SUGGESTED COURSES FROM OUTSIDE THE AERO DEPARTMENT
Dynamics and Controls Group - Aerospace Engineering

ELECTRICAL and COMPUTER ENGINEERING (ECEN)

605. Linear Control Systems. (3-3). Credit 4. Application of state variable and complex frequency domain techniques to analysis and synthesis of multivariable control systems. Prerequisite: ECEN 420 or equivalent.

606. Nonlinear Control Systems. (3-0). Credit 3. Techniques available to analyze and synthesize nonlinear and discontinuous control systems. Modern stability theory, time-varying systems, DF, DIDF, Lyapunov Theory, adaptive control, identification and design principles for using these concepts; examples from a variety of electronic and electromechanical systems. Prerequisite: ECEN 605.

608. Modern Control. (3-0). Credit 3. Vector Norms; Induced Operator Norms; Lp stability; the small gain theorem; performance/robustness trade-offs; L1 and Hoo optimal P control as operator norm minimization; H2 optimal control. Prerequisite: ECEN 605 or equivalent. Cross-listed with MEEN 674.

609. Adaptive Control. (3-0). Credit 3. Basic principles of parameter identification and parameter adaptive control; robustness and examples of instability; development of a unified approach to the design of robust adaptive schemes. Prerequisite: ECEN 605 or approval of instructor. Cross-listed with MEEN 675.

628. Linear System Theory. (3-0). Credit 3. Application of functional analysis and geometric concepts to the analysis and synthesis of control systems. Prerequisite: ECEN 605.

645. Pattern Recognition by Neural Networks. (3-0). Credit 3. Feedforward and feedback paradigms; training algorithms; supervised and unsupervised learning; associative networks; self-clustering networks; stability and convergence; comparison with statistical pattern recognition. Prerequisite: ECEN 649 or approval of instructor.

649. Pattern Recognition. (3-0). Credit 3. Introduction to the underlying principles of classification, and computer recognition of imagery and robotic applications. Prerequisites: MATH 601 and/or STAT 601 and approval of instructor.

COMPUTER SCIENCE AND ENGINEERING (CSCE)

601. Programming with C and Java. (3-0). Credit 3. Survey of the C and Java programming languages, including principles of procedural and object-oriented languages; multi-disciplinary
applications including business, Internet and engineering problems. Prerequisite: Graduate classification.

602. Object-Oriented Programming, Development and Software Engineering. (3-0). Credit 3. Teaches students Object-Oriented Programming in C++; software engineering techniques presented to teach how to build high quality software; semester project gives quasi-real-world experience with issues such as requirements capture and object-oriented development. Prerequisite: CSCE 601 or approval of instructor; graduate classification.

625. Artificial Intelligence. (3-0). Credit 3. Basic concepts and methods of artificial intelligence; Heuristic search procedures for general graphs; game playing strategies; resolution and rule based deduction systems; knowledge representation; reasoning with uncertainty. Prerequisite: CSCE 221.

635. AI Robotics. (3-1). Credit 3. Introduction and survey of artificial intelligence methods for mobile robots (ground, aerial, or marine) for science and engineering majors; theory and practice of unmanned systems, focusing on biological and cognitive principles which differ from control theory formulations.

635. Neural Networks. (3-0). Credit 3. Basic concepts in neural computing; functional equivalence and convergence properties of neural network models; associative memory models; associative, competitive and adaptive resonance models of adaptation and learning; selective applications of neural networks to vision, speech, motor control and planning; neural network modeling environments. Prerequisites: Math 304 and 308 or approval of instructor.

639. Fuzzy Logic and Intelligent Systems. (3-0). Credit 3. Introduces the basics of fuzzy logic and its role in developing intelligent systems; topics include fuzzy set theory, fuzzy rule inference, fuzzy logic in control, fuzzy pattern recognition, neural fuzzy systems and fuzzy model identification using genetic algorithms. Prerequisite: CSCE 625 or approval of instructor. Cross-listed with MEEN 676.

MATHEMATICS (MATH)

601 - Methods of Applied Mathematics I. Methods of linear algebra, vector analysis and complex variables. Prerequisite: MATH 308 or equivalent.

602 - Methods and Applications of Partial Differential Equations. Classification of linear partial differential equations of the second order; Fourier series, orthogonal functions, applications to partial differential equations; special functions, Sturm-Liouville theory, application to boundary value problems; introduction to Green's functions; finite Fourier transforms. Prerequisites: MATH 601 or MATH 308 and 407.