SE 5348 Systems Modeling & Simulation

Master of Science in Systems Engineering

Course Description

The use of models, simulations, and Model Base System Engineering (MBSE) to support lifecycle activities is covered. The course reviews essential characteristics for models, simulations, and MBSE as well as the relation among them. Some models for real-time systems such as Petri nets and State Transitions Diagrams are discussed in detail as well as tools that support its modeling and simulation. The course covers in detail the models included in the System Modeling Language (SysML) such as Use Case Diagram, Requirements Diagram, Sequence Diagram, Block Definition Diagram, Internal Block Diagram, and the Parametric Diagram. Students make use of tools to create models and execute simulations. Students also use a tool that supports both SysML models and the MBSE approach.

By the end of this course, participants will be able to:

1. Apply the concepts behind models, simulation, and MBSE
2. Apply different types of models and simulations to understand, define, verify and validate systems.
3. Discuss the support that MBSE brings to Systems Engineering
4. Analyze complex dynamic behavior of systems like concurrency, synchronization, and orthogonality.
5. Compare and contrast the models of the System Modeling Language
6. Examine and apply SysML Requirements Diagrams
7. Create formal specifications of dynamic behavior using Petri Net notation, State Charts, and State transition diagrams,
8. Create formal specifications of dynamic behavior using State charts and event and mode tables.
9. Create a system specification making use of the models in the System Modeling Language (SysML).
10. Apply tools to create models and simulations.
11. Define the structure of the system using IBD, IBD, Package, Constraint blocks and Parametric diagrams.

Contact Information	
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Personal enquiries should be done through e-mail messages. Course enquiries should be done through the course Discussion Board by creating a new thread.

Required Readings Material

You will need the following reading materials throughout this course:

- International Council on Systems Engineering. (2015). *INCOSE systems engineering handbook: A guide for system life cycle processes and activities.* Fourth edition. Eds. Forsberg, K. Roedler, G., Walden, D. et. al. Hoboken, NJ: Wiley. (please see the UTEP Library Guide for MSSE 5348 for instructions on creating an INCOSE account to download the handbook)
- Friedenthal, Sanford, et al. *A Practical Guide to SysML: The Systems Modeling Language*. Third ed., The MK/OMG Press.
- CMMI Product Team. (2010). *CMMI for development. Version 1.3*. CMMI Institute. CMMIInstitute.com. (available from the CMMI Institute's website)

Other readings are listed in the UTEP Library Guide for MSSE 5348. Please see the "Required Readings" section for readings assigned to each of the course modules.

Student Resources

Student resources include the course rubrics, instructions for collaborative work, and the links for the Library Guide, UTEP Bookstore, and UTEP technology support. The collaborative section includes the teams and its members for this course. The student resources section is located in the home page of this course.

Summary of Course Structure

Content is provided in seven modules that are released every two weeks. Each module will have a menu to guide participants through the content and identify discussion board postings and/or individual and group activities to be completed on Blackboard's course shell. The first module provides course overview and objectives, facilitates attendee's introductions, and discusses the structure of the ISO/IEC/IEEE Std. 15288. The seven modules for this course follows (see section 2 for a detailed description for each module):

#	Module Name
1	Modeling, Simulation, and Model-based Systems Engineering
2	Petri Nets
3	State Transitions Diagrams - Tools
4	SysML Intro & Requirement Diagrams
5	SysML Structure Diagrams
6	SysML Behavior Diagrams
7	SysML Models & Execution in IBM Rhapsody

Class Interaction and Communication

Being Successful Online

This section has some tips and trick about how to be successful online. Online learning is not a spectator sport. It is everyone's responsibility to participate as fully as they can so everyone can get the most from the experience. Here are some simple rules to follow to ensure your participation and engagement in the learning process:

1. Ask questions: If you don't know the answer, someone else will. The discussion board is the area for asking questions related to content OR any problems (related to the class) you are having. Make sure that you have clearly indicated the subject of your message.
2. Reach out to others: Offer a fact, article, link, or other item that can help others learn something you can share.
3. Be appropriate: The online classroom is not the place for insulting or insensitive comments, attacks, or venting. Inappropriate behavior can be subject to disciplinary action, as well.
4. Be diplomatic: When sending messages on emotionally charged topics, I recommend that you write the message and then walk away for at least an hour before re-reading the message and then sending it. Re-reading emotionally charged messages ensures that they are constructive instead of destructive. Think of the person at the other end.
5. Stay focused: Stay on topic to increase the efficiency of your learning.

Grading Criteria

The following scale is used for assigning letter grades.

