Capstone Projects
SE 490

Introduction

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Important policies First

- **Show your name in Zoom**

- **Lecture recording**
  - We will record each lecture, which will be posted on CapStone so that students can review lectures as many times as you can
  - If you have a privacy concern, you may turn off your camera during lecturing; otherwise I encourage students to show your faces so that we may have a close-to-real classroom learning environment.
- ZOOM passcodes
  - For Lecturing:
  - For Office Hours:

- The way to learn as an Engineering student
  - Classroom learning
  - Self-learning
  - Group learning

Capstone Course Series

- Senior Design is a **teamwork** process that spans two semesters, challenging students to apply what they have learned in college education to solve real-world problems.
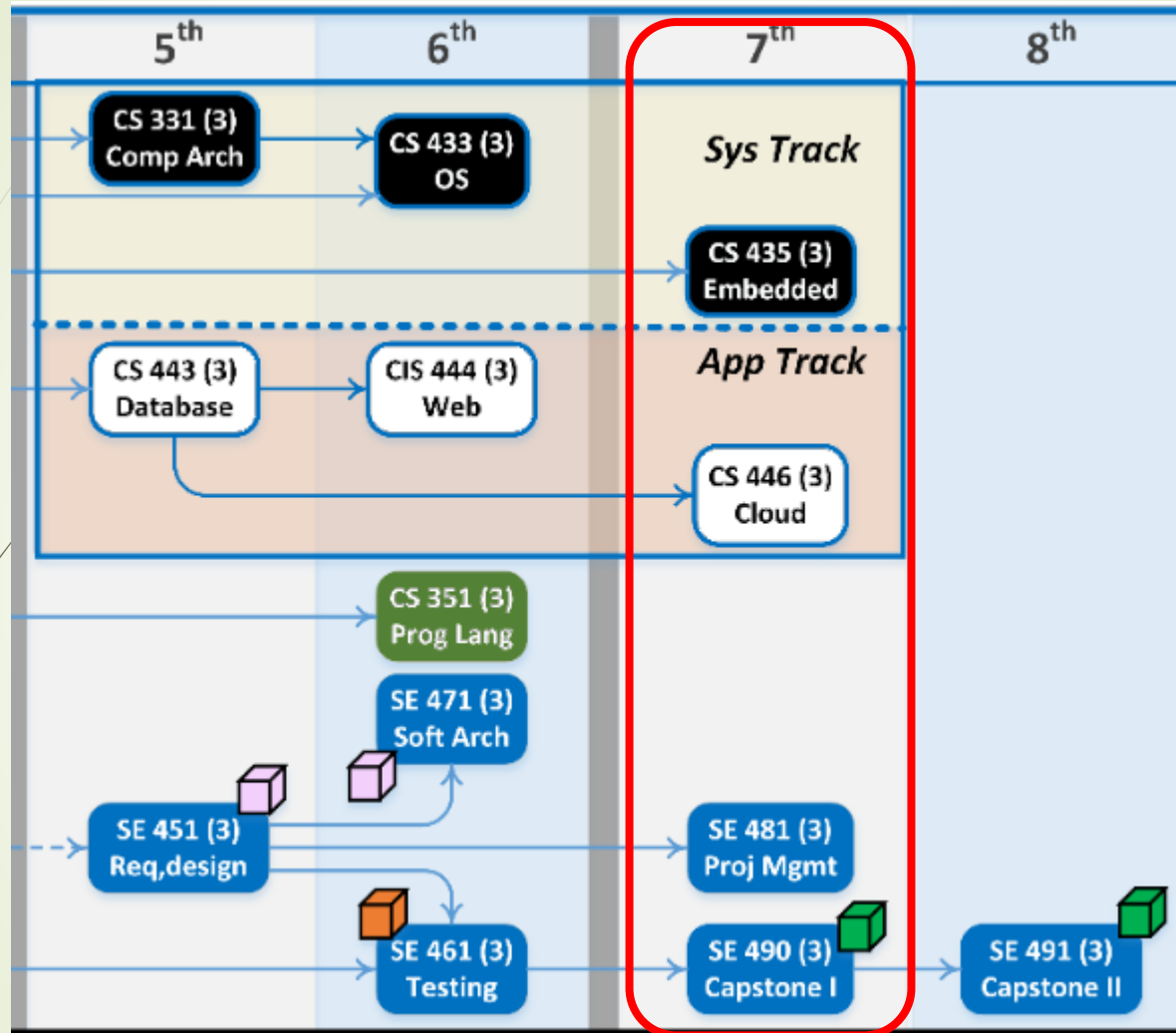

