SIME 5460/6460 - ME EN 5166/6166
Model-Based Systems Engineering

Professor: Yongzhi Qu
Office: MEK 1343
Email: yongzhi.qu@utah.edu
Phone: (801) 581-3517
Class Time: Tu & Thr 9:10 – 10:30 am
Class Location: AEB 360

Web: https://utah.instructure.com/courses/921869

Remote access and join online for real time zoom

https://utah.zoom.us/j/93043130611
Meeting ID: 930 4313 0611
Passcode: 414106

Office Hours: Monday 2 – 3pm
                        Tuesday 1 – 3pm

TA : Wahid Rahman

Email: u1496525@utah.edu

TA's office hours
Tuesday: 10:40 – 12:40
Thursday: 1 – 3 pm
Location : MEK 2nd floor, Study room 1

Or email appointment request over Zoom.

Prerequisite:
ME 5160 or ME 6160

Textbook:

Friedenthal, S., Moore, A., & Steiner, R. (2014). *A practical guide to SysML: the systems modeling language*. (Third Edition) Morgan Kaufmann.

Course Description

This course teaches students model-based systems engineering, which is a fundamental tool of systems engineers. The course teaches Systems Modeling Language (Sys-ML), a theoretical and practical modeling tool. Students will build their own Sys-ML diagrams and models in industry-relevant software. Specifically, the course covers the development of SysML behavior (activity, sequence, state machine, use case), structure (block definition, package, parametric, internal block), and requirement diagrams. The software will allow students to simulate and integrate

parametric equations with constraints to properly document systems requirements and other systems engineering concepts.

Course Objectives: By taking this course, the student should develop the following skills.

Understand the concept of object-oriented analysis, modeling and design

Understand the theoretical definitions, uses and benefits of SysML

Create and integrate SysML diagrams and models using software

Build and verify accurate use case, activity requirement, parametric and block diagrams in software

Integrate system requirements into parametric and block diagrams in industry relevant software

Use software to model and simulate the behavior of complex systems

Interpret SysML models

Attention

This is a new course in the department developed from scratch to satisfy the growing needs in workforce and industry. Your instructors and TAs are learning the course collaboratively with you together. If you have more previous experience and can offer suggestions or help streamline the class better, please do not hesitate to discuss with me.

These objectives will be met by through homework practices and three projects.

Grading Scheme
Homework 10%
Project 1 20% (due at the end of week 4)*
Project 2 20% (due at the end of week 8) *
Project 3 20% (due at the end of week 12) *
Project 4 30% (due at the end of week 17) *
*Due time subjected to change as course progresses.

Tentative schedule:

I SysML overview: Chapters 1-2 (2 weeks)
Systems Engineering Overview
Contrasting the document versus model-based approach
Introduction to Unified modeling language (UML)
Class Diagram
Introduction to SysML

Software introduction: Magic Systems of Systems Architect by Dassault Systemes
Project 1 assigned

II Introduction to Diagrams and Organization: Chapters 5-6 (2 weeks)
SysML diagrams
Diagram notations
Project 1 due
Package diagrams
Importing elements into packages
Project 2 assigned

III Diagrams: Chapters 7, 9, 12 (5 weeks)
Use Case Diagrams
Activity Diagrams
Requirement Diagrams
Project 2 due
Sequence Diagrams
Project 3 assigned
Block Diagrams

IV Modeling Constraints with Parametric Equations: Chapters 8,10, 11, 13(5 weeks)
Representing system constraints
Building complex constraint blocks
Parametric diagrams
Constraining time constraints
Sequence diagrams

Combining fragments to describe complex systems
State machine diagrams
V. Class summary and review (1 week).
Project 3 due

Attendance:

Attendance is heavily encouraged but not required. However, I view it as your job to be here.

Research on learning has indicated several things about the way people best absorb and retain information. Research indicates that learning is better accomplished through a combination of repetition and active thinking about a topic. If you are presented in class, you can expect to be asked questions about the course topics.

University Policies

1) Academic Honesty:

All students are responsible for their own work. Please review the University of Utah's "Rights and Responsibilities of Students (Student Code/Misconduct)" policies for details about the consequences of misconduct. Students must also complete the Canvas Module for Academic Integrity before accessing other materials on the course Canvas site.

