ENGINEERING, GENERAL

CAI 6826 Project in Artificial Intelligence Systems 3 Credits
Grading Scheme: Letter Grade
Using concepts learned in prerequisite courses, including AI ethics, machine learning, and the Artificial Intelligence Systems course, students will individually or as a team identify AI systems problems, formulate solutions, and apply AI Systems knowledge in the context of a real-world project. Project requirements include preparing a plan, technical final report, delivering an oral presentation, and creating a software repository.
Prerequisite: (LAW 6930 & EGN 5216) AND (CAP 6615 or EGN 6615) AND (CAP 5416 or EEE 6512 or EEL 5406) AND (CAP 6XXX or EEE 6561 or EEL 5793).

CAP 5771 Introduction to Data Science 3 Credits
Grading Scheme: Letter Grade
Introducing the basics of data science including programming for data analytics, file management, relational databases, classification, clustering and regression. The foundation is laid for big data applications ranging from social networks to medical and business informatics.
Prerequisite: COP 3530 Data Structures and Algorithms or equivalent.

EEE 5354L Semiconductor Device Fabrication Laboratory 3 Credits
Grading Scheme: Letter Grade
This course will be offering hands-on experience in semiconductor material characterization and device fabrication techniques.

EEE 5776 Applied Machine Learning 3 Credits
Grading Scheme: Letter Grade
Major machine learning concepts with a focus on application. Topics include classification, regression, unsupervised learning, maximum likelihood, Bayesian, and deep learning models.
Prerequisite: Math for Intelligent Systems, Programming for ADE, and Applied Data Science.

EEE 6778 Applied Machine Learning II 3 Credits
Grading Scheme: Letter Grade
Advanced topics in applied machine learning with an applied focus. Topics include graphical models, unsupervised learning, model selection, as well as variational auto-encoder, generative adversarial network, and recursive deep learning architectures.
Prerequisite: EEE 5776 Applied Machine Learning.

EGN 5215 Machine Learning Applications in Civil Engineering 3 Credits
Grading Scheme: Letter Grade
Students will leverage state-of-the-art techniques and tools in machine learning to solve Civil Engineering problems. Fundamentals of data analytics and machine learning techniques will be applied to real-world tasks in Civil Engineering. Students will gain essential knowledge and programming skills (using R) in data preprocessing, feature selection, model comparison, hyperparameter tuning and machine-learning interpretation. Case studies and applications are included for hands-on experience.
Prerequisite: Undergraduate level courses in probability and statistics.

EGN 5216 Machine Learning for Artificial Intelligence Systems 3 Credits
Grading Scheme: Letter Grade
This course aims to provide a framework to develop real-world machine learning systems that are deployed, reliable, and scalable. The focus of this course is to introduce basic modules of machine learning systems, namely, data management, data engineering, approaches to model selection, training, scaling, monitoring, and deploying to Machine Learning systems.
Prerequisite: (MAC 2313 OR EQUIVALENT) AND (MAS 4105 OR MAS 3114 OR EQUIVALENT) AND (STA 4321 OR STA 3032 OR EQUIVALENT) and familiarity with at least one programming language (Python preferred).

EGN 5442 Programming for Applied Data Science 3 Credits
Grading Scheme: Letter Grade
Concepts used to skillfully apply and create new Data Science algorithms using a high-level language such as Python or R.
Prerequisite: Previous experience with computer programming strongly encouraged.

EGN 5447 Mathematical Foundations for Data Science for Engineers I 3 Credits
Grading Scheme: Letter Grade
The first of a two-part series designed to equip students with the essential mathematical skills required in the rapidly evolving field of data science. This course lays a solid groundwork in the fundamentals of linear algebra, probability, and information theory, with a particular emphasis on their relevance and practical applications in data science.
Prerequisite: Undergraduate level statistics, linear algebra, and calculus.

EGN 6216 Artificial Intelligence Systems 3 Credits
Grading Scheme: Letter Grade
Apply the concepts, frameworks and tools used for building Artificial Intelligence (AI) systems in the real world. Examines the life cycle of AI systems and how such systems can be successfully deployed at scale and be monitored in production.
Prerequisite: One (1) of two ML course options: EGN 5216 or ABE 6933.

EGN 6217 Applied Deep Learning 3 Credits
Grading Scheme: Letter Grade
Covers the concepts, frameworks, and tools used for building deep learning models. It will also examine applications of deep learning systems in AI involving topics such as computer vision, natural language processing (NLP), speech recognition, sensor signal analysis, and security.
Prerequisite: One of three machine learning course options CAP 6610 or EEL 5840 or ABE 6933.