Capstone: definition
1. The top stone of a structure or wall.
2. The crowning achievement or final stroke

You shall start to ask yourself some serious questions:
Am I ready for a technical job? If not, how to prepare for that?

Recommended Action Plans

5th	6th	7th	8th

Sys Track

CS 331 (3) Comp Arch → CS 433 (3) OS

CS 435 (3) Embedded

App Track

CS 443 (3) Database → CIS 444 (3) Web

CS 446 (3) Cloud

CS 351 (3) Prog Lang

SE 471 (3) Soft Arch

SE 451 (3) Req,design

SE 481 (3) Proj Mgmt

SE 461 (3) Testing

SE 490 (3) Capstone I → SE 491 (3) Capstone II

You need to drop this course unless
- You have completed the prerequisites
- You are ready to graduate in 2 or 3 semesters

Syllabus & Course materials

CapStone Web Site: https://MyCapstone.csusm.edu/

What is CapStone?

1) A center for resources and instructions.
2) A toolbox for team members to work on system designs.
3) A platform for Agile process management.
4) A dropbox for work submission.
5) A hub to collect feedbacks from industry mentor, faculty advisor, and more.

CapStone: Grading Policy

2021 Fall Semester Grading Rubrics

Category	Variable	Percentage	InputFrom	Type	Points Earned		Final Points
System	G0	15%	Advisor	Team	0	× T	
Report Version 1.0	G1	10%	Advisor	Team	0	× T	
Report Version 1.5	G2	10%	Advisor	Team	0	× T	
Report Version 2.0	G3	10%	Advisor	Team	0	× T	
Report Version 2.5	G4	10%	Advisor	Team	0	× T	
Presentation Phase 1	G5	10%	(Co-)Advisor	Individual	0		0.00
Presentation Phase 2	G6	10%	(Co-)Advisor	Individual	0		0.00
Quiz	G7	15%	Instructor	Individual	0		0
Discussion Forum	G8	10%	Instructor	Individual	0		0.00
Attendency Penalty (negative means bonus)	G9	Up to 10 points	Instructor	Individual	0		0
My Final Grade	0 (missing teamwork parts)			What if	T = ☐		0

Teamwork Performance Factor T

Variable	InputFrom	Range	Value
α	Peer Evaluation Average	[0, 0.70]	
γ	Weekly Progress/Effort	[0, 0.25]	
δ	Peer Evaluation Quality	[0, 0.05]	
$T=\alpha+\gamma+\delta$	Sum of three factors	[0, 1]	

Final Grade Calculation G=

(G0 × 15%× T) + (G1 × 10%× T) + (G2 × 10%× T) + (G3 × 10%× T) + (G4 × 10%× T) +

(G5 × 10%) + (G6 × 10%) + (G7 × 15%) + (G8 × 10%) - G9

This course is different (I)

