

MS Software Engineering

CMPE 295A, 295B

Project Overview for MSSE Students

Enterprise Software Technologies (EST)

Software Systems Engineering (SSE)

Networking Software (NS)



Dan Harkey
San Jose State University

Agenda



- Master's Project Overview
- CMPE 295A Overview
- CMPE 295B Overview



The MSSE Master's Project

- Provides the “culminating experience” for your degree program
- Tests a student’s ability to:
 - Organize and complete a major piece of work
 - Do **independent** research, design, implementation, experiments, etc.
 - Communicate effectively using both written and spoken word



Entry Requirements

- To be in 295A a student should:
 1. Be in good standing and be classified or able to reach classified status
 2. Has completed (or had waived) the degree core courses:
 - ISE 201, CMPE 202, and CMPE 203
 - CMPE 272, CMPE 202, CMPE 203 under the new plan
 3. Has satisfied the University Written English Competency requirement (such as ENGR 200W or CMPE 294).
 4. Has completed two or more of the specialization core classes
- **NOTE: One** of the courses listed in items 2 and 3 above may be taken concurrently with CMPE 295A



Project Topics

- Topic selection and scope agreement between you and your project advisor
- The MSSE Director will review your topic
- Topic choice can serve other purposes beyond just satisfying degree requirements
 - Research an area as a path to a career change
 - Demonstrate your abilities for a new job
 - Develop a base of knowledge for publishing a paper, article, book, etc.



Project Topics (cont.)

- Topic can be a collaborative effort with industry, but avoid pitfalls:
 - Your topic and report must be put in the public domain at the end of your project. Proprietary information is not allowed.
 - You should have an industry sponsor that can work closely with your advisor.



Project Scope

- Topic should have sufficient scope to warrant **at least** six units of credit
 - Project is the “crown jewel” of your academic career. You (and your advisor) should be proud of your effort at the end.
- Should demonstrate “academic significance”
 - Should push the knowledge envelope for your topic area



MSSE Project Participants

- Student(s)
- Project Committee
 - Project Advisor
 - Readers (optional)
 - MSSE Director (or his delegate)
 - Department Chair



MSSE Project Student Participants

- Projects can be the effort of **one to three** students. Multiple student projects have some potential problems:
 - Skills mismatch (can be an advantage if complementary skills)
 - Freerider/freeloader problem
 - Additional dependency
 - Some doubt raised about authorship
 - An existing strong working relationship helps!



MSSE Project Student Participants (cont)

- MSSE students may collaborate with CMPE students
 - Advisor must agree and must assure requirements for both programs are met
 - Separate reports for CMPE and MSSE students must be produced
 - Students must meet requirements for their respective programs



Your Project Committee

- Your Project Committee consists of:
 - Your technical advisor
 - Must be a member of the SJSU faculty
 - Must be skilled in your topic area
 - Thesis writers: Advisor **must** be tenured or tenured track faculty
 - One or two committee members or readers (optional)
 - SJSU Faculty
 - Industry participation is highly encouraged but should be a person in a supervisory role and willing to work with your advisor
 - MSSE Director (or his delegate)
 - Department Chair
- Signatures from all members of your committee are required for project approval



Your Project Advisor

- Role of the advisor
 - Agrees to project topic/scope
 - Provides technical “sounding board”
 - Approves your project items
 - Project Plan
 - Report: Title, Abstract, Content
 - Prototype Implementation
 - Presentation
 - Helps determine/acquire project resources
 - Helps to flatten dependencies
 - Is your best friend (or enemy) when it comes to assigning a project grade
- Your advisor is **all important** to your project's success. Keep him/her informed so there are no surprises. Don't waste your project advisor's time!



Your Project Advisor (cont.)

