

# Models in Engineering

## WEEK 1: What Is a Model?

*In the first week, you'll take a Pre-Assessment to get a baseline of your understanding of the course material. During this 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.*

<b>Pre-Assessment</b>	<b>15 min</b>
<b>Get Started</b>	<b>25 min</b>
• Welcome	3 min
• Course Schedule	3 min
• Course Collaboration Tools	5 min
• Course Webinar	5 min
• Teams	1 min
• Who's in the Course	2 min
• Who's Teaching the Course	4 min
• Grading and Completion Criteria	1 min
• Certificate Information and CEUs	1 min
• Learning Objectives and Pedagogy	2 min
• Social Media Groups	1 min
• Presumed Modeling Experience	1 min
• Software Requirements	1 min
<b>What Is a Model?</b>	<b>4.5 hrs</b>
• 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
• Project	2 hrs
• Key Takeaways	5 min

## WEEK 2: Making a Model

*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.*

### Making a Model

4-5 hrs

- Webinar Q&A with Professor Olivier de Weck 1 hr
- Key Ideas 2 min
- How to Make a Model 25 min
- Optimizing Models 40 min
- Sensitivity in Models 15 min
  
- Graded Activity 20 min
  
- Project 1.5 hrs
  
- Action Plan 20 min
  
- Key Takeaways 2 min

## WEEK 3: Joining Several Models Together

*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.*

Joining Several Models Together	4-5 hrs
• Ask the Professor a Top 10 Question	5 min
• 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	30min
• Project	2 hrs
• Key Takeaways	5 min

## WEEK 4: Models in Verification and Validation

*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.*

<b>Models in Verification and Validation</b>	<b>4-5 hrs</b>
• 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
• Project	1.5 hrs
• Action Plan	20 min
• Key Takeaways	2 min
• Course Wrap-Up	3 min
• Exit Survey	10 min
<b>Post-Assessment</b>	15 min

## After the course ends...

*Download your certificate.*

### **Last Day of the Course**

- Course ends at 23:30 UTC

### **Two Days after the Course Ends**

- Download your Course Certificate from your student dashboard

### **90 days after Course 4 closes**

- Course closes and all content is archived