Course Schedule: centered around project development

2021 Fall Semester Schedule

NO.	Date	Topic	
1	M 08/30	Introduction	
2	W 09/01	SOLID Principles	
3	F 09/03	Agile Software Process (Project Schedule)	
4	W 09/08	Modeling Domain Concepts	
5	F 09/10	Bid for Projects & Team Formation	Ask faculty preference
6	M 09/13	Elicit requirements from users (contact industry mentor)	Work on problem statement (due next Friday)
7	W 09/15	Student-Centered Teamwork & ACM Code of Ethics	Faculty Advisor Assigned; Schedule weekly meeting time
8	F 09/17	Teamwork Commitment Form	Q2: Ethics (3)
9	M 09/20	Agile Practice I: Project Management	Forum 2: Past Experiences in Agile
10	W 09/22	Agile Practice II: Practices & Reflection	
11	F 09/24	Review: Project Problem Statement	Q3: Agile Principles (3)
12	M 09/27	Document User Requirement: Live workshop	Have some teams show the work process
13	W 09/29	System Requirements	Prioritize requirements
14	F 10/01	Report Writing	
15	M 10/04	Architecture Design: Technical Review	
16	W 10/06	Architecture Design: Case Study	
17	F 10/08	Architecture Design Workshop	30 min teamwork, then share
18	M 10/11	Phase I Wrap Up: Share & Workshop	Schedule Presentation
19	W 10/13	Agile Practice III: Continuous Integration	Version control GitHub;
20	F 10/15	Presentation to Faculty	Presentation Coverage
21	M 10/18	Presentation	
22	W 10/20	Presentation	
23	F 10/22	Presentation	
24	M 10/25	Agile Practice IV: Sprint Planning	Start of Construction
25	W 10/27	Agile Practice V: Test Driven Development	

We do have Required Textbook?

- **Yes**, it's a must-to-read for any software engineer
- **No**, we are NOT giving lectures on the book
  - **BUT**, we can share your reflection or understanding after reading

