MIT xPRO

Model-Based Systems Engineering: Documentation and Analysis

Note: Items preceded by a star (✮) are graded with due dates in red below.

WELCOME TO THE COURSE (25 min)

In the first section of the course, you'll take a Pre-Assessment to get a baseline of your understanding of the course material. During this period, you'll become familiar with the platform and course design.

- ✮ Pre-Assessment (15 min)
  Due at end of the course
- Welcome (3 min)
- MBSE Survey and Tools (2 min)
- Course Discussion Forums (5 min)
- Course Webinars (5 min)
- Teams (3 min)
- Who's Teaching the Course (4 min)
- Connect with MIT xPRO (1 min)

WEEK 1: WHAT IS MBSE? (4-6 hrs)

In Week 1, you'll deep dive into Model-Based Systems Engineering in contrast to traditional Systems Engineering, such as a document based approach. You will learn to identify the core tenets of MBSE and the situations in which it is recommended, and distinguish the differences between MBSE and traditional systems engineering. Finally, you'll overview a set of qualities to look for in MBSE models and how to define the scope and purpose of them.

- Key Ideas (3 min)
- Promise of MBSE (30 min)
- Overview of MBSE (40 min)
- Qualities of Great Models (20 min)
- Scoping MBSE (25 min)
- ✮ Graded Activity (20 min)
  Due at end of the course
- ✮ Project (2 hrs)
  Project Submission and Self-Assessment due at end of the first week
- Key Takeaways (2 min)

Live Events This Week
Course Orientation Webinar
More information in Welcome to the Course > Course Webinars section

WEEK 2: BUILDING AN MBSE MODEL (4-6 hrs)

In Week 2, you will step into how you might implement an MBSE approach. First, you will look at the perspective of the model as a data repository and what this represents in terms of querying abilities in an MBSE environment. While you do so, note the contrast with traditional document based SE approaches. Secondly, you'll look at SysML as modeling language used in MBSE and examples of syntax and a use case example.

- Key Ideas (10 min)
- Models as Data Repositories (45 min)
- SysML as an Example Language for MBSE (25 min)
- Modeling Behavior and Structure with SysML (50 min)
- MBSE Tools (15 min)
- ✴ Graded Activity (20 min)
  Due at end of the course
- ✴ Project (2 hrs)
  Project Submission and Self-Assessment due at end of the second week
- ✴ Action Plan (30 min)
  Due at end of the course
- Key Takeaways (2 min)

Live Events This Week
Course Q&A Webinar with Course Instructor
More information in Welcome to the Course > Course Webinars section

WEEK 3: CRITIQUING AN MBSE APPROACH (4-6 hrs)

For Week 3, you'll start by looking at the implementation challenges that come with adopting an MBSE approach. The Boeing case study will provide you with an overview of these. This will then pivot to how to analyze an MBSE model. How might you evaluate and analyze a model can be a common and challenging task in an MBSE environment. The structured process for performing a critique will guide you through this process. Finally, industry experts will provide an overview of current trends of MBSE in the community.

- Key Ideas (5 min)
- Implementation Challenges of MBSE (40 min)
- Performing an MBSE Critique (30 min)
- ✴ Graded Activity (30 min)
  Due at end of the course
- Current Debates in the MBSE Community (25 min)
- ✴ Project (2 hrs 30 min)
  Project Submission and Self-Assessment due at the end of the third week
  Peer Assessment due at the end of the third week
- Key Takeaways (2 min)

Top 10 Questions
Top 10 Questions discussion thread with Course Instructor
More information in the Discussion Forum

WEEK 4: MANAGING THE MODEL (4-6 hrs)

In Week 4, after reviewing the implementation and analysis of MBSE models, you will dive into managing models throughout their life cycle. Model management will have a great impact in both the MBSE environment and the organization. In this context, the model management plan, model owner, and the model curator are presented. Finally, you'll close with design patterns and a set of lessons learned by industry experts.

- Key Ideas (2 min)
- MBSE Lessons Learned (30 min)
- Model Management (50 min)
- Patterns in MBSE (5 min)
- ✷ Graded Activity (20 min)
  Due at end of the course
- ✷ Project (2 hrs)
  Project Submission and Self-Assessment due at the end of the fourth week
  Peer Assessment due at the end of the fourth week
- ✷ Action Plan (25 min)
  Due at end of the course
- Key Takeaways (2 min)
- Course Wrap-Up (2 min)
- Exit Survey (10 min)
- ✷ Post-Assessment (15 min)
  Due at end of the course

AFTER THE COURSE ENDS

End of the course
- Course ends
- Discussion forums lock
- Course staff will no longer monitor or update course content

Four days after the course ends
- Course certificates available on MIT xPRO dashboards