A	[90 % and above]
B	[80 % - 89 %]
C	[70 % - 79%]
D	[60 % - 69 %]
F	[0 % - 59%]

Note that there will not be “rounding up” automatically. The instructor does reserve the right to lower the grade scale if it is deemed appropriate.

Point Distribution

	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Total
Readings and Lecture	0	0	0	0	0	0	0	**0**
Discussion	50	50	50	50	50	50	0	**300**
Individual Assignment	40	40	40	40	40	40	120	**360**
Group Assignment	40	40	40	40	40	40	0	**240**
Assessment	40	40	40	40	40	40	50	**290**
Team assessment & Instructor evaluation			√		√		√	**100**
Sub Total	170	170	170	170	170	170	170	
							Total	**1290**

CALENDAR (Spring 2018)	
Module 1 Modeling, Simulation, and Model-based Systems Engineering	Week 1: 01/16/2018
	Week 2: 01/22/2018
Module 2 Petri Nets	Week 3: 01/29/2018
	Week 4: 02/05/2018
Module 3 State Transitions Diagrams - Tools	Week 5: 02//12/2018
	Week 6: 02/19/2018
Module 4 SysML Intro & Requirements Diagrams	Week 7: 02/26/2018
	Week 8: 03/05/2018
Spring Break (No activities)	Week 9: 03/12/2018
Module 5 SysML Structure Diagrams	Week 9: 03//19/2018
	Week 10: 03/26/2018
Module 6 SysML Behavior Diagrams	Week 11: 04/02/2018
	Week 12: 04/09/2018
Module 7 SysML Models & Execution with IBM Rhapsody	Week 13: 04/16/2018
	Week 14: 04/23/2018

2. Detailed course description

Module 1: Modeling, Simulation, and Model-based Systems Engineering			
Activity	**Description**	**Due Date**	**Points**
***Week 1* Readings and Lesson Presentations**	▪ For CMMI for Development, Version 1.3 read: DAR SP 1.4, OPP SP 1.5, PI SP 1.1; VAL SP 1.1, VER SG 1, TS Introduction section ▪ For INCOSE Systems Engineering Handbook V4 read: Section 4.6 "Systems Analysis Process", Section 9.1 "Modeling and simulation" ▪ Kumar, Jagat. *Modeling and Simulation* - Unit one: "System Models and System Simulation" ▪ Modeling & Simulation.ppt	Wednesday,	0
Week 1 Module 1 Discussion 1	*Model Characteristics* Students shall evaluate the essential characteristics that comprise a "model" and prioritize them according to what they feel is their level of significance. List four (4) characteristics that comprise a model and a short summary to what that characteristic entails in that model. Prioritize the listing of all characteristics into the order of importance for models.	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 1 Module 1 Assignment 1	*Modeling & Simulation Tools* Students shall research tools that perform both modeling and simulation, select one, then provide detailed information on the purpose, content, and application of that tools model and simulations.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 1 Group Assignment 1	*Types of Models* Students shall research and evaluate different types of models and simulations that exist in engineering. List three types of models and three types of simulations used in engineering. Provide a detailed summary, circumstance of their use, and one advantage & disadvantage for each.	Sunday, 11:00 PM Mountain Time	20
***Week 2* Readings and Lesson Presentations**	▪ For INCOSE Systems Engineering Handbook V4 read: Section 9.2 "Model-Base	Wednesday,	0

	System Engineering", Section 9.3 "Functions- Based Systems Engineering Method", Section 9.4 "Object-Oriented Systems Engineering Method" ▪ Graignic, Pascat., et al, *Complex System Simulation: Proposition of a MBSE Framework for Design-Analysis Integration*, Procedia Computer Science 16 (2013) 59 – 68, Elsevier. Available through UTEP library ▪ Model-based Systems Engineering.ppt		
Week 2 Module 1 Discussion 2	*MBSE Characteristics* Students shall analyze & prioritize the various MBSE characteristics covered in this module. Students shall also research & evaluate other MBSE characteristics based upon the provided reading.	Initial reply due Wednesday, 11:00 PM Mountain Time Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 2 Module 1 Assignment 2	*Applying MBSE* Students shall analyze the use of MBSE by evaluating the application of MBSE characteristics to a project in the provided reading. Students shall provide reference to where the article's author mentions the MBSE characteristics covered in this module. Students shall also evaluate the reading for additional MBSE characteristics not mentioned in the module.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 1 Group Assignment 2	*Selecting MBSE Tools* Students shall investigate commercial tools for MBSE practices with SysML. Use of the Decision Analysis & Resolution process to evaluate six potential tools and aid in the selection of a single tool.	Sunday, 11:00 PM Mountain Time	20
Week 2 Module 1 Assessment: Test	*Module 1 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 2: Petri Nets