Robert C. Martin Series

Clean Architecture
A Craftsman's Guide to
Software Structure and Design

Robert C. Martin
With contributions by James Grenning and Simon Brown

Foreword by Kevlin Henney
Afterword by Jason Gorman

Robert C. Martin Series

Clean Code
A Handbook of Agile Software Craftsmanship

Robert C. Martin

Foreword by James O. Coplien
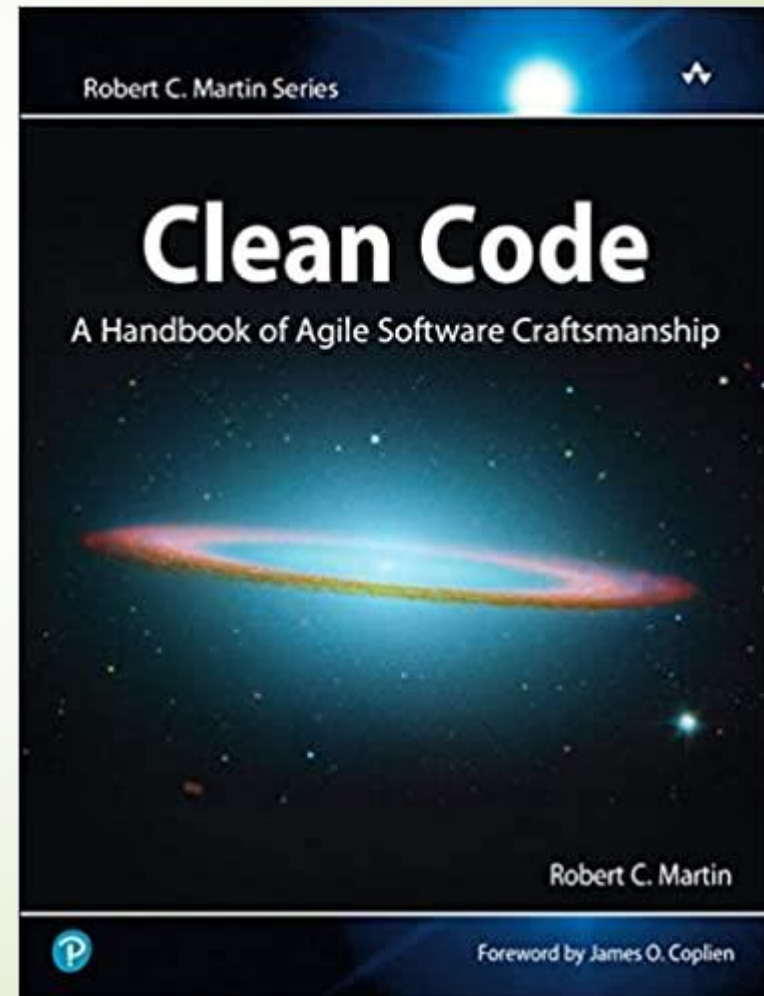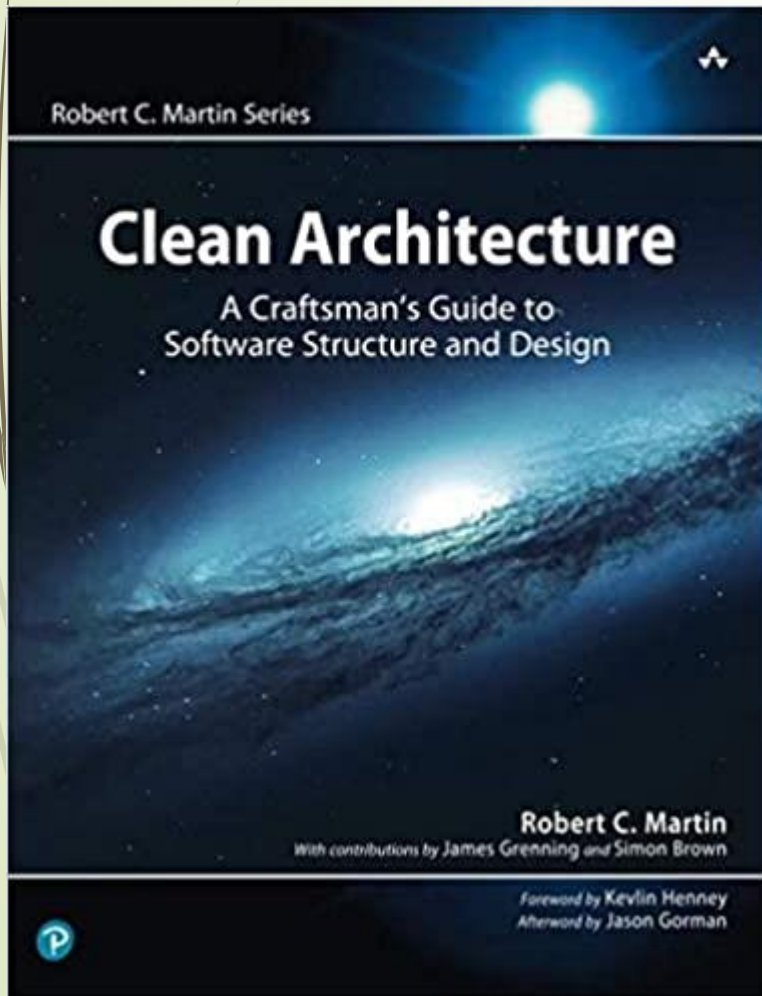
This course is different (II)