EGN 6446 Mathematical Foundations for Applied Data Science 3 Credits
Grading Scheme: Letter Grade
Understand and apply machine learning statistical models including functions of random variables, Monte Carlo, convergence, estimation, and hypothesis testing. Understand and apply optimization algorithms including constrained and unconstrained, first and second order, stochastic and gradient descent, and nonconvex.
Prerequisite: COT 5615.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6642 Engineering Innovation 3 Credits
Grading Scheme: Letter Grade
Concepts of innovative thinking and innovation practices. Using lectures, case studies, team exercises, and guest speakers, the course teaches life skills in innovative thought and action that students can use in careers ranging from starting companies to executing RD projects in large companies.

EGN 6937 Engineering Fellowship Preparation 0-1 Credits
Grading Scheme: Letter Grade
Engineering Fellowship Preparation will instill in students an understanding of the fellowship and grant process.

EGN 6951 Integrated Product and Process Design G1 3 Credits
Grading Scheme: Letter Grade
The first part of the two-semester Integrated Product and Process Design (IPPD) course sequence where multidisciplinary teams of students partner with industry sponsors to design and build authentic products and processes on time and within budget. Working along industry liaisons and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: 18 credits of graduate course work approved.

EGN 6952 Integrated Product and Process Design G2 3 Credits
Grading Scheme: Letter Grade
The second semester of the two-semester Integrated Product and Process Design (IPPD) course sequence where multidisciplinary teams of students' partner with industry sponsors to design and build authentic products and processes on time and within budget. Working along industry liaisons and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: EGN 6951.

EGS 6037 Managing Engineering with Integrity 3 Credits
Grading Scheme: Letter Grade
Managing Engineering with Integrity explores ethical norms in research, intellectual property, authorship, and RD management found within the engineering field. Through interactive lectures, team projects, and case studies, students develop strategies for ethical leadership. Weekly presentations enhance collaboration and communication. Emphasizing ethics, innovation, and leadership, the course equips graduate students to foster ethical cultures, resolve conflicts, and guide teams in high stakes.

EGS 6039 Engineering Leadership 3 Credits
Grading Scheme: Letter Grade
Concepts, theory and practice of engineering leadership; effective written and oral communications and presentations; engineering leadership characteristics, individual differences and self-awareness; developing and building teams; managing change, conflicts, and crises; and understanding real-world ethics and core values.

EGS 6101 Divergent Thinking 3 Credits
Grading Scheme: Letter Grade
Focuses on student acquisition of divergent thinking skills to support the engineering design process. It emphasizes the importance of student practices such as observing, questioning, learning and experimenting, and stresses cultivating an openness to new experiences, in order to generate ideas and devise solutions to complex design problems.

EGS 6216 AI Ethics for Technology Leaders 3 Credits
Grading Scheme: Letter Grade
Students learn core concepts of AI ethics and apply them to real-world scenarios. As future technology leaders, students completing this elective course will be able to identify, analyze and evaluate ethical considerations in developing and deploying AI systems. AI's global impact and navigating complex issues while respecting diverse values are examined. A major focus is on AI safety and beneficial AI development, providing current knowledge on social issues.
Prerequisite: Graduate student status. Course registration priority will be given to MS students enrolled in the MSADA and MSAIS programs. Preferably, students will have completed an undergraduate course in engineering ethics and/or AI systems

EGS 6626 Fundamentals of Engineering Project Management 3 Credits
Grading Scheme: Letter Grade
Provides engineering students with a comprehensive understanding of how to plan, optimize and efficiently manage projects (or tasks) to implement products, services or developments. This includes building the structure, processes, components and linkages with a team for successful project delivery within schedule, budget and quality requirements.

EGS 6628 Advanced Practices in Engineering Project Management 3 Credits
Grading Scheme: Letter Grade
Applied Engineering Project Management expands on foundational project management practices to include complex as well as new project delivery concepts. Topics include project acquisition; negotiation skills; advanced risk planning and management; program management; project.
Prerequisite: EGS 4625/6626, Fundamentals of Engineering Project Management, or equivalent (with permission of the instructor).

EGS 6629 Agile Project Management for Engineers and Scientists 3 Credits
Grading Scheme: Letter Grade
Provides students with a comprehensive understanding of the agile mindset and why agility is needed when managing complex-adaptive products in a volatile and uncertain environment. The course promotes agile thinking by building a complex-adaptive product using industry-leading agile frameworks (e.g., Scrum). Students explore conditions that foster personal and organizational agility.
Prerequisite: Students enrolled in a Herbert Wertheim College of Engineering graduate degree program or students enrolled at UF as a graduate certificate seeking student.

EGS 6681 Advanced Engineering Leadership 3 Credits
Grading Scheme: Letter Grade
Designed to further develop the leadership framework and capabilities of graduate engineering students. It involves a case study-based instructional approach that reviews and applies strategic leadership concepts and knowledge critical to the success of engineering-based companies that now operate in a highly-uncertain and volatile business environment.
Prerequisite: EGS 6039 or instructor approval.

ESI 6900 Principles of Engineering Practice 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Course work in specialized topics for graduate students.
Prerequisite: consent of instructor.