills and understandings to design and implement effective social studies programs for all young children, birth to age eight. Focus is on appropriate social studies content, teaching strategies, and materials from a developmental perspective designed to meet the needs of all young children. Students will use technology to support access to the learning environment and curriculum.

Prerequisites: IECE 420, IECE 421, IECE 422 and IECE 423. Corequisites: IECE 460, IECE 461, IECE 462, and IECE 468.

IECE 466. Seminar in Managing Classrooms and Guiding Behavior. 1 credit. This seminar examines research and professional literature on effective strategies for guiding young children’s behavior and managing groups. IECE 466 uses experiences in IECE 461 as a foundation for reflection, dialogue and development of a personal philosophy of classroom management. Prerequisites: IECE 420, IECE 421, IECE 422 and IECE 423. Corequisites: IECE 460, IECE 461, IECE 462 and IECE 464.

Individualized Study

Outreach and Engagement
IS 200. Individualized Studies Major Program Development. 3 credits. An introductory course designed to prepare students for transition into higher education programs. Specific content includes focusing a concentration, selecting an academic advisor, creating an individualized program, technology in higher education, accessing career resources, career decision making skills, self-awareness, life planning, identifying college level experiential learning, documenting experiential learning, determining a credit request and organizing a portfolio for assessment. Prerequisite: Individualized studies majors and individualized studies special students only.

IS 202. Orientation to Career and Life Planning. 1 credit. A short orientation course designed to prepare students for transition into higher education programs. Specific content includes identifying college-level experiential learning, documenting experiential learning, determining a credit request and organizing a portfolio for assessment. Prerequisite: Individualized studies majors and individualized studies special students only.

IS 250. Service Learning. 1-6 credits, repeatable to 6 credits. Leadership, citizenship and professional competencies may be acquired through community service experiences. Documented service learning competence will be assessed by the Community Service Learning and credit awarded as appropriate. Prerequisite: IS 200.

IS 270. Selected Topics. 1-6 credits, repeatable. In-depth study of selected topics with current importance and interest to lower division students that are not otherwise covered in the regular course offerings of academic units. Course content will vary. Prerequisite: Approval of the "Course Agreement Form" by the Individualized Study department head. IS 275. Dollars and Sense. 3 credits. This practical course will review the affect a personal philosophy on money, and management of personal finances, has on all aspects of life when it comes to securing the American Dream. Students will learn real life skills in the areas of eliminating debt, creating a budget, understanding investments and insurance, saving money, planning for retirement, shopping for a house and other topics dealing with financial issues faced in daily life.

IS 290. Special Studies. 1-6 credits, repeatable. Designed to give students an opportunity to do lower-division independent study in selected interdisciplinary areas under the supervision of a faculty member in the appropriate academic unit. Prerequisite: Approval of the "Course Agreement Form" by the Individualized Study department head. IS 380. Sponsored Learning. 1-6 credits, repeatable. A structured learning activity related to a student’s area of study and sponsored by an employer, volunteer agency or other appropriate organization. Prerequisite: Approval of the "Course Agreement Form" by the Individualized Study department head.

IS 480. Cooperative Studies. 1-6 credits, repeatable. Two or more upper-level students may elect to study cooperatively in a selected area of current importance and interest under the supervision of a faculty member in the appropriate academic unit. Prerequisite: Approval of the "Course Agreement Form" by the Individualized Study department head. IS 490. Special Studies. 1-6 credits, repeatable. Designed to give students an opportunity to do upper-division independent study in selected interdisciplinary areas under the supervision of a faculty member in the appropriate academic unit.
Industrial Design
School of Art, Design and Art History

All INDU courses are restricted to declared art, art history, graphic design, and interior design majors in art and art history during the fall and spring semesters. During May and summer sessions, INDU courses are open to all students who meet the additional stated course prerequisites. Non-majors wishing to enroll in an INDU course during the fall and spring semesters may request permission of the instructor.

INDU/ARC 220. CAD: 3D Modeling. 3 credits.
This course will introduce students to principles used in 3D Cad and BIM modeling. Technologies to draw three dimensionally on the computer will be considered as a discipline within itself, and students will be instructed to use the machine for design exploration. Various software packages will be utilized during the semester.

INDU 389. Independent Studies in Industrial Design. 1-3 credits. Offering varies. Independent activity at the intermediate level, such as research or studio practice, under faculty supervision. Projected studies in any area of the school’s offering must be arranged with the instructors who will direct them. Offered only with the consent of the instructor.

INDU 392. Topics in Industrial Design. 3 credits. Study of selected topics in art, art history, graphic design, interior design, or industrial design at the intermediate level. May be repeated when course content changes. See e-campus for current topics.

INDU 490. Independent Studies Industrial Design. 1-3 credits, repeatable.
Offering varies. Independent activity, such as research or studio practice, under faculty supervision. Projected studies in any area of the school’s offering must be arranged with the instructors who will direct them. Offered only with the consent of the instructor.

