

Models in Engineering

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

WELCOME TO THE COURSE (35 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: Final day of the course
- Welcome (3 min)
- Discussion Forum (5 min)
- Course Webinars (5 min)
- Teamwork (3 min)
- Who's in the Course? (2 min)
- Who's Teaching the Course (4 min)
- Connect With Us (1 min)
- Presumed Modeling Experience (1 min)

WEEK 1: WHAT IS A MODEL? (4-5 hrs)

In the first week, you'll be introduced to models in engineering, you'll learn about model credibility, and you'll do several exercises to assess the credibility and fidelity of models.

- Key Ideas (3 min)
- Opening Activity (30 min)
- Defining Models (35 min)
- Making Decisions with Models (15 min)
- Model Fidelity and Credibility (30 min)
- ★ Graded Activity (20 min)
Due: Final day of the course
- ★ Project (2 hrs)
Project Submission and Self-Assessment due Sunday of the first week
Peer Reviews due Monday of Week 2
- Key Takeaways (5 min)

Live Event This Week

TA Office Hour Webinar

Date & Time TBD

More information in Welcome to the Course > Course Webinars section

WEEK 2: MAKING A MODEL (4-6 hrs)

In Week 2, you'll spend time learning about how models are made. You'll learn about a model development process, you'll be introduced to some of the relevant optimization considerations for modeling, and you'll review the different types of sensitivity analysis that are often conducted on a model.

- Key Ideas (2 min)
- How to Make a Model (25 min)
- Optimizing Models (40 min)
- Sensitivity in Models (15 min)
- ★ Graded Activity (20 min)
Due: Final day of the course
- ★ Project (1 hr. 30 min)
Due Sunday of the second week
- ★ Action Plan (20 min)
Due: Final day of the course
- Key Takeaways (2 min)

Live Event This Week

Course Q&A Webinar with Course Faculty

Date & Time TBD

More information in Welcome to the Course > Course Webinars section

WEEK 3: JOINING SEVERAL MODELS TOGETHER (4-6 hrs)

In Week 3, you'll learn about the opportunities and challenges of joining models together. You'll be introduced to Multidisciplinary System Design Optimization as a tool, and you'll be asked to reflect on how you would divide analysis between several models.

- Key Ideas (5 min)
- Bringing Models Together: Promises and Challenges (25 min)
- Multidisciplinary Design Optimization (MDO) (60 min)
- Choosing One Model or Several (30 min)
- ★ Graded Activity (30 min)
Due: Final day of the course
- ★ Project (2 hrs)
Project Submission and Self-Assessment due Sunday of the third week
Peer Reviews due Monday of the fourth week
- Key Takeaways (5 min)

Top 10 Questions

Key Ideas Section

Questions due by 21:00 UTC on Friday

Responses posted by 21:00 UTC on Monday

WEEK 4: MODELS IN VERIFICATION AND VALIDATION (4-6 hrs)

In Week 4, the focus is on Verification and Validation (V&V). You'll be asked to think about the role that models can play in V&V for a system, and you'll construct a V&V framework. You'll also learn about how to apply V&V to models themselves, including how to think through testing a model.

- Key Ideas (8 min)
- Introduction to V&V (50 min)
- Roles of Models in V&V (15 min)
- Developing a V&V Strategy Framework (10 min)
- When Are Models the Right V&V Strategy? (25 min)
- ★ Graded Activity (20 min)
Due: Final day of the course
- ★ Project (1 hr 30 mins)
Project Submission and Self-Assessment due Sunday of the fourth week
Peer Reviews due on the final day of the course
- ★ Action Plan (20 min)
Due: Final day of the course
- Key Takeaways (2 min)
- Course Wrap-Up (3 min)
- Exit Survey (10 min)
- ★ Post-Assessment (15 min)
Due: Final day of the course

AFTER THE COURSE ENDS

Day the Course Ends at 23:30 UTC

- Graded assignments no longer accepted
- Discussion Forums lock
- Course staff will no longer monitor or update course content

Friday after the Course Ends

- Course certificates available on MIT xPRO dashboard