Activity	Description	Due Date	Points
Week 1 **Readings and Lesson Presentations**	▪ *Petri Nets for Dynamic Even-Driven System Modeling* by Jiacun Wang ▪ Petri Net Presentation.ppt	Wednesday,	0
Week 1 Module 2 Discussion 1	*Petri nets and Activity Diagrams* Activity diagrams were created after Petri nets and incorporated some of the elements from Petri nets. Specify if the semantics of the elements have been preserved in the activity diagrams	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 1 Module 2 Assignment 1	*Petri Net Execution* You are given a Petri net that was developed to model a lightning system with mutual synchronization. Using the provided Petri nets and place definitions on the template, create the step-by-step execution (firing) of the net by placing tokens in the subsequent places. Then, write the formal notation for the Petri net.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 2 Group Assignment 1	*Petri Nets - Warehouse* Develop a new Petri net based on the written requirements for the warehouse scenario. Create the step-by-step process, graphically, of how your Petri net shall fire by moving the tokens from the input places to the subsequent output places on the template. Write the formal notation for the updated Petri net.	Sunday, 11:00 PM Mountain Time	20
Week 2 **Readings and Lesson Presentations**	▪ *CMMI for Development*, V1.3 QPM ▪ Petri Net Advanced.ppt	Wednesday,	0
Week 2 Module 2 Discussion 2	*Advanced Petri nets & Property analysis* Construct and support an argument as to which of the Colored and Timed Petri nets has a broader application within the SE domain and support your argument. Also, evaluate and select a property analysis that you believe has a broader application within the SE domain and support your argument.	Initial reply due Wednesday, 11:00 PM Mountain Time Peer replies due Sunday, 11:00 PM Mountain Time	25

Week 2 Module 2 Assignment 2	*Petri net Tools* Using the Petri net tool *PIPE2.5*, model and simulate the provided Petri nets. Provide screenshots on the template and the separate .xml file of your work.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 2 Group Assignment 2	*Petri net Tool Analysis* For the models provided in the template, create the models using the tool *PIPE2.5*. Run the simulation and take a screen shot either as the simulation is running (the net is live) or after the simulation fell into a dead state. Paste the image into the template. Document the type of errors that are present within that particular Petri net. Propose a solution(s) that fixes the errors in the Petri net. Also, using the bus example from slides 13-15 of the Petri Net – Advanced presentation, develop a solution that you can create and simulate in *PIPE2.5* and verify that it is free of errors.	Sunday, 11:00 PM Mountain Time	20
Week 2 Module 2 Assessment: Test	*Module 2 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 3: State Transitions Diagrams - Tools

Activity	Description	Due Date	Points
***Week 1* Readings and Lesson Presentations**	▪ Heitmeyer, Constance. "Applying Practical Formal Methods to the Specification and Analysis of Security Properties." *Naval Research Laboratory*. ▪ Heitmeyer, Constance, et al. "Tools for constructing requirements specifications: The SCR toolset at the age of ten." *International Journal of Computer Systems Science and Engineering*, vol. 20, no. 1, 2005, pp. 19-35. ▪ Software Cost Reduction.ppt	Wednesday,	0

Week 1 Module 3 Discussion 1	*Software Cost Reduction Properties* The Software Cost Reduction tool contains the following four properties/capabilities: Semiformal specification translation, consistency & correctness checking, simulation, and source code generation. Prioritize the four items above from most important to least important, then provide support for your most important selection. Use the provided template.	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 1 Module 3 Assignment 1	*CCS SCR Tables to STD* SCR specification tables and content dictionaries for a Cruise Control System on an automobile are provided in the template. Translate the tables into a state transition diagram (STD). Use Tables 1, 3 and 5 to start developing the states and transitions of your STD, while using Tables 2, 4, and 6 (the dictionaries) to help define the variables and constants in your diagram. Recall that for a state transition diagram, you will need: i) the states, ii) transitions between states, and iii) the event [condition]/action for each transition. Use the template provided.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 3 Group Assignment 1	*Creating SCR Tables* Develop the specifications necessary for operating a standard elevator. It must be capable of: movement, responding to call buttons, and emergency stops. Create a state transition diagram (STD) to verify and validate your specifications. Translate your specifications into the four SCR Tables: a. Mode class table b. Event table c. Conditions table d. Variable Dictionary table Use the provided template.	Sunday, 11:00 PM Mountain Time	20
***Week 2* Readings and Lesson Presentations**	▪ Stateflow Presentation.ppt ▪ Introduction to Simulink and Stateflow.mp4 ▪ Introduction to Stateflow.mp4	Wednesday,	0
Week 2 Module 3 Discussion 2	*SCR & Stateflow Comparison* Stateflow and the SCR method both provide the capability to verify and validate models. Determine what SCR capabilities are also included in Stateflow and how. Then identify and discuss what benefits	Initial reply due Wednesday, 11:00 PM Mountain Time Peer replies due Sunday,	25