INDU 491. Studio Assistant. 1-3 credits, repeatable. Offering varies. An on-campus program monitored on an individual basis designed to provide practical studio experience in the visual arts. Students will learn safe studio practices and management skills, including material usage, inventory control and the proper operation of equipment found within various individual classroom studios. Prerequisite: Permission of the instructor.

INDU 492. Topics in Industrial Design. 3 credits. Offering varies. Study of selected topics in industrial design at the advanced level. May be repeated when course content changes. See MyMadison for current topics.

INDU 496. Internship in Industrial Design. 1-8 credits. An off-campus program prepared and monitored on an individual basis. Internships are designed to provide practical experience in the arts. Prerequisite: Permission of the instructor.

Integrated Science and Technology
Department of Integrated Science and Technology

First Year Student – Sophomore Sequence

GISAT 100. Environmental and Energy Sustainability. 3 credits.
This course explores scientific and technical issues important to environmental and energy sustainability. Students study fundamental chemistry and physics and then apply this knowledge to better understand air quality, water quality, and conventional and alternative energy processes. The class also explores the societal impacts of our energy choices and the potential impact we as individuals can have through personal initiative. Prerequisite: Freshman standing at JMU.

GISAT 112. Environmental Issues in Science and Technology (2, 2). 4 credits.
This course integrates the study of biology, chemistry and statistics within the context of environmental issues that include ozone depletion, acid rain, global warming, waste management and biodiversity.

GISAT 113. Biotechnology Issues in Science and Technology (2, 2). 4 credits.
This course introduces current topics in the life science technologies through lecture and laboratory exercises. Topics include advances in genetic engineering, the hierarchy of life and the rise of infectious diseases.

GISAT 131. Technology, Science and Society (1, 2). 3 credits.
This course introduces the social aspects of technology and science. It covers social science methods and related philosophical and ethical analyses. Students learn how the practice of science relates to the human-built world and why critical evaluations of science and technology policies are important.

GISAT 150. Algebra Essentials. 1 credit.
This course provides review and practice in algebra concepts that are needed to successfully complete GISAT 151. Various mathematical models, including trigonometric, are also reviewed. The course is designed for students who possess a basic understanding of algebra but are not proficient in its application. Prerequisite: Permission of instructor. Corequisite: GISAT 151 and permission of instructor.

GISAT 151. Topics in Applied Calculus in GISAT. 4 credits.
This course introduces the concepts of differential and integral calculus and ordinary differential equations to model real-world applications in science, business, technology and economics. This course includes a computer laboratory component emphasizing modeling and numerical methods. Course assumes familiarity with algebra and trigonometry.

GISAT 151L. Analytical Methods I: Applied Calculus Laboratory. 1 credit.
This course is the computer laboratory portion of GISAT 151. Topics in Applied Calculus in GISAT. It is intended for students who already have AP credit or calculus lecture credit. Students will use numerical methods to solve mathematical modeling and calculus problems with Microsoft Excel. Students will study linear, polynomial, exponential, logarithmic, S-curve and trigonometric models in business and the physical and natural sciences. Prerequisite: Permission of instructor or academic unit head required.

GISAT 152. Topics in Applied Physics in Integrated Science and Technology. 4 credits.
This course introduces topics in general physics including one- and two-dimensional motion, mechanics, energy, waves, electricity, magnetism, optics, lasers, and early quantum theory. Vectors, algebra, and differential and integral calculus, are used to model physical systems behavior. Laboratory experiments and computer exercises enhance understanding of the concepts. Prerequisites: GISAT 151 or permission of instructor.

GISAT 150. Problem Solving Applications in Science and Technology. 3 credits.
This course examines issues in modern science and technology as a means to introduce, develop and enhance critical thinking and problem solving skills. Current scientific and technological research and applications will be introduced to reinforce problem solving, instruction in systems thinking and critical inquiry. The course provides opportunities for using both oral and written communication in a variety of learning activities.

GISAT 165/BIO 203. Viral Discovery. 1 credit.
This course is an exploratory laboratory experience, designed for incoming freshmen. In the course, the students will learn about the life cycle and ecology of viruses infecting bacteria. Soil samples will be collected, and techniques for isolation and purification of the viruses will be performed by the students. Isolated viruses will be visualized using electron microscopy. The genomic material will be isolated and prepared for nucleic acid sequencing.

GISAT 166/BIO 204. Viral Genome and Bioinformatics. 2 credits.
This is a computer-based laboratory experience, designed for those students completing the Viral Discovery course. Students will learn how to identify genes in a viral genome, compare the predicted proteins with known proteins in databases, describe the contents of the genome, and note all the relevant information for publication. Students will also research the ecology of soil and the role played by bacteriophages in ecology and evolution. Prerequisites: GISAT 165 or BIO 203.

GISAT 180. Topics in Integrated Science and Technology. 1-4 credits.
Special topics in integrated science and technology which are of interest to the entry-level student. May be repeated for credit when course content changes. Students should consult the instructor prior to enrolling for the course. Prerequisite: Permission of instructor.

http://www.jmu.edu/catalog/13