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Software Engineering
CSC648-848
Fall 2024

Student Team Project Overview and Instructions

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About Team Project

- ***General Objective**:* By developing a SW application in a team setting, students will learn, experience and exercise all key steps in SW Engineering methodology of choice.

- Final project is the cornerstone of the class – learn SE methods and teamwork "by doing it" **- 60/100!**
- Teaching synchronized with Final Project – topics taught as they are needed for final project milestones
- We will simulate real world small SW company – we believe this is the best way to learn real SW Engineering
- Adherence to the **SE process** as well as final **SE product** quality are both part of grading

Class is centered around student team project

- Class teaching usually 1.5-2 hours
- Teams work together in class last hour (mandatory attendance)
- Class teachings synchronized with the needs of team project

Benefits of team project

- Skills to be developed during final project:
  - Practical application of class material on SE methods
  - Teamwork in SE and working with people
  - Experience with full SW development lifecycle starting from very basic requirements gathering
  - Experience with modern tools and platforms and collaborative and continuous SW development in team setting
  - **NEW: Practice ChatGPT and related tools (not only for coding)**
  - As close as possible to real life as possible
- Great experience for getting and retaining good jobs in global economy
- Portfolio (M5 docs and working WWW app) will be developed which is very useful in job search, especially for students with no industry experience
- Advice on how to update CV will be provided – important!
- **Being able to develop SW application in almost realistic industry team setting will add huge marketability to you**

About class instructors

Prof. Dragutin Petkovic petkovic@sfsu.edu - head instructor but also:

- Class Instructor BUT ALSO
- CEO of multiple “startups” e.g. student teams
- Coach and helper
- Customer “persona” for giving UI feedback
- Ultimate say in deadlines and product features, including global teams up to December 2018
- Final say in grading for SFSU students

Anthony Souza ajsouza@sfsu.edu - Co-instructor but also:

- Class CTO (for IT infrastructure)
- Coach and helper on technical issues; resolves technical conflicts and issues
- Helps in grading

Instructor roles

- Student teams will receive guidance, user feedback and coaching from class instructor Prof. Petkovic who will play the role of CEO for the start-up assigned by Venture Capitalist (VC) firm considering financing student start-up.
- Anthony Souza shall be CTO expert assigned by VC advising student teams on technical questions they can not resolve themselves.

Team Project is managed with 6 formal Milestones M0-M5

- Each milestone will be formally announced, instructions and deadline posted on Canvas, and team has to respond as required
- Schedules are strictly observed - like in real life
- Failure to abide by schedules results in negative pints for the whole team
- Extension can be required via e-mail by team lead minimum 24 h before the deadline

Milestone 0 – individual milestone – Choose, learn and install team project SW tools and create team ABOUT page - 10/100

1. Students have to chose the tools and ask class CTO for approval
2. CTO reviews and approves
3. Team installs he tools, learns how to use them and creates team page (ABOUT page for final project WWW site)

10/100 of the grade -Details to be presented and posted on Canvas – graded for individual team members separately

- Grading: functionality AND SW organization and use of frameworks and github

Students within the team encouraged to help each other!

Other benefits of M0:

- Learn how to use tools for professional SW development
- Learn basics of Cloud Computing and server management
- Build teamwork

Group/Team Milestones 1-5 – 50/100

- **Milestone 1:** High Level Req.&Specs, Use cases
- **Milestone 2:** More detailed specs, tools, servers and architecture defined, UI mock-ups, first vertical prototype
- **Milestone 3**: Project review (30 min with instructor): review of horizontal (UI) and basic vertical prototype - feedback via focus group with Prof. Petkovic as customer "persona"; CTO Anthony reviews code and github off-line and sends feedback; team summarizes feedback and makes plans; NEW: team performs self-review of architecture.
- **Milestone 4:** Beta delivery, QA plans and usability feedback, final functionality committed
- **Milestone 5: a)** Final Project documents ("Milestone 5 Folder") and b) demo of the SW – both graded for final team grade