	you think Stateflow has over SCR. Use the provided template.	11:00 PM Mountain Time	
Week 2 Module 3 Assignment 2	*Stateflow Traffic Light* In this assignment, you shall use Stateflow to modify a model's state transition diagram (STD) for a Traffic Light system and verify those modifications through simulation. The system shall have the additional capability of changing the light to green if an emergency vehicle is in the lane. Open the model within MATLAB modify the diagrams to add in the ability of a light to change to green if an emergency vehicle is present in the lane. Type out your assumptions and the intended modifications for the Traffic Light system within the provided template. Run the simulation to detect any errors. Reiterate modifications until the simulation can run without any errors.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 3 Group Assignment 2	*Using a Tool for Quantitative Analysis* You are provided with a Stateflow diagram for a home security system (HSS). Modify it to include the capability for a user to login with a password to turn it on and have a 30 second window to turn it off with a password when entering the house. Validate your solution and verify through simulation that it is free of errors.	Sunday, 11:00 PM Mountain Time	20
Week 2 Module 3 Assessment: Test	*Module 3 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 4: SysML Intro & Requirements Diagrams

Activity	Description	Due Date	Points
***Week 1* Readings and Lesson Presentations**	▪ INCOSE Handbook, v4.0, section 9.1.9 ▪ Hause, Matthew, et al. "*Testing Solutions through SysML/UML.*" INCOSE, 2009.	Wednesday,	0

	▪ L. Li, N. Wang, L. Ma and Q. Yang, "*Modeling method of military aircraft support process based SysML*," The Proceedings of 2011 9th International Conference on Reliability, Maintainability and Safety, Guiyang, 2011, pp. 1247-1251. doi: 10.1109/ICRMS.2011.5979460 ▪ Systems Modeling Language (SysML).ppt		
Week 1 Module 4 Discussion 1	*Modeling Languages* Students shall evaluate the similarities and difference between the Unified Modeling Language (UML) and the Systems Modeling Language (SysML) in order to infer the rationale behind the creation of SysML for systems engineers.	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 1 Module 4 Assignment 1	*SysML Diagrams of Best Fit* Students shall apply knowledge of the intended purpose of SysML diagrams and the applicable concepts in which they can each represent.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 4 Group Assignment 1	*Using SysML Diagrams* Students shall apply knowledge of the individual diagrams within SysML and the information that each diagram is intended to be provided from the systems engineer to the rest of the development team. Provide guidelines to the use of each of the SysML diagrams that you have covered in the module in the table provided in the template.	Sunday, 11:00 PM Mountain Time	20
***Week 2* Readings and Lesson Presentations**	▪ Dos Santos Soares, Michel, and Jos Vrancken. "*Model-Driven User Requirements Specification using SysML*." Journal of Software, vol. 3, no. 6, June 2008, pp. 57-68, doi:10.1.1.523.5486. Accessed 31 Aug. 2017. ▪ SysML Requirement Diagram.ppt	Wednesday,	0
Week 2 Module 4 Discussion 2	*Guidelines for Requirement Diagram Relationships*	Initial reply due Wednesday,	25

	Students shall create guidelines for the use of the requirements relationships between requirements and other elements in SysML requirements diagrams.	11:00 PM Mountain Time Peer replies due Sunday, 11:00 PM Mountain Time	
Week 2 Module 4 Assignment 2	*Identifying Requirements Relationships* It is not only important to know the syntax and semantics of a diagram, but also its application. Students shall use their knowledge to identify the types of relationships that are missing between elements in a provided requirements diagram.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 4 Group Assignment 2	*Creating a Requirements Diagram for your system* Developing abstract models takes a keen mindset and practice. Students shall make use of a previous systems in creating a requirement diagram for that system.	Sunday, 11:00 PM Mountain Time	20
Week 2 Module 4 Assessment: Test	*Module 4 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 5: SysML Structure Diagrams

