

**The University of California, Irvine**  
**Department of Informatics**  
**IN4MATX 191A – Senior Design Project – Winter 2018**

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**Class Times:** 2:00 – 3:20, Tuesday / Thursday, PSCB 140  
**Office:** DBH 5044  
**Office Hours:** M / W 12:00 – 3:00, or by appointment  
**Web/Files:** ics.uci.edu/~ddenenbe/191A

**Course Description:**

This class is a capstone, meaning it is project-focused and student-led, and the onus is on the student, along with their partner company, to determine the requirements and schedules that will ensure a successful completion of the project. An assumption is made that all prerequisites have been met, and they will all be required as you move through the course and the project.

**Learning Objectives**

The main objective of the course is to utilize all you have learned during your academic career, and apply those concepts to a real-world project defined by a company you will be working with to achieve a pre-determined goal/objective. You will learn about not only the technical aspects of project involvement, but about marketing, team dynamics and management, communication strategies, scheduling, and other facets of project management.

**Grading – All assignments are due the Friday of their respective week by 9:00pm**

Implementation Deliverables	30%
Execution tests (10%), Final demo/delivery (10%), UI / Software prototype (5% each)	
Design Deliverables	40%
UI Document, Software design, Software requirements, project plan, sprints (8% each)	
Other Documentation	20%
Risk analysis, Business case, stakeholder comm plan, covenant, GRIPS	
Miscellaneous, yet important, items	10%
Attendance, peer evaluations, progress reports	

**PLEASE NOTE:**

It is important to understand that **final letter grades reflect academic achievement and not effort**. A plus or minus further delineates rankings within these grade ranges.

While mistakes in the arithmetic computation of grades and grade recording errors will always be corrected, it is important to understand that in all other situations **final letter grades are not negotiable and challenges to final letter grades are not entertained**. If you choose to discuss your grade, the instructor reserves the right to adjust the grade up or down after further review.

Additionally, because of the heavy group-based nature of this class, and because by being in this class you are representing yourselves, the faculty, the department, the school and the university to outside organizations, there are minimum requirements that must be met before you will be considered for a grade, as detailed below:

### **Mandatory minimum requirements to successfully complete 191A / B**

The grading and evaluation process for the capstone is two-fold: To be considered for a passing grade, you must first meet a series of mandatory minimum participation and involvement requirements as listed below. If, at the end of the quarter, you meet those requirements, the grading process will then take place. Failure to meet these requirements will indicate you have not made the basic effort nor met the basic expectations of students in this course, and therefore will not receive a passing grade.

Please also note that minimum requirements are just that: minimum. Meeting the minimum requirements does not guarantee a specific grade, it simply means that you have met the threshold to be considered for a grade.

### **Minimum Requirements:**

#### **Participation in and engagement with the group**

Each group member must actively participate in the group. That includes attending group meetings via approved channels, at agreed-upon times, participating in group communication via approved channels, and simply being present as an active member.

#### **Participation in and engagement with the project**

Each group member must contribute intellectually, conceptually, and communicatively with the group via approved channels. That includes contributing ideas, writing, designs, suggestions, and other involvements. Your task assignments, responsibilities, or other contributions agreed upon by the group must be met and with evidence of interest. In other words, don't do things last-minute or throw things together.

#### **Participation and engagement with your Capstone Partner**

Like 'Participation in the Group,' each group member must meet at the agreed-upon times with their partner, as part of the group, via agreed-upon communication channels, and be adequately prepared and present both physically and intellectually.

#### **Class Attendance**

Class attendance is expected, as that is one of the best times to meet the requirements listed above. Many class sessions will be open-ended, allowing ample time to meet with your group and work on the project, and receive feedback from the instructor and TAs.

Peer and partner evaluations will be solicited at various times throughout the course of the Capstone, and meetings between the group and instructor / TAs will be frequent. Presentations, observation, and individual meetings will also be held regularly. At the end of each quarter, we will be very well informed regarding who is participating and contributing their share, and who isn't.

### **Attendance and Due Dates**

Attendance is a part of the class, as it would be if you were working for a company and as part of a team, both of which would, will, and do, rely on you. Attendance is mandatory in the workforce, this class is no different.

As is true in the real world, the due date is an inherent part of the assignment; All materials are due on the assigned due date, no exceptions.