This year project – same for all teams

- High level team project description to be posted on Canvas (only very high level –one page vague specs and requirements)
- Start from the above and work with instructors to develop full application ➔ forces teams to exercise **complete SW lifecycle**
- Simple? Maybe be, but you must make it:
  - Satisfy all functions you committed
  - Bug free (needs QA)
  - Easy to use
  - Have basic security and input field validation
  - Attractive and compelling
  - Run on multiple laptop browsers and on mobile (not as native app)
  - Run from server
  - Ensure easy access for all major browsers
  - DB, architecture and the code of good quality
  - Deliver on time

Teamwork - critical

- ***Teamwork***: people working together toward a common goal (deliver a SW product, win a soccer world cup) - CRITICAL
  - This is different from ***group work, which is***: students working together to help each other do their own individual assignments

NEW paradigm shift for SE – GenAI, ChatGPT, copilot…

- How can they help in SE (not only for coding)?
- Will learn about these and use/practice in team project
  - (See also some renounces on this in Canvas Important Readings section)
- Will have separate class (and student demos) on how it works and best practices to use it
- Will develop official class policies for the use of ChatGPT and related tools
- **This semester each team will have to use GenAI as they see fit, and document it – instructions will be provided – this is NOT graded**

Team selection for final project

- Teams formed based on mandatory skills self-survey (**NOT used for grading**) administered in seciond class
- Team structure: 5-7 students, comprising of: Team *Lead/project manager*, team *front-end lead* and team *back-end lead* and *github master* (new)
- Instructors will interview and recommend team leads (team approves or chooses somebody else), teams will select *front-end and back-end leads and github master*

- Student team plays the role of a small SW company with a team lead/project manager "reporting" to class instructors
  - Prof. Petkovic: plays he role of company CEO and also provides user feedback
  - Prof. Souza plays he role of company CTO – focus on technical advise and feedback

Team Leads – recommended by Prof. Petkovic

- Team lead: good communication and organization skills critical, not necessarily the best coder
- Role of team leads
  - Get the teams going (establish the teamwork)
  - Organize and schedule meetings
  - Help setup collaborative and development tools
  - Keep the focus toward project goals
  - Single point of contact with instructors
  - Submits milestone documents to isntrutors
  - Help resolve issues within the team first , when necessary escalates to the instructor. **Monitors attendance and participation and acts on issues ASAP**
  - Can request meeting/input from instructors
  - Participates in creating deliverables as other team members
  - Works in coordination with team CTO
- **May get up to 5/100 extra points** for job well gone
- Great experience for those interested in SW lead or management
- Will get coaching and help from instructors

Team front-end and back-end leads (team selects)

- Selected by the team In charge of key technical decisions, architecture and development of front/back end
- Supervise sub-teams (back and front-end)
- Helps and educate team with programming, architecture
- Participates in creating deliverables as other team members
- Back-end lead takes most guidance from Anthony (class CTO)
- Front-end lead: takes UI feedback from Prof. Petkovic and others
- **May get up to 3/100 points** for job well done

Critical: establish good API/interface between back end and front-end – follow standard patterns

Team github master (team selects)

- Organizes branches
- Establishes polices of proper use of github with master deployment branch
- Helps others in githuib usage
- Reviews and makes sure githiub commit comments and policies are followed adequately
- Participates in creating deliverables as other team members
- Suggested: Organizes main QA and code reviews
- **May get up to 3 extra points** for job well done

Interaction among group members

- Team lead organizes and runs the team meetings, sets up meetings, follows progress, and is the key communication person with instructors
- Team use any tool of their choice for intra-team comm.; instructors use e-mail
- **Attendance for all team meetings is mandatory and will be checked. If a student has to be absent from team meeting or can not attend or deliver committed work, he/she must inform the team lead ahead of time. Any violations of attendance need to be dealt with immediately (team lead must inform the instructor)**
- Individual members (e.g. back end, front end) can meet any time in smaller groups
- **Everybody must read and respond to all class e-mail and other messages in a timely fashion**
- Commitments/milestones must be delivered on time or team lead must be informed of the delay (role of team lead)

