

Systems Engineering (SYSE)

SYSE 299 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

SYSE 301 Introduction to Systems Engineering 3 Credits (3,0)

Overview of systems engineering. System life cycle, project management, systems control, risk analysis, system requirements, and trade-offs.

Daytona Beach Prerequisites: MATH 424

Prescott Prerequisites: AE/ME students must have a C or better in MATH 242

Course Offered at: Daytona Beach, Prescott

SYSE 302 System Engineering Design Considerations 3 Credits (3,0)

Examines systems that meet performance requirements and achieve reliability, maintainability, supportability, and cost-effectiveness.

Course Offered at: Daytona Beach, Prescott

SYSE 303 Optimization in Systems Engineering 3 Credits (3,0)

Focus on traditional and multi-objective optimization methods, trade-offs between subsystem performance and overall system effectiveness.

Daytona Beach Prerequisites: SYSE 301

Prescott Prerequisites: AE/ME students must have a C or better in SYSE 301

Course Offered at: Daytona Beach, Prescott

SYSE 304 Trade Studies, Risk and Decision Analysis 3 Credits (3,0)

Trade studies, risk and decision analyses. Decision making under risk and uncertainty, decision trees and Bayes decision rule, utility theory, Analytical Hierarchy Process, game theory, fuzzy theory, quality function deployment, simulation approaches.

Daytona Beach Prerequisites: MATH 242

Prescott Prerequisites: AE/ME students must have a C or better in MATH 242

Course Offered at: Daytona Beach, Prescott

SYSE 310 Systems Architecture Modeling 3 Credits (3,0)

Fundamentals of system functional modeling and allocation to components to create functional, physical, operational, and interface architectures. Survey of graphical modeling techniques used for system architecture development.

Course Offered at: Daytona Beach, Prescott

SYSE 330 Professional Standards for Systems Engineers 3 Credits (3,0)

Certification and professional standards relevant to system engineers. Relevant entry-level certification, preparation for the certification exam, a long-term certification plan for each student. Ethical and legal implications case studies. Professional Engineers Certification Pathway and INCOSE Associate Systems Engineering Professional (ASEP).

Course Offered at: Daytona Beach, Prescott

SYSE 399 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

SYSE 401 Systems Modeling and Simulation 3 Credits (3,0)

Systems modeling and simulation-based decision analysis to improve performance of engineering systems. Monte-Carlo simulation, statistics of input and output analysis, statistical design of experiments, and simulation optimization.

Course Offered at: Daytona Beach

SYSE 402 Optimization in Systems Engineering II 3 Credits (3,0)

Stochastic methods used to investigate the behavior and performance of engineering systems under conditions of uncertainty. Probability models, decision theory, queuing theory, inventory models, forecasting, Markov chain models, Markov decision processes, and advanced heuristics. Engineering problem solving such as system risk, performance, and cost solutions.

Prerequisites: SYSE 303.

Course Offered at: Daytona Beach

SYSE 403 Systems Engineering Life Cycle Costing 3 Credits (3,0)

Application of economic principles for evaluating systems engineering projects. Design for affordability across the life cycle. Defining and implementing an economic analysis framework. Methodologies for the economic evaluation of project alternatives: capital budgeting, cost estimating, economic decision tree analysis, life cycle costing, and activity-based costing.

Prerequisites: MATH 242

Course Offered at: Daytona Beach

SYSE 405 Aerospace Systems Guidance and Control 3 Credits (3,0)

Multidimensional state-space approach. Application of digital control systems in aerospace instrumentation, sensors, guidance, and navigation. Optimal control systems, multi-objective control, fuzzy systems control, neural networks, and genetic algorithms.

Prerequisites: ELEC 401

Course Offered at: Daytona Beach

SYSE 410 Space Systems and Mission

Analysis 3 Credits (3,0)

Application of systems engineering through the development of a hypothetical deep space exploration mission. Mission development and operations including , spacecraft design, communications, navigation, payload data handling, personnel, and cost. Discipline teams, engineering documentation (concept of operations, project plans, schedules, budgets, mission operations plans, and system design documents).

Prerequisites: SYSE 302

Course Offered at: Daytona Beach

SYSE 415 Systems Engineering Practices:

Specialty Engineering 3 Credits (3,0)

System verification and testing, reliability, maintainability, supportability, reproducibility, operability and safety. Probability and statistics. Design and analysis for operational feasibility.

Daytona Beach Prerequisites: SYSE 301 and MATH 412

Prescott Prerequisites: AE/ME students must have a C or better in SYSE 301

Course Offered at: Daytona Beach, Prescott

SYSE 425 System Quality Engineering 3 Credits (3,0)

Techniques for planning, organizing, controlling, and improving the quality of a system throughout its life cycle. System quality models, development, verification, validation, and testing procedures for quality assurance, process control, experimental design for development assurance and production, quality-based evaluation of supplier products, quality continuous improvement. Mathematical and statistical modeling techniques.

Prerequisites: SYSE 301 and MATH 412

Course Offered at: Daytona Beach

SYSE 460 Systems Engineering Management 3 Credits (3,0)

Fundamental principles of engineering management. Issues related to effective technical planning, scheduling and assessment of technical progress. Qualitative and quantitative management techniques. Life-cycle costing, operational resource allocation, and performance evaluation.

Prerequisites: MATH 412

Course Offered at: Daytona Beach

SYSE 490 Systems Engineering Capstone Project I 3 Credits (3,0)

First course in the systems engineering senior capstone. Preliminary design of interdisciplinary projects, focusing on objectives and functional analysis.

Course Offered at: Daytona Beach

SYSE 491 Systems Engineering Capstone Project II 3 Credits (3,0)

Continuation of the capstone project. Completion of detailed design, implementation, testing, and demonstration.

Prerequisites: SYSE 490

Course Offered at: Daytona Beach

SYSE 499 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