### **Assignments**

#### **(Group): Set up your file structure. Due Oct. 4**

In this class you are required to use a cloud-based service (Google Drive, Office Live, Zoho, etc.) / and Github to facilitate document sharing with your teammates and the teaching team (NO DROPBOX!). Create your folders using the following structure: one for each assignment where the team has access and then one "TEAMNAME Final Assignments" folder that is shared with the instructors and TAs in addition to your team.

Do your work first in the team's folder, where you can all see what changes have been made by others since the last time you checked (your revision history) and work simultaneously and cooperatively, seeing in real time what the others are doing. Some people facilitate this using open chat or voice to coordinate and comment in the session, or better yet, work side-by-side to ensure a constructive dialog. However you do it, we strongly suggest you have some means of synchronous communication during the editing process. Save your documents in their appropriate folder as "TEAMNAME-AssignmentName."

When your team is ready to submit the final document for an assignment, place it in the "TEAMNAME Final Assignments" folder. Share with us using ddenenbe@uci.edu and vishals1@uci.edu, with permissions set to "Can Comment" so we can provide appropriate feedback.

We will also use the revision history as input to your participation grade as we can see who contributed what. We understand that sometimes a teammate will be reading and commenting in the chat/voice connection without editing text, but that's not standard. Most contributors actually enter/edit text, making the revision history a reasonable proxy for participation in the document.

Be reflective of your document management practices, be cognizant of what works and what doesn't, and improve as you go.

By October 4<sup>th</sup>, we should be able to see the folders/collections you have shared with us, properly named.

In all your assignments that follow, adopt a brand for your team and a professional layout. Develop a team name and logo, professional formatting with no grammatical or spelling errors. These are all very important when you present yourself to the class, the companies, and the world.

(Group): Group photos. Due Oct. 11, Oct. 25, Nov. 8, Nov. 22\*

Team bonding can have a direct correlation to quality of work. Therefore, we encourage (require, actually) you to have social experiences your team and document them with a photo that you share with us. Teams have done this in many unique ways, including going out to lunch or dinner, having a movie night, playing cards or pool, hunting for a special restaurant in LA, one team even went to Las Vegas for a team member's birthday! I'm not sure I'd recommend that, but you get the idea.

Title these photos TEAMNAMEPhoto#n and put them in your team folder.

(Individual): Individual Gantt chart. Due Oct. 4

You are to make a personal Gantt chart of the assignments in this class. Find the start date by seeing when the topic of an assignment is talked about, and the end date is when it is due. Many assignments in this class include parts that are useful earlier in the process, others later. The document you hand in is just a compilation of all of these on a particular topic (e.g. User Interface). Be sure to note on your Gantt chart when you think you'll do each part because that's when it's needed.

Then put the assignments in *all your other classes* on the same Gantt chart, clustering all the assignments for each class together. Note milestones like midterms, finals, and due dates for projects. Print this chart out and keep it, and create a PDF version with the title YOURNAMEGanttChart.

In another document, write 1-2 paragraphs (single spaced, double spaced between paragraphs, no indent for the paragraph) describing what you notice regarding your schedule this quarter in terms of the Gantt chart, as well as anything else that stands out by doing this. Title the file YOURNAMESchedule.

Put the two files in the cloud folder your team is sharing with us.

(Group): Sprints. Due Oct. 11, Oct. 25, Nov. 8, Nov. 22\*, Nov. 29 (wrap)

List the tasks you had planned in the last two weeks, who was assigned, how long you thought it would take, and the percent completed. Then, list the tasks for the next two weeks (including those that were not completed in the last two-week sprint, plus new ones arising because of what you learned or what happened) along with people, time

estimates and percentages. Add any explanatory notes, with sufficient detail so someone reading won't have to ask any questions.

Put this document in the cloud folder that is available to the instructors by 5:00pm on each of the five dates listed.

**(Group): Communication Covenant. Due Oct. 11**

A Communication Covenant is an agreement every member of a team makes about communicating:

- Pledging to communicate regularly (even when the news is bad)
- Pledging to answer your email a certain number of times a day
- Agreeing that you will all use the same cloud folders / service for file management
- Specifying when and where your meetings will take place (1-2 times a week)
- Pledging to notify team mates if you can't make a meeting
- Agreeing to reasonable consequences if a team member is late or misses without notifying everyone
- Pledging to volunteer to contribute, do so well and on time.

Include a table of preferred email addresses and cell phone numbers.