Activity	Description	Due Date	Points
***Week 1* Readings and Lesson Presentations**	▪ From *A Practical Guide to SysML:* Ch 7: Modeling Structure with Blocks pgs 115 – 176 ▪ M5_Structure Diag_BDD & IBD	Wednesday,	0
Week 1 Module 5 Discussion 1	*Build an IBD from a BDD* First, write a guideline to create an Internal Block Diagram (IBD) from a Block Definition Diagram (BDD). The guideline shall list the steps to be followed. Second, write a verification checklist with at least five criteria to assure that *BDD* and *IBD* are consistent	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25

Week 1 Module 5 Assignment 1	*Modeling System Scope* You should develop a Block Definition Diagram (BDD) and an Internal Block Diagram (IBD) for the Candy Machine system.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 5 Group Assignment 1	*Defining Sys Scope BDD & IBD* Find a manual or technical description for a washing mashing, dishwasher, or similar device and identify main components followed by creating a BDD, IBD, and consistency review.	Sunday, 11:00 PM Mountain Time	20
***Week 2* Readings and Lesson Presentations**	▪ From *A Practical Guide to SysML*: Ch 6: Organizing the Model with Packages (pgs 101 – 113) Ch 8: Modeling Constraints with Parametrics (pgs 185 – 202) ▪ M5_Parametric and Package Diag	Wednesday,	0
Week 2 Module 5 Discussion 2	*Build Parametric from Class diag.* First, write a guideline to create a parametric diagram from a class diagram with constraint blocks. The guideline shall list the steps to be followed. Second, write a verification checklist with at least five criteria to assure that the *Class diagram* and the *Parametric diagram* are consistent.	Initial reply due Wednesday, 11:00 PM Mountain Time Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 2 Module 5 Assignment 2	*Parametric Diagram* Using the Candy vending machine from Module 5 Week 1, create a class diagram with constraint blocks and then define the parametric diagram.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 5 Group Assignment 2	*Package & Parametric Diagram* Create a class diagram with constraint blocks (system formulas and their parameters); create the parametric diagram; and create a package diagram.	Sunday, 11:00 PM Mountain Time	20
Week 2 Module 5 Assessment: Test	*Module 5 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 6: SysML Behavior Diagrams

Activity	Description	Due Date	Points
***Week 1* Readings and Lesson Presentations**	▪ From *A Practical Guide to SysML (Third Edition):* ▪ Ch 12: Sections 12.1 – 12.5.2 (pg. 295 – 302) ▪ Ch 10: Sections 10.1 – 10.6 (pg. 247 – 260) ▪ Use Case and Sequence Diagrams.ppt	Wednesday,	0
Week 1 Module 6 Discussion 1	*Use Cases & Sequence Diagrams* As system engineer, you shall have a good understanding of both a) the intended use (purpose) of the model and b) the semantics and syntax of the model. Based on the system's context and the circumstances, you shall decide what model is more appropriate. In this discussion, you will compare and contrast four modeling tools for defining system scope and system components interactions.	Initial reply due Wednesday, 11:00 PM Mountain Time. Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 1 Module 6 Assignment 1	*Registering for a course in UTEP Online MSSE* In modeling the dynamic aspects of a system, it is important to understand the different behaviors that a system can take. One way to understand the different behaviors of a system is to analyze the different scenarios to deliver system services; that is, the sequence of interactions between actors and system components that take place while delivering a system service (use case). In this assignment, you will create a scenario of registering for a course in the Online MSSE at UTEP and its visual representation using a sequence diagram.	Thursday, 11:00 PM Mountain Time	20
Week 1 Module 6 Group Assignment 1	*Applying SysML to your project* The intended services that a System of Interest (SOI) provides to actors and the behaviors that the SOI performs while delivering that service should be understood by people developing the SOI. In this assignment, you should create a use case diagram and a sequence diagram for a system that you have reviewed in in a previous assignment in this course.	Sunday, 11:00 PM Mountain Time	20

