DELLIGATTI ASSOCIATES, LLC
7428 Woodward Springs Drive
Pearland, TX 77584
(281) 715-0061
da@delligattiassociates.com
https://delligattiassociates.com

On-Demand OOSEM Accelerator™ MBSE Methodology Training Course Syllabus

Course Title: On-Demand OOSEM Accelerator™ MBSE Methodology Training Course (2023 Edition)

Objectives

- Become a model-based systems engineering (MBSE) advocate, capable of articulating to organizational decision makers the roots of the return on investment (ROI) from practicing MBSE
- Apply a modeling method, OOSEM (INCOSE's Object-Oriented Systems Engineering Method), to create a behavioral and structural model of a system of interest in a standardized modeling language, SysML (OMG's Systems Modeling Language), using a dedicated SysML modeling tool, Cameo Systems Modeler (or an equivalent modeling tool—see full list, below)

Duration

- 26 hours of self-paced activities delivered on demand through the Delligatti Associates Learning Center (Appendix A contains a detailed breakdown of content duration.)

Training materials (electronic files downloadable from Delligatti Associates Learning Center):

- DellMod Method Model.zip
- DellSat-77 Satellite System Models.zip
- DellSat-77 Satellite System Requirements.csv
- MBSE-with-SysML_presentation.pptx
- OOSEM Accelerator MBSE Methodology Training Course Handbook.docx
- Recommended Reading.pdf
- Course completion certificate. This certificate is valid documentation to claim recertification Professional Development Units (PDUs) for technical certifications

Training materials/equipment (provided by Client):

- Computer with high-speed internet connection and the ability to stream video content from Vimeo. (Note: the course is accessed via the Delligatti Associates Learning Center learning management system which uses Vimeo to stream the training videos. Some organizations' IT policies prevent streaming from Vimeo, in which case we recommend learners access the course from outside their organization's IT network, including VPN.)

- We recommend Cameo Systems Modeler version 2021x Enterprise Edition be installed on learner's computer. (The tool vendor Dassault Systèmes will provide a complimentary 30-day license for Cameo Systems Modeler that can be used for this course. The link to request a complimentary license will be provided after purchase.)
- Learners may use an acceptable alternative to Cameo Systems Modeler. The following is a list of products suitable for use in the OOSEM Accelerator™ MBSE Methodology Training Course:

(Legacy)No Magic Products

- Cameo Systems Modeler Enterprise Edition
- Cameo Systems Modeler Architect Edition plus Simulation Toolkit plugin
- Cameo Enterprise Architecture plus Simulation Toolkit plugin
- MagicDraw plus SysML, Requirements Modeler, and Simulation Toolkit plugins

(New)Dassault Systemés CATIA Magic Products

- Magic Cyber Systems Engineer plus Magic Model Analyst plugin
- Magic System of Systems Architect plus Magic Model Analyst plugin

Scope of Coverage

This course consists of the following activities:

Activity	Topic	Duration (h:mm)
1	Course Introduction	0:28
2	"MBSE with SysML" Business Case Presentation	0:38
3	Object-Oriented Systems Engineering Method (OOSEM) Overview	0:30
4	Organize the Model	0:31
5	Identify Project Stakeholders	0:58
6	Specify Mission Requirements (Stakeholder Concerns)	1:02
7	Define Enterprise Use Cases	1:33
8	Define To-Be Domain BDDs	1:13
9	Define Mission Scenarios (Use Case Narratives)	7:02
10	Capture Critical System Properties and Constraints	1:07
11	Define System Context	1:12
12	Specify Black-Box System Requirements	1:45
13	Define System State Machine	2:01
14	Define Logical Decomposition	1:36
15	Define Interaction Between Logical Components	1:09
16	Define System Logical Architecture IBD	3:26

Topics covered:

- The roots of the return-on-investment from practicing MBSE – with supporting data
- The design activities in the Object-Oriented Systems Engineering Method (OOSEM) modeling methodology
- Creating an effective model structure for partitioning design elements and representing that model structure on SysML package diagrams
- Capturing stakeholders and their concerns in a SysML model
- Modeling system use cases and actors with SysML use case diagrams
- Creating SysML activity diagrams to graphically represent system use case specifications
- Creating a structural model of a system's domain and representing it on SysML block definition diagrams (BDDs) and internal block diagrams (IBDs)
- Modeling system requirements and traceability relationships with SysML requirements diagrams, matrices, and tables
- Creating a structural model of a system's architecture and representing it on SysML BDDs and IBDs
- Creating a behavioral model of the system via decomposition of use case level behaviors
- Allocating system behaviors to system structures
- Modeling interfaces and object flow in dynamic and static views of the system
- Creating SysML state machine diagrams to represent the state-based behavior of system structures
- The mechanics of operating the Cameo Systems Modeler SysML modeling tool (or equivalent tools) to create and simulate a system model

Cost

Item	Rate
On-demand OOSEM Accelerator™ MBSE Methodology Training Course (2023 Edition) 1-Year Subscription	Price for single 1-year subscription: $525 / participant Bulk purchase tiers: • Tier 1 - minimum purchase of 25 seats: $475 / participant • Tier 2 - minimum purchase of 50 seats: $420 / participant • Tier 3 - minimum purchase of 100 seats: $370 / participant • Tier 4 - minimum purchase of 200 seats: $315 / participant

Payment Terms

- Individual seats up to a quantity of 25 can be purchased via credit card in our online store (https://ei194.infusionsoft.app/app/storeFront/showCategoryPage?categoryId=2).
- For bulk purchases, Delligatti Associates will electronically submit one invoice to the Client in accordance with Client's invoicing instructions. The Client will pay the invoice at the standard rate listed above within 30 calendar days of receipt of the invoice. Client will remit payment on the invoice either by credit card or via ACH electronic funds transfer (EFT).

Terms and Conditions of Service

- For purchases made in the online store, buyers will receive an automated confirmation email with access codes and instructions for accessing the training in the Delligatti Associates Learning Center. To help ensure delivery of this email, please be sure to add the delligattiassociates.com domain to your safe senders list. Buyers purchasing this course on behalf of others (i.e., you are not the participant), will need to provide the access code(s) and instructions to the participant(s).
- For purchases made by purchase order and invoiced by other means, Delligatti Associates will email a list of access codes along with instructions for learners to redeem them to the client's point of contact (POC) within one (1) business day of Delligatti Associates receiving payment.
- Access codes are valid for one (1) year from the date they are provided to the client POC. Once a learner redeems an access code, they will have access to the On-demand OOSEM Accelerator™ MBSE Methodology Training Course until the end of the period of service. No extensions will be granted.
- Access codes for the On-demand OOSEM Accelerator™ MBSE Methodology Training Course cannot be traded for access codes for the On-demand OCSMP Accelerator™ SysML Training Course and vice versa.
- Each access code may only be redeemed once by a single named individual. Access codes are not transferrable once redeemed.
- Access codes not redeemed prior to the period of service end date will be forfeited. No refunds will be provided for unused access codes.

Training Content Terms of Use

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- Delligatti Associates retains ownership of our training materials. The Client does not gain joint ownership of these training materials. Delligatti Associates grants paid participants of our training courses the right to use the content provided during training in their daily engineering work. Use of the training materials to provide training to others, either internally or externally, is strictly prohibited.