- Roles you should **NOT** expect your advisor to play
 - Motivator
 - Planner
 - Referee
 - Source of all information
 - Project leader
 - Copyeditor



Your Project Committee Members (Readers)

- Committee members are supporting cast members on your committee
 - Should be informed of your topic
 - Read your report for technical accuracy and errors
 - May attend your presentation and Project Exposition



MSSE Director

- Default member of your committee
- The MSSE Director assures consistent quality for the MSSE program
 - Topic
 - Work scope
 - Report style and content



Department Chair

- Default member of your committee
- Makes sure your report follows university and department guidelines



MSSE Project Outcomes (listed in order of completion)

- Project Plan
- Prototype Project Implementation
- Formal Project Report
- Project Presentation
- Project Exposition presentation



Project Plan

- Identifies
 - State of the art related to project
 - Project Requirements
 - Dependencies
 - Is a “workbook” for architecture and design decisions
 - Tasks to complete
 - Schedule



Prototype Project Implementation

- Programming prototype should be
 - A **substantial** coding/implementation effort
 - Well-tested and stable for demonstration purposes
 - Use best-practice techniques for implementation
 - Have an attractive user interface



Project Report

- The Project Report captures the outcome of your effort for perpetuity
 - Single most important outcome of your effort
- Make your report attractive
 - Follow style guidelines
 - Heavily illustrate your project using diagrams, tables, and screen shots
- Guidelines will be distributed for:
 - Writing style
 - Format
 - Content/Organization



Project Report (cont.)

- **The project report should be grammatically and stylistically correct**
 - Don't depend on your advisor to correct grammar or discover style problems
 - Hire someone to do copyedit if necessary
 - **Poor grammar and inconsistent style can be a barrier to completing your project!**



Project Report Content

- Typical Report includes:
 - Title Page
 - Copyright Page
 - Signature Page
 - Acknowledgments
 - Table of Contents, List of Figures, List of Tables
 - Report Body
 - Bibliography
 - Appendices



Project Report Body

- The outline for your report body can depend on the subject matter
- The body of **most** MSSE project reports will follow an outline as follows:
 - Project description (Chapter 1)
 - Should describe the goals of your project
 - Should describe current state of the art in your topic area
 - Business Modeling, Requirements, Proposed architecture (Chapter 2)
 - Use UML to describe
 - Include use cases as required
 - Technology background (Chapter 3)
 - Describe technologies that you will use to implement your project
 - Assume your audience has the background of a typical MSSE student



Project Report Body (cont)

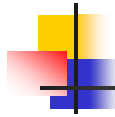
- The body of **most** MSSE project reports ... (cont.)
 - Project Analysis and Design
 - Use UML to describe classes and data
 - Include class and interaction diagrams as required
 - Mock up user interfaces
 - Project Implementation and Testing
 - Describe implementation details
 - Give code examples
 - Describe testing strategy and execution
 - Project deployment, performance analysis
 - Provide operational (deployment and change management) and performance details
 - Include any analysis



Project Report Body (cont)

- The body of **most** MSSE project reports ... (cont.)
 - Conclusions
 - Describe how your project goals were met and what conclusions you reached
 - Future research

- **The organization of your project report is ultimately up to your advisor with input from MSSE director**



Project Presentation

- Presentation is given to your advisor and should include
 - Powerpoint presentation
 - Answers to all of your advisors questions
 - Software demonstrations

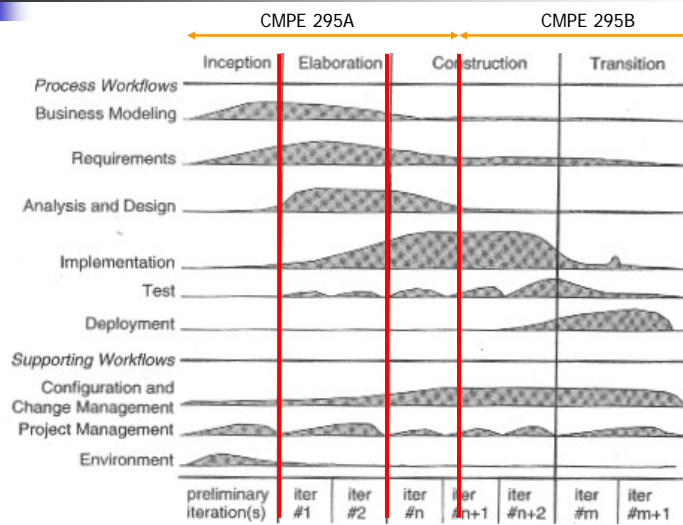


Project Presentation content

- Project description
- What you hope to achieve?
- How did you go about doing?
 - Research
 - Analysis & Design
 - Implementation
- What did you learn from the project?
- Future research recommendation