***Week 2* Readings and Lesson Presentations**	▪ *A Practical Guide to SysML (Third Edition):* ▪ Ch 12: Sections 9.1 – 9.5 (pg. 205 – 215) ▪ Ch 11: Sections 11.1 – 11.6.3 (pg. 273 – 287) ▪ Skip Section 11.4.2 (pg. 279 – 282) (**Do not read**) ▪ Ch 16: Sections 16.4.3 – 16.4.4 (pg. 394 – 400) ▪ Ch 16: Section 16.7.4 with focus on Fig. 16.30 ▪ Activity & State Machine Diagrams.ppt	Wednesday,	0
Week 2 Module 6 Discussion 2	*Behavior Elements in SysML* Systems engineers have four SysML diagrams available for modeling the behavior of a system. These diagrams are: the Use case diagram (uc), Sequence diagram (sd), Activity diagram (act), and State Machine diagram (stm). In this discussion, you shall analyze and identify the applications of the behavioral diagrams in SysML.	Initial reply due Wednesday, 11:00 PM Mountain Time Peer replies due Sunday, 11:00 PM Mountain Time	25
Week 2 Module 6 Assignment 2	*Modeling the Human Body* Behavioral analysis can be very useful in describing the states that a system can exist within as well as the events that causes changes between those states. These can be visually represented by a state machine diagram in SysML. In this assignment, you shall analyze the states that exist within the human body and the event-driven responses that can occur within the body and create a state machine diagram.	Thursday, 11:00 PM Mountain Time	20
Week 2 Module 6 Group Assignment 2	*Applying SysML to your Projects* In modeling the behavior of a system-of-interest, it is important to fully understand a scenario involved in providing a service, as this is the entire reason to a system's existence. Activity diagrams shall now be used to depict the flow of the activities between actors and the system, modeling synchronization and concurrency of activities. State machine diagrams shall model the activities performed within different event-driven modes that a system can exhibit in response to different stimuli.	Sunday, 11:00 PM Mountain Time	20

	In this assignment, you and your group shall continue to analyze and depict the behavior of two systems-of-interest from previous assignments in order to create an Activity diagram and State Machine diagram.		
Week 2 Module 6 Assessment: Test	*Module 6 Quiz* This test covers readings, discussions, assignments, group assignments, and presentations in the module. The test contains 10 questions with a 30-minute time limit.	Sunday, 11:00 PM Mountain Time	40
		Total	**170**

Module 7: SysML Models & Execution with IBM Rhapsody

Activity	Description	Due Date	Points
***Week 1* Readings and Lesson Presentations**	▪ QQ001 – IBM Rhapsody Tool.pdf ▪ QQ001 – IBM SysML Overview.pdf ▪ Student Workbook (Lab Manual) pgs 5 - 75	Wednesday,	0
Week 1 Module 7 Assignment 1	*IBM Rhapsody Tool 1* In this assignment, you will make use of Rational Rhapsody to complete various labs provided to you on Blackboard. These labs will include items such as creating a new project, importing requirements, and modeling use cases, activities, and structure.	Thursday, 11:00 PM Mountain Time	20
***Week 2* Readings and Lesson Presentations**	▪ QQ001 – IBM Rhapsody Tool.pdf ▪ QQ001 – IBM SysML Overview.pdf ▪ Student Workbook (Lab Manual) pgs 77 – 142	Wednesday,	0
Week 2 Module 7 Assignment 2	*IBM Rhapsody Tool 2* In this assignment, you will continue using Rational Rhapsody to complete various labs provided to you on Blackboard. These labs will include items such as modeling sequence and states, and executing model	Thursday, 11:00 PM Mountain Time	20

	checking and simulations of created SysML models.		
		Total	**170**

3. Student Participation

Students bring a wealth of knowledge and experience to this course from their respective fields; however, students' knowledge and technological expertise vary. The course is designed to be an enjoyable learning experience for everyone, with support for every participant. This course will immerse students into a community of practice so that students can develop skills and knowledge that facilitate their professional development.

Students are expected to complete all weekly content and to participate actively and respectfully on discussion boards, chats, and blogs, as well as synchronous or asynchronous collaboration tools where the main course concepts are discussed and class projects are developed. Furthermore, students should finish quizzes and deliver complete quality assignments and projects on time.

The following policies will be enforced:

1. Students must complete all discussion boards assigned for each week to receive a weekly participation grade.
2. Students who miss two major assignments will be dropped from the course.
3. Students who have little or no activity in the course will be dropped.

4. Assessing Student Learning

This course uses several different methods to access student learning. A description of each method follows:

Peer Review: In a peer review, students can get the feedback they need to become more successful in a less stressful situation. For peer review to be successful, the instructor will provide clear guidelines and/or questions to be answered by the student reviewers.

Self-Reflection/Self-Evaluation: Reflection and self-evaluation develop metacognitive thinking. By engaging in self-review, students can carry their learning into other parts of their lives and take more responsibility for their own learning. Although not all students take self-evaluation seriously, those who do will benefit greatly from it.