Appendix A

OOSEM Accelerator™ MBSE Methodology Training Course (2023 Edition) Content Durations

Summary

Total Course Duration: 25 hours, 54 minutes, 21 seconds
Average Activity Duration: 1 hour, 37 minutes, 9 seconds
Longest Activity (Activity 9): 7 hours, 1 minute, 39 seconds
Longest Segment (Activity 9, Segment 7): 51 minutes, 3 seconds

Content Item	Content Description	Duration (h:mm:ss)
Activity 1	**Course Introduction**	**0:27:47**
Segment 1	Course Prep Housekeeping	0:08:37
Segment 2	Instructor Bio and Course Objectives	0:19:17
Activity 2	**"MBSE with SysML" Business Case Presentation**	**0:37:19**
Segment 1	Activity 2 Inputs and Outputs	0:02:56
Segment 2	Presenting the Business Case for MBSE	0:34:23
Activity 3	**Overview of INCOSE's Object-Oriented Systems Engineering Method (OOSEM)**	**0:29:15**
Segment 1	Activity 3 Inputs and Outputs	0:04:56
Segment 2	OOSEM Presented in SysML Form	0:24:19
Activity 4	**"Set up model: Organize the model"**	**0:30:16**
Segment 1	Activity 4 Inputs and Outputs	0:02:58
Segment 2	Activity 4 DellMod Method Procedure	0:04:30
Segment 3	Starting with a System Model Template	0:06:45
Segment 4	Creating a Package Diagram to Display Model Structure	0:16:03
Activity 5	**"Analyze Stakeholder Needs: Identify Project Stakeholders"**	**0:48:09**
Segment 1	Activity 5 Inputs and Outputs	0:05:06
Segment 2	Activity 5 DellMod Method Procedure	0:07:27
Segment 3	Brainstorming Project Stakeholders	0:11:39
Segment 4	Adding Stakeholder Elements to the Model	0:23:57
Activity 6	**"Analyze stakeholder needs: Specify mission requirements (stakeholder concerns)"**	**1:01:51**
Segment 1	Activity 6 Inputs and Outputs	0:06:38
Segment 2	Activity 6 DellMod Method Procedure	0:03:37
Segment 3	Modeling Stakeholder Concerns	0:45:42
Activity 7	**"Analyze stakeholder needs: Define Enterprise Use Cases"**	**1:32:24**
Segment 1	Activity 7 Inputs and Outputs	0:04:26
Segment 2	Activity 7 DellMod Method Procedure	0:03:26
Segment 3	Heuristics for Creating Good Use Cases	0:19:34
Segment 4	Deriving Use Cases from Stakeholder Concerns	0:20:32
Segment 5	Building a Use Case Model and Diagram	0:44:26
Activity 8	**"Analyze stakeholder needs: Define to-be domain BDD"**	**1:12:29**