The Software Development Process





MSSE Project Tasks (CMPE 295A)

- Write Abstract
- Project Plan
 - Topic Research
 - Requirements
 - Analysis & Design
 - Schedule
 - Implementation Proof of Concept
- Write First Draft of Chapters 1 – 2



MSSE Project Tasks (CMPE 295B)

- Implementation & Coding
- Testing
- Deployment
- Complete Project report
- Write/Present Project presentation
- Attend Student Exposition
 - Mandatory requirement



Title and Abstract

- Should succinctly describe your project and its goals
 - Should be written in academic form
 - Should be “eye-catching” to attract interest to your report
- Use title and abstract as a “tool” to negotiate your project topic with your advisor



“State of the Art” Research, Academic Contribution

- After you have reached agreement on a topic with your advisor, you should establish the current “knowledge base” or “state of the art” for your topic
 - Do a literature/Web search and keep a list of the information you use for your bibliography
 - Update your advisor and solicit his/her guidance
- You should also be able to identify your academic contribution, i.e., your addition to the state of the art



Requirements/Business Model

- Determine the system requirements of your project
- Establish a business or research justification for your project



Publish Plan & Schedule

- Establish:
 - Project tasks
 - Start and end dates
 - Milestones
 - Resources/dependencies
- Solicit input from your advisor



Complete Project Design

- Complete end-to-end design
- Use UML throughout to describe design
- Mock-up user interface



Implementation

- Proof of concept prototype
- Working prototype
 - Testing
 - Deployment
 - Performance analysis



First Two Chapters

- Write the first two chapters of your project report (draft)
 - Describe project in detail
 - Capture literature search and state of the art in topic area
 - Establish business model and requirements
 - Propose architectural solution



Complete Project Report

- Complete the body of your project report
- Solicit approval from your advisor



Write/Give Project Presentation

- Use PowerPoint to succinctly describe your project
 - Draw from material in your report
 - Make liberal use of diagrams
 - Limit the number of slides to < 30
- Give your project presentation to your advisor
 - Budget your time wisely
 - Clearly answer all questions posed to you
 - Be prepared to answer questions that probe into the depth of your knowledge of your topic area



Make Report Corrections/Get Advisor Approval

- Gather all report corrections from your advisor
 - Other committee members may also contribute corrections
- Incorporate into your report
- Get signature from your advisor



Bind and Submit Final Report

- Submit final report to MSSE Director
 - Include original signature page with signature space for:
 - Your advisor
 - MSSE Director
 - The Computer Engineering Chair
 - Dr. Sigurd Meldal, Chair of Department of Computer Engineering
 - Use Velo-binding with a clear front cover and black opaque back cover



Prepare for Project Exposition

- Poster board describing project
- Demonstration of project software prototype



Attend Project Exposition

- **Attending the Project Exposition is a university and department requirement. You must attend and a project exposition and demonstrate your project before you can graduate**
 - **This is also true for students that extend their project via CMPE 298**



Grading

- A grade will be assigned in 295A based on project technical challenge and progress
 - See green sheet for milestones
- Each individual will be given a grade
 - For multi-person projects there should be identifiable portions of the project that each person has accomplished
 - Project members will be asked to identify the accomplishments of other team members
- You advisor will assign a grade for 295B based on overall project accomplishment and individual effort
- Projects will also be reviewed during Project Exposition
- Final grade will be recorded by the MSSE director



Misc CMPE 295A/B Policy

- Must complete project in two consecutive semesters
 - After two semesters, students can take CMPE 298 (with consent of your advisor) to extend your project or course will be assigned a grade of "F"
 - CMPE 298 can only be taken two times to extend a project, then CMPE 295B will turn into an "F"
- Changing advisors means retaking 295A and/or 295B