CSU Course Syllabus
ENGR/ECE 567 – Systems Architecture

Instructors:
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Reference Texts:
Please do purchase the INCOSE Systems Engineering Handbook v3.2:
No need to purchase these, except for your reference. We will distribute all relevant chapters of the following:
- Holt and Perry, SysML for Systems Engineering, 2008, available to all CSU students at: http://discovery.library.colostate.edu/Record/.b40132456
- Dickerson and Mavris, Architecture and Principles of Systems Engineering, 2010. I will post portions of this reference text on Canvas.
- Holt and Perry, Modelling Enterprise Architectures, 2010, available to all CSU students at: http://discovery.library.colostate.edu/Record/.b3632646x

Office Hours: At request

Instructional Methodology/Mode of Delivery:
Wednesdays 5:15 pm - 8:00 pm MST Clark A 206

Classroom instruction using mixed media to present content and examples. Lectures and laboratory sections to present systems architecture modeling through SysML. All class lectures can be either attended in person Wednesdays 5:15 pm - 8:00 pm MST, or will be available online at Canvas.

Grading and Exams:
Midterm Project 20%
Final Project 30%
Homework Assignments 50%
**Course Description:** Systems architecture defines the relationship between the form and function of a system. This course provides an introduction to systems engineering, a toolset for observing and classifying systems architecture, practice in the application of systems architecting principles, and a critical evaluation of systems architectures through design studies.

**Student Learning Objectives:**
Use the methods of system architecting to lead system development processes from the conceptual stage through validation. Understand the sources of complexity in systems and engineer architectures to maintain transparency, tractability, and function.

**Course Schedule:**

Main Topics:

**Introduction and Background to Systems Architecture** *(2 weeks)*
1. Introduction and Motivation
2. Importance and Role of the Architect

Lab 1 – Introduction to SysML and Block Definition Diagram Models (1/21)
Lab 2 – State Machine and Activity Models (1/28)

**Application of Systems Architecting Principles** *(4 weeks)*
1. Systems Architecture Design Methods
   i. Normative Design Methods
   ii. Rational Design Methods
   iii. Participative Design Methods
   iv. Heuristic Design Methods

Lab 3 – Requirements Models (2/4)
Lab 4 – Quality Function Deployment (2/11)
Lab 5 – Exam 1 Assignment and Discussion (2/18)
Lab 6 – Use Case Models (2/25)

**Analysis and Evaluation of System Architectures** *(4 weeks)*
1. Requirements Setting
   i. Requirements Engineering
   ii. Decision Support Tools for Requirements
2. Architectural Quality
3. Architecture Evaluation and Revision

Lab 7 – Agile Software Architecting (3/4)
Lab 8 – Sequence Diagram Models (3/18)
Guest Lecture in Support of Requirements Setting (3/25)
Lab 9 – Exercise in Rational Architecture Design (4/1)

**Classification of Systems Architecture** *(4 weeks)*
Use case studies/evaluation to determine effectiveness of system architectures

1. Architecture Frameworks
   i. DODAF/MoDAF
   ii. TOGAF
   iii. Zachmann Framework

2. Systems of Systems

3. Final Project Introduction and Assignment

   Guest Lecture in Support of System of Systems (4/8)
   Lab 10 - Internal Block Diagrams (4/15)
   Lab 11 – Final Project Introduction and Assignment (4/22)