

Systems Engineering (SYSE)

SYSE 500 Fundamentals of Systems Engineering 3 Credits (3,0)

Overview of systems engineering principles, processes, and practices across the system life cycle. Emphasis on total system view, requirements development and analysis, risk management, optimization, reliability, availability, maintainability, and trade-offs.

Course Offered at: Daytona Beach, Worldwide

SYSE 505 System Safety and Certification 3 Credits (3,0)

Safety engineering considerations when designing, testing, and certifying airborne safety-critical systems in regulated industries. Fundamentals of system safety engineering and the regulatory framework for initial airworthiness certification; system hazard and risk analysis and safety assessment; safety requirements validation and verification; fault models and failure analysis techniques such as fault trees, FMEA, event tree analysis, common cause/mode analysis, dependence diagrams, and Markov analysis. Industry standards for aircraft development (SAE ARP4754B and ARP4761A) and for airborne hardware and software development (RTCA DO-178C and DO-254).

Course Offered at: Daytona Beach, Worldwide

SYSE 515 Mathematical Applications in Systems Engineering 3 Credits (3,0)

Applied approach to calculus, economics, probability, and statistics for engineers???. Analytical skills for systems planning, design, and analysis.

Course Offered at: Worldwide

SYSE 530 System Requirements Analysis and Modeling 3 Credits (3,0)

Development, definition, and management of requirements for systems or products. System requirements process; stakeholder identification; requirements elicitation techniques; requirements modeling and analysis techniques; requirements specification; requirements verification and validation; requirements management; and requirements standards and tools.

Course Offered at: Daytona Beach, Worldwide

SYSE 560 Introduction to Systems Engineering Management 3 Credits (3,0)

Principles of engineering management in the context of systems engineering life cycle. Systems engineering technical planning; organizational structure; configuration management; risk management; design structure matrix; systems engineering project budgeting and resource allocation; systems engineering project monitoring and control; and systems engineering project management optimization techniques.

Course Offered at: Daytona Beach, Worldwide

SYSE 599 Special Topics in Systems Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in systems engineering.

Course Offered at: Daytona Beach, Prescott, Worldwide

SYSE 610 System Architecture Design and Modeling 3 Credits (3,0)

Concepts and techniques for architecting systems and the process of developing and evaluating functional, physical, operational, and interface architectures. System complexity; architecture development and analysis processes; architecture modeling languages and techniques; architecture frameworks; architecture modeling for engineering decision-making; and system architecture optimization.

Course Offered at: Daytona Beach, Worldwide

SYSE 625 System Quality Assurance 3 Credits (3,0)

Advanced modeling principles and methods for quality planning and control. System quality design; Taguchi models; system development assurance including system verification and testing for quality; statistical models for design quality assurance; statistical process control and process capability; acceptance sampling models; total quality management; and quality continuous improvement models.

Course Offered at: Daytona Beach, Worldwide

SYSE 650 Digital Engineering with Artificial Intelligence and Machine Learning 3 Credits (3,0)

Explore the principles and applications of Digital Engineering (DE), focusing on how Artificial Intelligence (AI) and Machine Learning (ML) enhance modern engineering practices. In-depth understanding of Model-Based Systems Engineering (MBSE), digital twins, digital threads, and system lifecycle management; leveraging industry-standard tools such as Genesis Vitech, and MATLAB. AI and ML-driven analytics optimize system design, performance, and decision-making.

Course Offered at: Worldwide

SYSE 660 Organizational Systems Management 3 Credits (3,0)

Concepts of organizational management and leadership approached from a system level perspective. Systems thinking; system dynamics; organizational system design and transformation; soft systems methodology; data-driven system organizational modeling; and elements of network science as they relate to organizational systems. Models are drawn from a variety of areas including operations management, finance, organizational behavior, and strategic management.

Course Offered at: Daytona Beach, Worldwide

SYSE 690 Systems Engineering Project 3 Credits (3,0)

Systems engineering semester-long project conducted under the supervision of a faculty project advisor. The project is expected to demonstrate the student's mastery on the selected systems engineering topic.

Course Offered at: Daytona Beach, Worldwide

SYSE 696 Graduate Internship in Systems Engineering 1-3 Credit (1,0)

Practical application of systems engineering in real-world settings through supervised internships.

Course Offered at: Daytona Beach

SYSE 699 Special Topics in Systems Engineering 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in systems engineering.

Course Offered at: Daytona Beach, Prescott, Worldwide

SYSE 700 Graduate Thesis 1-9 Credit (1-9,0)

Master-level research thesis in systems engineering conducted under the supervision of the student's advisor and thesis committee. Submission of committee approved thesis and an oral defense are required for thesis credit to be earned.

Course Offered at: Daytona Beach

SYSE 700A Graduate Thesis I 3 Credits (3,0)

First of a two-course sequence (SYSE 700A and SYSE 700B). Propose and develop a thesis on a systems engineering topic. Supervised by the student's Thesis Committee. Consists of a research proposal in systems engineering that the student will undertake at the conclusion of the academic coursework for the program. Culminate in a written document demonstrating proficiency and suitable for MSSYSE degree.

Course Offered at: Worldwide

SYSE 700B Graduate Thesis II 3 Credits (3,0)

Completion of the thesis under supervision of the student's Thesis Committee. Must complete SYSE 700A first. Culminating in a written document demonstrating proficiency and suitable for a formal, high-quality Master of Science in Systems Engineering degree. Demonstrate the student's mastery of the chosen topic and must be of a quality suitable to support the completion of an approved research thesis.

Prerequisites: SYSE 700A

Course Offered at: Worldwide