Title this file TEAMNAMECommunicationCovenant and put this file in the cloud folder your team is sharing with us

**(Group): Stakeholder Communication Plan. Due Oct. 11**

This is a simple document indicating the stakeholder's names, roles, and contact information, plus the agreed upon plan to communicate with them, both for regular meetings and how to contact them if things come up (which they will). If you can get them to agree on how quickly they'll respond to you as well, that's a bonus; politely request if they could provide that information. This is a communication covenant-lite with your sponsors.

Title this file TEAMNAMEStakeholderPlan and put this file in the cloud folder your team is sharing with us.

**(Group): Business Case. Due Oct. 18 (Draft), Nov. 1 (Final)**

The Business Case for your project is the argument for outsiders about what the project is and why it is important. Depending on the type of project it should include:

- Project statement
- Stakeholders
  - Stakeholder analysis

- Similar / Competing products and services and a comparison with the one you propose
- Market analysis (if relevant)
- Cost/benefit or ROI (which translates here to benefits)

Name the file TEAMNAMEBusiness Case and submit it by putting it in the cloud folder you have shared with us.

**(Group): Project Plan. Due Oct. 18 (Draft), Nov. 1 (Final)**

This is a formal, **living** document that includes the following, in increasing detail as the quarter progresses:

- Project Name
- Team Name
- Team Members
- Date
- Table of Contents
- Revision History (what changed since last time, since this document will continue throughout the project in the following quarters)
- Statement of work (like the project statement above, but longer and in more detail)
- Stakeholders
- Technical constraints
- WBS in increasing levels of detail (analogous to a list of sprints)
- Time estimates for each task (or points)
- Gantt chart showing dependencies (for the project, as well as for assignments)
- Annotations as to who will do each task
- Who will serve as project manager for various periods of time

Name the file TEAMNAMEProjectPlan and submit it by putting it in the cloud folder you have shared with us.

**(Group): Risk Analysis. Due Oct. 23 (Draft), Nov. 6 (Final)**

Expected length: 3-5 pages.

This is a key exercise to assess in which ways your project will endure hurdles, and it will. You will list the types of things that might go wrong (e.g. framework doesn't support all the functionality, data is not available in the format you expected, team members or sponsor drop out, etc.) and for each item what you will do to mitigate damage or overcome it.

Name the file TEAMNAMERiskAnalysis and submit it by putting it in the cloud folder you have shared with us.

**(Group): Requirements. Due Oct. 23 (Draft), Nov. 6 (Updated), Nov. 20 (Final)**

Expected length: 10-20 pages (including diagrams/charts), 2,000 – 3,000 words

This is a **living** document that grows in detail as the quarter progresses.

- Project Name
- Team Name
- Team Members
- Date
- Table of contents
- Revision history
- Statement of work (copied from above)
- Assumptions
- Functional requirements (the big part)
  - An overall use-case diagram that shows all actors and use cases on a single diagram
    - Except if you choose user stories instead (which must be approved)
  - Use cases/user stories
    - Each detailed separately using a consistent template
  - PRIORITIZED by “must have,” “nice to have (a stretch goal),” “great if we can get to it.”
- Non-functional requirements
  - Requirements for each relevant quality, e.g., security, reliability, availability
  - Others such as performance
  - You can mention usability, user-friendliness, etc., but details belong in the UI document

In the final draft, we expect:

- All use cases / user stories to be elaborated (in sufficient detail to be implementable)
- All requirements in those use cases to be testable (more on that in Lecture)
- The document to be ‘internally consistent’ (more on that in Lecture)

Name the file TEAMNAMERequirements and submit it by putting it in the cloud folder you have shared with us.

**(Group): Software Design. Due Nov. 6 (Draft), Nov. 13 (Final)**

Expected length: 20-35 pages (including diagrams/charts), 3,200 – 5,000 words.

This is a **living** document that grows in detail as the quarter progresses.