- Violations include, but are not limited to:

a) Cheating on an examination:

such as copying from another's paper, using unauthorized notes, calculators, etc., or giving or receiving unauthorized aid, such as trading examinations, whispering answers, passing notes, or using electronic devices to transmit or receive information.

b) Plagiarism:

This is using someone else's work without giving credit. It is, for example, using ideas, phrases, papers, laboratory reports, computer programs, data - copied directly or paraphrased - that you did not arrive at on your own. Sources include published works such as book, movies, Websites, and unpublished works such as other students' papers or material from a research service. In brief, representing someone else's work as your own is academically dishonest. The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.

c) Unauthorized collaboration:

This is working with or receiving help from others on graded assignments without the specific approval of the instructor. If in doubt, seek permission from the instructor before working with others. Students are encouraged to learn from one another: Form study groups, discuss assignments, BUT each assignment must be individual work unless specifically stated and turned in as a group assignment.
- Copying another student's assignment and putting your name on it is plagiarism. - You are encouraged to talk to one another about your assignments; however, all assignments must be done by the student whose name is on it!

d) Academic Integrity:

Engineering is a profession demanding a high level of personal honesty, integrity and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the profession, adhere to the Department of Mechanical Engineering Policy for Academic Misconduct.

This policy is based upon:
[the University of Utah's Policy 6-400: Code of Student Rights and Responsibilities](#)

As part of the ME policy, students must review and acknowledge the:
["ME EN Academic Misconduct Policy"](#)
This policy states:

Academic Integrity: Engineering is a profession that demands a high level of personal honesty, integrity, and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the engineering profession, adhere to the Department of Mechanical Engineering Policy for Academic Misconduct. This policy is based on University of Utah Policy 6-400: Code of Student Rights and Responsibilities that states *"Academic misconduct includes but is not limited to cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct."*

Students must acknowledge the ME Academic Misconduct Policy and course-specific definitions of academic misconduct by completing the corresponding CANVAS quiz by the end of the first week of class. Students who are not in compliance with this will receive an EU grade for the course.

COLLEGE OF ENGINEERING GUIDELINES –
https://www.coe.utah.edu/students/academicaffairs/academics/semester-guidelines/

2) **The Americans with Disabilities Act.**
The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

3) **University Safety Statement.**
The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801- 585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

4) **Addressing Sexual Misconduct.**
Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to

offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

5) **COVID-19 Campus Guidelines. Students are required to self-report if they test positive for COVID-19. To report, please contact:**

<div align="center">

COVID-19 Central @ The U
801-213-2874
coronavirus.utah.edu

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To reduce the spread of COVID-19 on campus, **face coverings are not required, but are encouraged. However, the university may change the rules and you are expected to abide by the university and laws of the state and city.**

Some students may qualify for accommodations and exemptions from these guidelines through the Americans with Disabilities Act (ADA).
Accommodations should be obtained prior to the first day of class.
If you believe you meet these criteria, contact:

<div align="center">

Center for Disability and Access
801-581-5020
disability.utah.edu
162 Union Building
200 S. Central Campus Dr.
Salt Lake City, UT 84112

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6) **Drop/Withdrawal Policies**.
Students may drop a course within a given timeline of a given semester without any penalties. Students may officially withdraw (W) from a class or all classes after the drop deadline through the midpoint of a course. A "W" grade is recorded on the transcript and appropriate tuition/fees are assessed. The grade "W" is not used in calculating the student's GPA. For deadlines to withdraw from full-term, first, and second session classes, see the U's Academic Calendar.

7) Other important information to consider including:
   a) Student Code:
      http://regulations.utah.edu/academics/6-400.php
   b) Accommodation Policy (see Section Q):
      http://regulations.utah.edu/academics/6-100.php

8) **Wellness Statement.**

Your personal health and wellness are essential to your success as a student. Personal concerns like stress, anxiety, relationship difficulties, depression, or cross-cultural differences can interfere with a student's ability to succeed and thrive in this course and at the University of Utah.

Please feel welcome to reach out to your instructor or TA's to handle issues regarding your coursework. For helpful resources to manage your personal wellness and counseling options, contact:

Center for Student Wellness
801-581-7776
wellness.utah.edu
2100 Eccles Student Life Center
1836 Student Life Way
Salt Lake City, UT 84112

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Women's Resource Center
801-581-8030
womenscenter.utah.edu
411 Union Building
200 S. Central Campus Dr.
Salt Lake City, UT 84112

9) Students with Disabilities
The Center for Disability Services is dedicated to serving students with disabilities by providing the opportunity for success and equal access at the University of Utah. They also strive to create an inclusive, safe, and respectful environment.

For more information about what support they provide and links to other resources, view their website or contact:

Center for Disability Services
801-581-5020
disability.utah.edu
162 Union Building
200 S. Central Campus Dr.
Salt Lake City, UT 84112
Students of Ethnic Descent

10) Other Student Groups at the U
To learn more about some of the other resource groups available at the U, check out:

getinvolved.utah.edu/
studentsuccess.utah.edu/resources/student-support