

Spring 2024

Instructor: Sergio Luna, Ph.D.

Course Schedule: Wednesday (6:00 pm – 8:50 pm MST)

Location: Physical Science Building 222A

Contact Information: salunafong@utep.edu

Office Hours: Thursday 3:00 pm - 4:30 p.m. MST or by appointment

COURSE DESCRIPTION

This course provides a formal introduction to model-based systems engineering. The course reviews the need for systems engineering and its evolution to model-based systems engineering. In this course, students develop holistic thinking by characterizing a system across its lifecycle, dissecting lifecycle models, and describing a system through digital models. Additionally, students will get hands-on experience in No Magic System of Systems Architect by implementing Systems Modeling Language (SysML) concepts and models. The course is designed for all graduate students pursuing graduate certificates and degrees in an engineering discipline.

No (proficient) programming experience is required.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to:

- **Understand** the need, methods, and processes of model-based systems engineering
- **Implement Systems Modeling Language for model and architectural development**
- Dissect proper system requirements for need traceability
- Communicate effectively in teams

COURSE FORMAT AND STRUCTURE

- Our weeks will run from Wednesday to Tuesday. I will post information (online activities, discussion starters, etc.) in Blackboard for the upcoming week by Tuesday evening so you can begin the new week when you log in on Wednesday.
 - Course Web Address:
- Virtual office hours will be held Thursday from 3:00 p.m. - 4:30 p.m. MST or by appointment. Please email me at salunafong@utep.edu to schedule a meeting.
- Assignments are due by 11:59 p.m. MST on the due date listed in the course schedule. **Late submissions will be accepted up to 24 hours after the due date. However, 50% of the maximum will be deducted from the assignment score. No assignments will be accepted after 24 hours from the due date.**

- An assignment file should be appended with the respective assignment number, your Last Name, and your First Name, such as “assignment1_LastName_FirstName.pdf”. This makes it easier to manage assignment files when downloading to my computer.

TENTATIVE COURSE SCHEDULE

The schedule below is subject to change. If, for any reason, I am required to make any amendments, I will inform you via Blackboard, email, and MS Teams.

Assignments are due by 11:59 p.m. MST on the day specified in the “Assignment” column seen below.

Tentative Schedule

Week 01	Jan 16 th – 22 nd , 2024	Review of Systems Engineering Install No Magic Cameo
Week 02	Jan 23 rd – 29 th	Creating Requirements Modeling Requirements
Week 03	Jan 30 th – Feb 5 th	Define Stakeholder Need, Context and Boundary
Week 04	Feb 6 th – 12 th	SYSML and MBSE
Week 05	Feb 13 th – 19 th	System Behaviors Diagrams I
Week 06	Feb 20 th – 26 th	System Behaviors Diagrams II
Week 07	Feb 27 th – March 4 th	System Behaviors Diagrams III Mistern Project
Week 08	March 5 th – 11 th	Physical Architecture I
Week 09	March 12th – 18th	Spring Break – Midterm Project
Week 10	March 19 th – 25 th	Physical Architecture II
Week 11	March 26 th – April 1 st	Verification
Week 12	April 2 nd – 8 th	Validation
Week 13	April 9 th – 15 th	Reporting
Week 14	April 16 th – 22 nd	Configuration Management
Week 15	April 28th	Final Project

COURSE MATERIALS

- Friedenthal, Sanford, et al. A Practical Guide to SysML: The Systems Modeling Language. Third ed., The MK/OMG Press. Klöpffer, W., and Grahl B. (2014). Life Cycle Assessment (LCA). Ed. Wiley.
- International Council on Systems Engineering. (2023). *INCOSE systems engineering handbook: A guide for system life cycle processes and activities*. Fifth edition. Eds. Forsberg, K. Roedler, G., Walden, D. et. al. Hoboken, NJ: Wiley.
 - (please see the [UTEP Library Guide for MSSE 5345](#) for instructions on creating an INCOSE account to download the handbook)
- BKCase. (2015). *Guide to the systems engineering body of knowledge (SEBoK)*. SEBoK Wiki. SeBokWiki.org. Version 1.4 (available from the [SEBoK website](#))
- **Attendance:** Attendance is not mandatory but recommended.

As you move through the topics in each module, you will be asked to read, listen to, and watch various media rather than simply viewing lecture content. You will also be regularly prompted to evaluate your knowledge as you build it actively.

The components in each module are designed to be completed sequentially in order. In addition to videos, readings, and interactives, we want to bring your attention to a few learning activities you'll encounter.

- **Live Sessions:** Live sessions are scheduled in each module. You will work with your classmates in some sessions to solve a problem. In others, you will work through hands-on virtual labs to help you complete your lab assignments.
- **Homeworks:** To help reinforce the material covered in the module, homework exercises will be assigned each week, which will involve formulating and solving a small but practically relevant homework problem.
- **Quizzes:** These graded quizzes evaluate your mastery of concepts shortly after they are introduced. You are expected to complete these checks (and your doing so will contribute to your overall participation grade).
- **Midterm Project:** The midterm project reviews foundational concepts in model-based systems engineering and the implementation of SysML Models
- **Final Project:** The final project captures the knowledge and skills acquired during the semester. It evaluates students' approaches when a system architecture is No Magic Cameo.

GRADING PROCEDURES

Grades will be based on the following weights:

Assignment	Percentage of Final Grade
Homework assignments	30%
Mid-term project	30%
Final project	30%
Quizzes	10%

The final grading rubric will be as follows:

A	90 - 100
B	80-89
C	70 - 79
D	60 – 69
F	< 60

TECHNOLOGY REQUIREMENTS

Required Software:

- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint
- No Magic System of Systems

LEARNING ACCOMMODATIONS

The Center for Accommodations and Support Services (CASS) aspires to provide students with disabilities with accommodations and support services to help them pursue their academic, graduation, and career goals. For more information concerning services for students with disabilities, please get in touch with the Center for Accommodations and Support Services at <https://www.utep.edu/student-affairs/cass/>

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, we must create an educational environment of inclusion and mutual respect. This consists of the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. Please inform the instructor of the necessary changes if the class roster does not match your name and pronouns.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.