SE 5345
Systems Engineering

"Systems Engineering Practicum"

Spring 2022

Instructor: Sergio Luna, Ph.D.

Course Web Address: https://blackboardlearn.utep.edu/ultra/courses/_150503_1/cl/outline
Course Schedule: Monday to Sunday, assignments due Sunday at 11:59pm MST.
Contact Information: salunafong@utep.edu
Virtual Office Hours: Wednesday 3:00 p.m. - 5:30 p.m. MST or by appointment.
Virtual session **Wednesday at 6:00pm MST**

Virtual session URL: https://utep-edu.zoom.us/j/84916202984?pwd=c1FaVWg2MHFvNmZLSm9xZlZ1ZlBIQT09

We will be reviewing and clarifying concepts. **This course is online; thus, participation is not mandatory nor penalized.**

Course Description

The Systems Engineering Project Practicum course provides to students the opportunity to apply Systems Engineering principles, methodologies, and processes in real customer projects. The class is project based and students are members of self-directed teams where they develop soft skills to manage system development and customer participation. Students play the role of systems engineering consulting experts who manage the implementation of engineering principles to understand multiple phases of the system development lifecycle such as customer needs, system requirements, proposed system solutions, implementation, maintenance, among others. To manage the evolution of the course project, teams generate systems engineering documents including problem definition, stakeholder requirements, system requirements, system engineering project management plan, design, and test plans. To contribute to the body of knowledge while developing technical SE competencies, teams develop a conference-level manuscript where they discuss the stakeholder's problem, the proposed approach, implementation, and results.

Student Learning Outcomes

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

- Understand, critically derive, and apply systems engineering principles to approach stakeholder's needs while proposing and developing a systems approach that address the need.
    - The students will be able to use systems thinking to derive, develop a system that addresses a real-life need.
- Develop public speaking and project management experience by creating a systems engineering management plan (SEMP), a conference-level manuscript, and a team presentation to disseminating the key insights to technical and non-technical audiences.

    - Students will develop 3 major projects that will need to be managed in collaboration with team members. Text artifacts and oral presentation skills are being practiced and evaluated.

Course Format and Structure

- Our weeks will run from Monday to Sunday. I will post information (online activities, discussion starters, etc.) in Blackboard for the upcoming week by Sunday evening, so that when you log in on Monday, you can begin the new week.
    - Course Web Address:
    - Virtual session URL:

- Virtual office hours will be held Wednesday 3:00 p.m. - 5:30 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 24 hours after the due date. However, a 50% of the maximum will be deducted from the assignment score. **No assignments will be accepted after 24 hours from the due date.**

TENTATIVE COURSE SCHEDULE

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

Tentative Schedule

Module	Date	Topic(s)	Assignment
Week 01	Jan 18thth – 24th, 2022	Introductions and dynamics	**Activity #1 deadline: 1/24th, Syllabus, dynamics and introduction.**
Week 02	Jan 25th – 31st, 2022	Systems Engineering	**Activity#2 deadline 1/31st: Article critical review**
Week 03	Feb 1st – 7th, 2022	Development Lifecycles	**Quiz#1: Week 2 and 3 – deadline: 2/7th**
Week 04	Feb 8th – 14th, 2022	Understanding Stakeholders	**Activity#3 deadline 2/14th: Project presentation - introductions**
Week 05	Feb 15th – 21st, 2022	Review Requirements	
Week 06	Feb 22nd –28th, 2022	Design Definition and Architecture Development	**Quiz#2: Week 5 and 6 – deadline: 2/28th**
Week 07	March 1st – 7th, 2022	Allocating Functions to components	**Activity# 4 deadline 3/7th: Project presentation – progress I**
Week 08	March 8th – 14th, 2022	SYSML 1	**Release midterm project**
Week 09	**March 15th – 21st, 2022**	SYSML 2	**Quiz #3: Week 8 and 9, deadline: 3/21st**
Week 10	March 22nd – April 4th, 2022	**Review: Project Update**	**Midterm SEMP UPDATE, deadline: 4/4th Progress II**
Week 11	April 5th – 11th, 2022	Implementation, Integration, & Transition, Interface Analysis	
Week 12	April 12th – 18th, 2022	Verification, Validation, Quality, Test	**Quiz #4: Week 11 and 12, deadline: 4/18th**
Week 13	April 19th – 25th, 2022	Specialty Engineering Decision Analysis and Value Functions	**Activity# 5 deadline: 2/28st - Project presentation – progress III**
Week 14	April 26th – May 2nd, 2022	Operation, Maintenance, Disposal	**Quiz #5: Week 13 and 14th, deadline: 5/2nd**
Week 15	**May 3rd – May 9th, 2022**	**Project review**	**SEMP Final Manuscript and Presentation – deadline 5/9th**

Course Materials

Primarily, you will be searching for authoritative sources, to support the conference-level manuscript.

Example of authoritative sources:

- IEEE Journals
- INCOSE Symposium
- Institute of Industrial and Systems Engineers
- CSER (Conference on Systems Engineering Research Center)
- American Society Mechanical Engineers
- American Institute of Aeronautics Astronautics
- Conference proceedings, journal articles, news articles, government documents, among others.

You may 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 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)

Course Requirements

- **Attendance:** Attendance is not mandatory but recommended.
- **Assignments:**
  - A weekly quiz based on INCOSE Handbook chapter. Please see calendar to discuss relevant chapter
  - SEMP updates. Complete the respective section
- **Project(s):** 1 Final Project will be assigned.
  - Conference-level manuscript indicating contribution and implementation of systems engineering perspective to support the described need.

Grading Procedures

Grades will be based on the following weights:

Quizzes	15%
Activities	30%
Midterm Report	25%
Final Report	25%
Final Presentation	5%

Final grading rubric will be as followed:

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

Technology Requirements

Required Software:

- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

Optional

- Cameo Systems Modeler
- MS Visio
- IBM Rational Rhapsody

Learning Accommodations

The Center for Accommodations and Support Services (CASS) aspires to provide students with disabilities, accommodations and support services to help them pursue their academic, graduation, and career goals. For more information concerning services for students with disabilities, please contact 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, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

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