Student centered Multiple parties
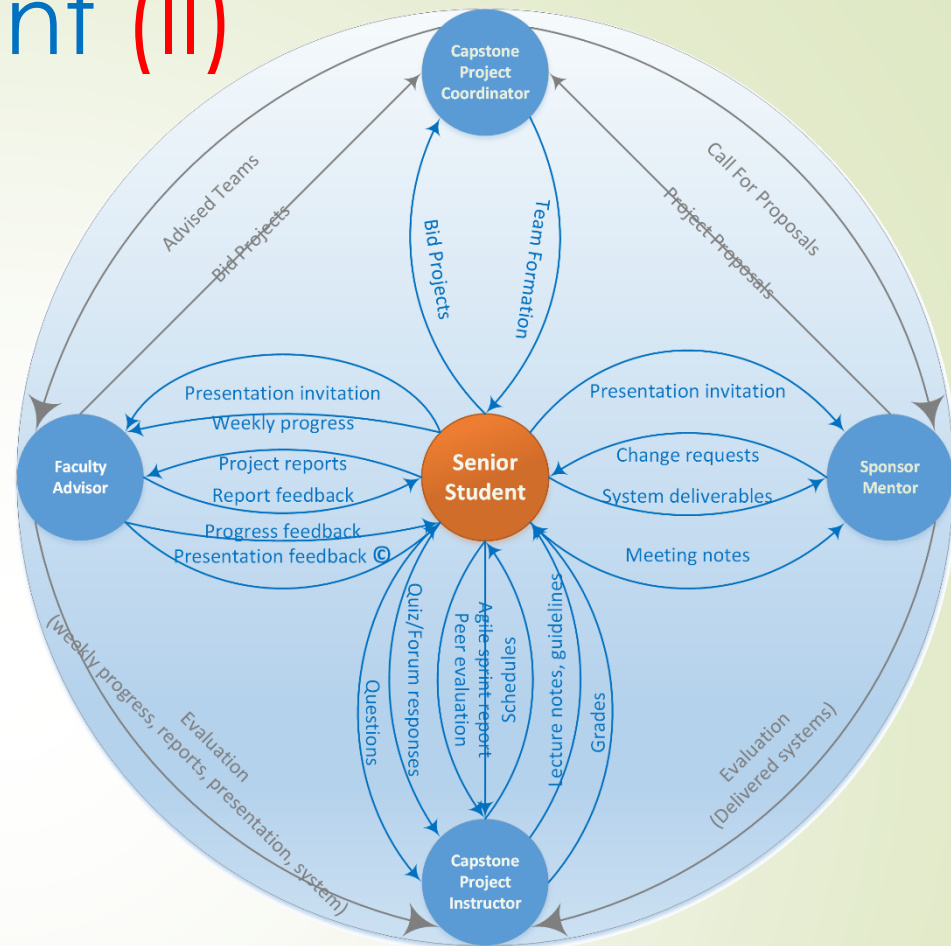
- **Instructor**
  - Process control (CapStone)
  - Quality control (cross-review & cross-learning activities)
  - Guidance on software engineering principles and practices

- **Industry mentors** are your system users/clients
- **Faculty advisors** are valuable consultants for technical issues

This course is different (II)

Multiple parties

- As a **senior student**,
  - You will be challenged to learn new techniques by yourself
  - You will be challenged to become a good team player
  - You will be challenged to make rational project decisions
  - You will be challenged to communicate effectively
  - You will be challenged to practice quality management

- You either **GAIN a lot** or **LOSE a lot**, all depending on your teamwork spirit and attitude
  - If you take the above challenges seriously and positively, you will become a computing professional whom most employers wish to hire

How much effort on senior project?

Concentration & Perseverance are the keys to success

- **How to fail myself in a senior design project?**
  - Do not contribute
  - Do not collaborate

- **What's the cost of failing senior design in the Fall semester?**
  - Graduation rewind: work on a new project with new team members in the next fall semester
  - Retake SE 490

- **What's the cost of failing senior design in the Spring semester?**
  - Graduation rewind: work on a new project with new team members in the next fall semester
  - Retake SE 491

- **How much effort to put on my senior project?**
  - Make progress every day

Effort: Each student should budget about **10 hours per week** (excluding class time) to work on your project. For a team of 3 students, the team would have $3 \times 10 \times 15 \times 2 = 900$ hours (assuming 15 weeks per semester) to work on your two-semester project.

Capstone is NOT yet another course project

It's MUCH more

	Capstone project	Course project
Client/ customer	Real clients	Make-ups
Constraints	Realistic, hard	Assumptions, soft
Success	Failure is failure	Failure can be a success
Commitment	Expect high commitment: RAP is design such that your senior year is less burdensome than your junior	Expect enough commitment
Reputation	Each of you is an ambassador of CSUSM: We care, and future SE students count on you	Your teammates count on you or no longer count on you in future classes

Homework

- Log onto CapStone: **https://MyCapstone.csusm.edu** , update your info
  - Contact email
  - User icon

  If your CSUSM access ID (xyz1234) is NOT recognized, send me an email including your Name and access ID.

- Discussion Forum
  - SE practices at Google