

SYSTEMS ENGINEERING (SEE)

SEE 501. Systems Engineering Project Phase I. (1 Unit)

Co-requisite: SEE 510 required. Introduction to systems thinking, systems engineering core body of knowledge and engineering problem solving methodologies. Case studies involving complex, large scale systems.

SEE 502. Systems Engineering Project Phase II. (1 Unit)

Prerequisites: SEE 501 and SEE 510 required. Presents relevant theoretical perspectives, best practices, tools and methodologies related to the engineering of complex systems and systems-of-systems.

SEE 503. Systems Engineering Project Phase III. (1 Unit)

Presents ascendant systems engineering methodologies and tools.

SEE 504. Systems Engineering Project Phase IV. (1 Unit)

Prerequisite: SEE 503, SEE 550, SEE 560, SEE 570 required. Co-requisite: SEE 520 and SEE 580 required. Modeling and simulation, statistical decision and risk analysis, systems architecture and quantitative methods.

SEE 510. Introduction to Systems Engineering. (3 Units)

Co-requisite: SEE 501 required. Theoretical and practical foundations of systems engineering; processes, tools and principles employed throughout a system's life cycle: from concept inception through system retirement/disposal.

SEE 520. Analytics in Systems Engineering. (3 Units)

Prerequisite: MAT 131 or MAT 321 or an introductory course in statistics, and CSC 121 or an introductory programming, and SEE 502, SEE 550, SEE 560. Statistical methods used in data analytics with a focus on decision making in engineering applications.

SEE 530. Quantitative Methods in Systems Engineering. (3 Units)

Prerequisite: MAT 131 or MAT 132 or an introductory course in probability and statistics and SEE 510. Probability and statistics for engineering project cost estimates, system risk assessments, life cycle models and management plans.

SEE 540. Economic Factors in Systems Engineering. (3 Units)

Co-requisite: SEE 510 required. Principles of engineering economics; impact of economic factors for systems engineers, tools for understanding and analyzing these factors, fundamental quantitative analysis of cash flow, system life-cost estimating; parametric cost models.

SEE 550. Modeling and Simulation. (3 Units)

Prerequisite: SEE 530 required. Application of computer simulation to engineering (sub)systems; systems structure, system analysis, model construction, data collection, and computer simulations tools.

SEE 560. Model Based Systems Engineering. (3 Units)

Prerequisite: SEE 530, SEE 540, SEE 550. Co-requisite: SEE 550 required. Application of model curation, model repositories and model integration in MBSE; distinction between engineering models and model-based systems engineering is emphasized.

SEE 570. Complex Systems Architecture. (3 Units)

Prerequisite: SEE 510 required. Holistic approach to the process of architecting systems in various engineering disciplines.

SEE 580. System-of-Systems Engineering. (3 Units)

Prerequisite: SEE 550, SEE 560, SEE 570 required. Critical issues associated with the integration of systems and/or systems-of-systems.

SEE 585. Engineering Complex Systems. (3 Units)

Prerequisite: SEE 570 and SEE 580 are required. Concepts and methods for the design and analysis of complex adaptive and resilient systems/ systems-of-systems.

SEE 590. Master's Project. (3 Units)

Prerequisite: SEE 504, SEE 505 (may be taken concurrently) and consent of graduate advisor. Co-requisite: SEE 585 required. Individual research on a systems engineering topic under the direction of graduate faculty. Repeatable course.