Team interaction with instructor

- Instructor visits each class during each class teamwork segment (last hour of each class)
- E-mail comm. and document/milestone submission goes via team lead
- E-mails to and from the instructor must have “CSC 648-848 Fall 2024 Team N” in subject line (N is team number).
- If any team member has any concerns first try to resolve with team, but if necessary OK to send e-mail to instructor directly
- Use only SFSU e-mail
- Team lead can ask team related questions any time, via e-mail – email subject line “CSC 648-848 Fall 24 Team N”

Participation and full focus on team project are required and are cornerstone of the class (50/100 points) -

- Team gets same grade for team project unless:
- Team lead reports non-engagement **(MUST be done as soon as problem occurs)** or instructor discovers it, such as:
  - Not responsive to e-mails
  - Misses meetings with no excuse
  - Does not abide by schedules, tasks not delivered on schedule
  - Low activity in github

➔ **Will result in lower Team grade for individual – minimum 10%**

General conflict resolution process - technical or teamwork or personal

- Team leads first tries to resolve the issue within the team AND keeps e-mail records
  - If above does not work for a week (not longer!) team lead involves the instructor. Instructor will investigate (e.g. speak to team lead, document, check github) then instructor will speak to individual and put him/her on formal notice

Personal or teamwork issues ➔ contact Prof. Petkovic

Technical issues ➔ Contact class CTO Anthony

Common issues identified by teams' self assessment – IMPORTANT

- **Deal with technical issues early** – resolve them in the right way early and ask for help if you can not resolve them.
- **Same for personal issues like poor participation. Deal with it as soon as you discover it and/or involve instructor**
- Read tool and class documentation and assignment instructions and follow up
- Before doing the assignment/milestone check related class slides
- **Manage tasks tightly: each task must have its owner and deadline. Then follow up 2 X week!**
- **Verify each document** before it is submitted to instructors

Team grade -Final project grading – *same* basic grade per team

Total 50/100 of class grade

Adherence and achievement of adequate *SE process* – **25%** (based on M5 folder and student behavior during the whole semester)

Quality of the delivered *SE product* – **25 %** (based on delivered SW and its architecture, gihub organization, code “smell” etc.)

Rubrics for team project grading

Measured Team Outcomes for SE *process*	**Measured Team Outcomes for SE *product***
1. Fraction of the team participating at the meetings with the instructor 2. Quality and timing of follow-up on outstanding issues 3. Ability to deal with feedback constructively 4. Producing the non-SW and SW deliverables on time; following submission guidelines 5. Quality and completeness of non-SW deliverables (requirements, use cases, UI mockups, design documents, test plans etc.) as in M5 folder 6. Number of teamwork issues that instructor had to deal with (whether resolved or not) 7. Ability to apply best SE process and teamwork practices 8. Adherence to continuous and collaborative development practices 9. Ability to effectively use the SE tools (e.g. collaborative tools, version control, issue trackers)	1. Correctness and reliability of operation 2. Functionality of the product vs. desired requirements and use cases 3. Ease of use, user interface 4. Architecture of the developed system 5. Database design 6. Basic security, field validation 7. Performance 8. Code quality and “smell” (coding principles, style, documentation) 9. Proper usage of collaborative tools e.g. repository 10. Presentation style and effectiveness of final product demonstration (content, delivery, adherence to time, dealing with Q/A)
25 %	**25 %**

Use of ChatGPT and related AI tools

- Must use it and learn it (this year it is a MUST not optional – they are here to stay and you are expected to know how to leverage them)
- Team chose how and for what to use it
- Not graded BUT must describe its usage as instructed for each milestone
- Must adhere to class policy on this and avoid plagiarism
- **YOU are responsible for accuracy not ChatGPT/tools**

Have fun!

- Great to build some cool and non-trivial SW app and get it to work
- You will learn a lot of things in SW (process, tools, cloud, DB, SE teamwork) including use of ChatGPT and related tools in SE
- You will improve your CV and portfolio and gain confidence
- You will met new friends and learn to work with diverse group of people you did not know before
- You will get more confidence as SW engineer and for job search