Group Problem Solving: When students work together to solve a problem or complete a project, they learn from each other and expand learning for all. Student-to-student interaction is increased, which in turn increases student learning and assignment completion. The group problem includes group-member evaluation so that students can peer-evaluate each other's work. Also in place are a team/group charter and procedures for when disagreements happen within the group; these ground rules make for a much smoother and more effective group experience for all. For this class, consider the following example:

> *Team structure:* There is a team leader and the following role managers: Planning, Customer Interface, Design, Implementation, Quality, and Process. The team leader resolves any technical

problems. Personal problems are first handled by the team leader and escalated to the instructor if necessary. Each role manager has the authority to assign tasks, review status, and resolve issues within his or her technical scope.

Quizzes: Moodle supports many different types of quizzes and several types of questions (such as multiple-choice, true/false, matching, short-answer, and essay).

Rubrics: Rubrics are an objective way of assessing work. They provide clear criteria that can be shared with students so that they know how they will be graded. The criteria used for each assignment will be indicated as part of the assignment.

5. Course Rules and Policies

Ground Rules for Discussion Board Participation

You should write at least 100 words in your discussion posting in response to the provided guided questions. You should also reply (at least with 50 words for each response) to the entries of at least two of your classmates for each assigned discussion (unless noted otherwise). Refer to the discussion board and course content for further details on each assignment.

Remember your place: A Web-based classroom is still a classroom, and comments that would be inappropriate in a regular classroom are likely to be inappropriate in a Web-based course as well.

This is permanent: Think carefully about the content of your message before contributing it. Once sent to the group, there is no taking it back. Members of the class and the instructor will be reading any postings.

Respect your fellow students and instructor. Respect and courtesy must be provided to classmates and to instructor at all times. Do not use inappropriate language, all capital letters, or language short cuts. No harassment, flaming, or inappropriate postings will be tolerated.

Giving feedback professionally: Write constructive feedback by addressing the idea, not the person. People may have different points, positions and believes in the aspects being discussed. The discussion must be limited to the aspects/ideas only. Personal attacks are not tolerated. When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face to face situation.

Be forgiving: If someone states something that you find offensive, mention this directly to the instructor. Remember that the person contributing to the discussion is also new to this form of communication. What you find offensive may quite possibly have been unintended and can best be cleared up by the instructor.

Language: Given the absence of face-to-face clues, written text can easily be misinterpreted. Avoid the use of strong or offensive language and the excessive use of exclamation points. If you feel particularly strongly about a point, it may be best to write it first as a draft and then to review it, before posting it, in order to remove any strong language.

Test for clarity: Messages may often appear perfectly clear to you as you compose them, but turn out to be perfectly obtuse to your reader. One way to test for clarity is to read your message aloud to see if it flows smoothly. If you can read it to another person before posting it, even better.

Submit quality work. Online entries should be written in Standard Writing English with edited spelling, grammar, and punctuation. Although the grammar and spelling of a message typically are not graded, they do reflect on you, and your audience might not be able to decode misspelled words or poorly constructed sentences. It is a good practice to compose and check your comments in a word-processor before posting them.

Follow the parameters / Stick to the point: Follow the posting requirements and parameters set up by your professor. Contributions to a discussion should have a clear subject header, and you need to stick to the subject. Don't waste others' time by going off on irrelevant tangents.

Read first, Write later: Don't add your comments to a discussion before reading the comments of other students unless the assignment specifically asks you to. Ignoring your fellow students is rude. Avoid repetition of what someone else has already said. Add something new to the discussion. Comments related to the content of previous messages should be posted under them to keep related topics organized, and you should specify the person and the particular point you are following up on.

Quality posts get credit: There is no credit for yes/no answers. Posts should justify positions and provide specific examples. Students must demonstrate that they have read the assignment and their classmates' comments carefully and thoughtfully.

Meet the deadline: Be sure to post in a timely fashion to receive credit for attendance and for the discussion. Pay close attention to the posted deadlines. The deadline for postings is 11:59:00 p.m. MST every Thursday. Replies to colleagues are due by 11:59 p.m. every Saturday.

Academic Dishonesty

Academic dishonesty is prohibited and is considered a violation of the *UTEP Handbook of Operating Procedures*. It includes, but is not limited to, cheating, plagiarism, collusion, and fabrication.

1. Cheating can involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports.
2. Plagiarism occurs when someone intentionally or knowingly represents another person’s words or ideas as his or her own.
3. Collusion involves unauthorized collaboration with another person or group to commit any academically dishonest act.
4. Fabrication occurs when false information is included on a works-cited page.

Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Office of Student Conduct and Conflict Resolution for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions. You can find more information in the *UTEP Handbook of Operating Procedures*, under the heading “” and in the Regents’ Rules and Regulations.