Segment 1	Activity 8 Inputs and Outputs	0:08:27
Segment 2	Activity 8 DellMod Method Procedure	0:04:26
Segment 3	Creating the BDD and the Domain Block	0:14:55
Segment 4	Modeling the System and its Actors as Parts of the Domain	0:32:54
Segment 5	Modeling Types of Connections Between the System and its Actors	0:41:47
Activity 9	**"Analyze system requirements: Define mission scenarios (use case narratives)"**	**7:01:39**
Segment 1	Activity 9 Inputs and Outputs	0:09:59
Segment 2	Activity 9 DellMod Method Procedure	0:10:51
Segment 3	Drafting a Textual Use Case Specification	0:16:19
Segment 4	Establishing Traceability from Concern to Use Case to Activity	0:15:51
Segment 5	Building the Activity: Modeling the Inputs	0:37:25
Segment 6	Building the Activity: Modeling the Flight Controller as a Participant	0:18:28
Segment 7	Building the Activity: Modeling the Main Success Scenario, Step 1	0:51:03
Segment 8	Building the Activity: Modeling Step 2 and the Sender Side of Step 3	0:31:44
Segment 9	Building the Activity: Modeling the Target Side of Step 3	0:33:27
Segment 10	Building the Activity: Modeling Step 4	0:17:57
Segment 11	Building the Activity: Modeling Steps 5 and 6	0:24:22
Segment 12	Building the Activity: Modeling Step 7	0:28:16
Segment 13	Checkpoint Homework Assignment: Modeling Steps 8 and 9	0:07:33
Segment 14	Building the Activity: Modeling Step 10	0:15:37
Segment 15	Building the Activity: Modeling Step 11	0:14:04
Segment 16	Building the Activity: Modeling Step 12	0:21:40
Segment 17	Building the Activity: Modeling Step 13	0:07:51
Segment 18	Building the Activity: Modeling Steps 14 and 15	0:14:52
Segment 19	Checkpoint Homework Assignment: Modeling the Alternative Branches	0:04:47
Segment 20	Simulating the Activity	0:39:33
Activity 10	**"Analyze system requirements: Capture critical system properties and constraints"**	**1:06:42**
Segment 1	Activity 10 Inputs and Outputs	0:04:05
Segment 2	Activity 10 DellMod Method Procedure	0:03:01
Segment 3	Modeling Performance Constraints on System Behavior	0:17:40
Segment 4	Modeling Probabilities Within System Behavior	0:09:21
Segment 5	Modeling Physical Constraints on System Structure	0:32:35
Activity 11	**"Analyze system requirements: Define system context"**	**1:11:12**
Segment 1	Activity 11 Inputs and Outputs	0:05:43
Segment 2	Activity 11 DellMod Method Procedure	0:02:35
Segment 3	Modeling Connections Between the System and its Actors	0:38:16
Segment 4	Modeling System Inputs and Outputs	0:24:38
Activity 12	**"Analyze system requirements: Specify black-box system requirements"**	**1:44:19**
Segment 1	Activity 12 Inputs and Outputs	0:05:06
Segment 2	Activity 12 DellMod Method Procedure	0:03:59

Segment 3	Thought Process for Deriving System Requirements	0:33:40
Segment 4	Importing System Requirements into Cameo Systems Modeler	0:28:39
Segment 5	Establishing Requirements Traceability	0:32:55
Activity 13	**"Analyze system requirements: Define system state machine"**	**2:00:57**
Segment 1	Activity 13 Inputs and Outputs	0:04:58
Segment 2	Activity 13 DellMod Method Procedure	0:04:06
Segment 3	Creating a State Machine to be the Classifier Behavior	0:10:35
Segment 4	Modeling a Transition with a Signal Event Trigger	0:21:53
Segment 5	Modeling a Compound Transition	0:18:11
Segment 6	Modeling a Transition with a Change Event Trigger	0:14:37
Segment 7	Modeling a Transition with a Call Event Trigger	0:29:39
Segment 8	Completing the State Machine Behavior	0:16:58
Activity 14	**"Define logical architecture: Define logical decomposition"**	**1:36:06**
Segment 1	Activity 14 Inputs and Outputs	0:04:07
Segment 2	Activity 14 DellMod Method Procedure	0:26:51
Segment 3	Brainstorming System Parts	0:36:43
Segment 4	Decomposing the System into Parts	0:28:25
Activity 15	**"Define logical architecture: Define interaction between logical components to realize each system action and operation"**	**1:08:33**
Segment 1	Activity 15 Inputs and Outputs	0:05:10
Segment 2	Activity 15 DellMod Method Procedure	0:16:47
Segment 3	Decomposing and Allocating Behaviors	0:25:48
Segment 4	Representing Multiple Usages of a Defined Behavior	0:20:48
Activity 16	**"Define logical architecture: Define system logical IBD"**	**3:25:23**
Segment 1	Activity 16 Inputs and Outputs	0:08:19
Segment 2	Activity 16 DellMod Method Procedure	0:03:39
Segment 3	Defining Types of Connections Between Actors and Components	0:43:26
Segment 4	Creating a Full Port to Represent a System Interface	0:33:13
Segment 5	Revising the System Context IBD to Display a System Interface	0:11:40
Segment 6	Specifying System Interface Features	0:28:46
Segment 7	Specifying Component Connections	0:41:12
Segment 8	Specifying Component Features	0:35:08