

Mission Engineering

Developing Robust Architectures that Deliver Mission Outcomes

Course Description

Mission success rarely depends on a single system. It depends on how multiple systems—legacy and new—interact to deliver real operational capability. Mission Engineering equips you to make informed decisions across those interdependencies—before fragmented investments and disconnected upgrades undermine mission outcomes.

This course focuses on the decisions that shape mission outcomes in complex operational environments. You'll learn how to define mission context, decompose mission threads, and evaluate alternative solutions using relevant measures of effectiveness. Emphasis is placed on discovering critical relationships, performing mission-level trade studies, and recommending architectures that close real capability gaps—not just locally optimize individual systems.

Mission Engineering is treated as a decision-support discipline that helps leaders determine which capabilities to mature, integrate, or adapt to achieve desired effects. Digital engineering and MBSE concepts are introduced where they improve clarity and evidence-based recommendations.

Are you evaluating capability gaps across multiple systems? Integrating legacy and emerging technologies? Supporting investment decisions at the mission—not just the system—level? This course is designed for systems engineers, architects, and technical leaders responsible for shaping mission outcomes across complex enterprises.

Course Objectives

At the end of this course you should be able to...

- ◆ Describe the big picture challenges of Mission Engineering in the context of mission characterization, solution evaluation and documented decisions
- ◆ List and define key objectives of Mission Engineering as they relate to Systems Engineering and Mission Architecture
- ◆ Identify scenarios and missions threads within a system CONOPS
- ◆ Characterize the various types of models and understand their role in Mission Engineering
- ◆ Apply metrics to specific mission scenarios to capture mission effectiveness, performance, and outcomes including sensitivity to overall mission success
- ◆ Associate relevant performance parameters and modeling results to assess individual solution options in the context of defined ME metrics
- ◆ Analyze scenarios including threat capabilities at a given timeframe for various CONOPS alternatives
- ◆ Formulate a comprehensive ME study plan to assess a given domain-specific scenario using the DoD Mission Engineering Guide

Course Topics

- ◆ **Module 1—Introduction to Mission Engineering**
 - ME Definitions
 - Intro to Systems Engineering and MBSE
 - ME Approach & Methodology
- ◆ **Module 2— Mission Characterization and Operations**
 - Key Questions to Identify Mission Gaps
 - Mission Threads and Operations Decomposition
 - Metrics and Mission Utility Assessments
- ◆ **Module 3—Solution Trades and Capability Mix**
 - Mission Architectures
 - Modeling Approaches
 - Trade Studies & ME Thread Analysis
- ◆ **Module 4—Inform and Recommend Mission Solutions**
 - Decision Support
 - Integration Considerations
- ◆ **Optional—Integrated MBSE Exercise**
 - Integrated implementation with MBSE environment

Who Should Attend

Project managers, systems engineers, technologists, subsystem engineers or modeling and simulation analysts who are participating in or responsible for designing and analyzing new systems and capabilities.

Testimonials

"I received a much better understanding of why it is necessary to look beyond just the system being developed, but to ensure the whole mission is considered to build an appropriate capability. Great course!" - US Navy Engineer

Key takeaway: the ability to link information is KEY to DE, and that we need to use the limited systems we have in place now to do MBSE." - USMC Engineer