Policy on Copyright and Fair Use

The University requires all members of its community to follow copyright and fair-use requirements. Students are individually and solely responsible for violations of copyright and fair-use laws. The University will neither protect nor defend students and will not assume any responsibility for students who violate fair-use laws. Violations of copyright laws can result in federal and state civil penalties and criminal liability, as well as disciplinary action under University policies.

Other References

UTEP Handbook of Operating Procedures @ http://admin.utep.edu/Default.aspx?alias=admin.utep.edu/hoop

UTEP Office of Student Life @ http://sa.utep.edu/studentlife/#student-conduct

UTEP Office of Institutional Compliance @ http://admin.utep.edu/Default.aspx?alias=admin.utep.edu/hoop

UT Regents' Rules and Regulations @ http://www.utsystem.edu/bor/rules/#A6

Disability Statement

If you have a disability and need classroom accommodations, please contact the Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit the office located in UTEP Union East, Room 106.

For additional information, please visit the CASS website at www.sa.utep.edu/cass.

6. Software Requirements

You will need the following software on your computers to efficiently work in this course. In some cases, your computer may already have some of these programs installed.

1. Adobe Acrobat Reader. You can get the program by going to http://www.adobe.com/ and then clicking on the icon on the center of the screen which says 'Get Adobe Reader'? Follow instructions to install the reader.
2. Adobe Flash Player. You can get the player by going to http://www.adobe.com/ and then clicking on 'Get Adobe Flash Player?'. Follow instructions to install the player.
3. Apple QuickTime Player. You can get this player by going to http://www.apple.com/ . Once there, click on the 'Downloads'? tab on the top of the page and then click on QuickTime 'Download'? and follow instructions.
4. Microsoft Office. I recommend buying this if you do not have any word processing software or presentation software. As students, you can generally buy this whole package for about $25, far less than the store price of approximately $400.
5. Email tool with file attachment capability. Please use your UTEP email account.
    a. If you do not have a UTEP e-mail account, please get one immediately. Here is how:
        i. Go to https://newaccount.utep.edu/.
        ii. Create your account (remember that your date of birth is in the form mm/dd/yyyy: two digits for the month and day, and four digits for the year).
        iii. After you create your account, you must wait 48 hours, then go back to the site and click on "Check on existing account." Enter your UTEP Student ID Number (e.g. 80XXXXXX) and date of birth, and you will get your login name and password. Please let one of us know if you have any difficulty. You may also call the UTEP HELP desk at (915) 747 - 5257.
        iv. The HELP desk hours are given below:
        Mon-Fri 7:00am - 8:00pm (Mountain Time)
        SAT 9:00am - 1:00pm (Mountain Time)
        SUN CLOSED

7. Equipment Requirements

You ***need a personal computer*** with administrative privileges so that you may take the quizzes at the end of the modules. In addition, you need to install Respondus Lockdown Browser. You will also install other software applications that requires administration privileges. Not being able to use a work computer to take the quizzes or to install software applications is not an excuse to not submit work.

8. Glossary

Cyber-Harassment, or the use of a computer to cause a person harm such as anxiety, distress or psychological harm, including abusive, threatening or hateful emails and messages and the posting of derogatory information online.

Cyberbullying, or intimidating messages sent directly to the victim via email or other Internet communication mediums, and/or the use of technological means to interfere with a victim's use of the Internet such as hacking or denial of services attacks. This can also include spreading rumors about the victim in internet forums or discussion boards; subscribing the victim to unwanted online services or sending messages to others in the victim's name.

Cyberstalking, or threatening behavior or unwanted advances directed at another using the Internet and other forms of online and computer communications. With personal information becoming readily available to an increasing number of people through the Internet and other advanced technology, state legislators are addressing the problem of stalkers who harass and threaten their victims over the World Wide Web.

Flaming, or hostile and insulting interaction between internet users. It is frequently the result of the discussion of heated real-world issues such as politics, religion, and philosophy, or of issues that polarize subpopulations, but can also be provoked by seemingly trivial differences. **Deliberate flaming**, as opposed to flaming as a result of emotional discussions, is carried out by individuals who are specifically motivated to incite flaming. Usually, are subtler than their counterparts, or trolls, who also post inflammatory messages in an online community. Their primary intent is to provoke readers into an emotional response and disrupt normal, on-topic, discussion.

Plagiarism, or the presentation of another person's work as your own, whether you mean to or not (i.e. copying parts of or whole papers off the Internet).

Collusion, or lending work to another person to submit as his or her own.

Fabrication, or deliberately creating false information on a works cited page.