- Project Name
- Team Name
- Team Members
- Date
- Table of contents
- Revision history
- Statement of work (copied from above)
- Assumptions
- High-level use-case diagram or equivalent summary of features/user stories (copied from requirements documents)
- UML design diagrams (the big part)
  - (It's possible that UML doesn't fit certain projects, but that's unlikely and you'll need to discuss that with us)
  - Organized on a use-case-by-use-case basis
  - For each use case:
    - One or more UML sequence diagrams for important use-case flows (basic or alternative)
    - One class diagram showing all classes relevant to ('participating in') this use case
  - A 3-tier (or n-tier) UML class diagram summarizing all classes for all use cases organized in layers
  - Additional UML diagrams relevant specifically to your project (activity diagrams, state diagrams)
- Other kinds of diagrams relevant specifically to your project (ER (DB) diagrams)

In the final draft, we expect:

- All use cases/user stories to be covered (in sufficient detail to be implementable)
- All UML diagrams to be detailed (class names, methods, attributes, class relationships)
- The document to be internally and externally consistent with the requirements

Name the file TEAMNAMEArchitecturalDesign and submit it by putting it in the cloud folder you have shared with us.

**(Group): UI Document. Due Nov. 6 (Draft), Nov. 13 (Final)**

The parts of this document should be done when needed, but turned in as a collection on their due date(s). For example, personas and scenarios should be done right away near the beginning, *before* the requirements document should be formulated (We will look for this evidence in your Gantt chart and WBS). The required components are:

- Project Name
- Team Name
- Team Members



- Date
- Table of contents
- Revision history
- Personas
- Scenarios
- Swim lane diagrams (if appropriate)
- Comparative analysis of interfaces
- Story boards
- Generalized Transition Network
- Wire frames
- Usability, functionality and satisfaction goals

We will talk more about the prototype of your interface in class and during individual meetings.

(Group): WIC (Winter is Coming). Due Nov. 29 (Draft), Dec. 7 (Final)

An overview of goals for the team for the brief break between Fall and Winter quarter, with week-by-week task breakdown. It can include 'working' assignments such as implementing something to reduce risk or as a prototype or experiment and, most importantly, 'learning' assignments based on what you know you need to learn in order to “hit the ground running” in Winter Quarter. We are looking primarily for items such as:

- (some of us) need to catch up or learn new technologies such as ReactJS, AngularJS, NodeJS or others in the more detailed list below. Don't just list the technology but also a weekly schedule and resources to use.
- Need to work on design and implementation items that were left out during the quarter, including UI things like professional design and consistent look-and-feel, code things like minor bugs, range/validity checks, etc.
- Need to stay in touch with each other and with the sponsors including something social, holiday events and wishes, email updates, continue using your communication and messaging channels, etc.
- A general agreement to stay in touch, to continue working, to keep your hands dirty, and to maintain momentum during downtime.

The key to a good learning plan is to consider everything. That means not just a programming language or IDE, but also:

- If I know the language (say Java), do I still need to learn additional aspects of it, such as J2EE, JDBC, Java reflection, some MVC framework, Java for Android, etc.

- Any UI design or web languages? Do I need to learn Ruby, PHP, JavaScript, HTML5, AJAX, etc.?
- Any mobile platform such as iPhone development with iOS and Objective-C?
- Any tools or systems outside of the application itself? My SQL or PHP-DB? Drupal or other CMS?
- Any specific frameworks or APIs that the sponsor asked you to use?
- Any tool support for your development method or project management? trac, assembla, Pivotal Tracker, Google code reviews, anything else that helps SCRUM or sprint management?
- Any tools for version control and configuration management? CVS, SVN, Git / GitHub, BitBucket?
- Any testing tools? Fit/Fitness, Selenium for web testing?
- Any user-testing and usability-engineering tools and methods? A/B testing, walkthroughs, heuristic evaluation?

Name the file TEAMNAMEWIC and submit it by putting it in the cloud folder you have shared us.

You will be held to this document!

	<u>Date</u>	<u>Topic</u>	<u>Sprints</u>	<u>Deliverables</u>
Week 0	Sep. 27	Presentations		
Week 1	Oct. 2 / 4	Project selection Group – project assignments / Discussions Group – project assignments / Discussions		File Structure Personal Gantt Chart
Week 2	Oct. 9 / 11	Project Planning, Writing Business Case Stakeholder Communication Plan Interviews, Personas, Scenarios, Stories Presentations	Sprint 1	First social photo Team Gantt chart Communication. Covenant Stakeholder comm. plan
Week 3	Oct. 16 / 18	Use Cases / Requirements Elicitation Elevator pitch / Presentations / Writing Presentations		Draft project plan Draft business case
Week 4	Oct. 23 / 25	Methodology / Agile Methodology Requirements draft, a little UML Presentations	Sprint 2	Draft requirements / Risk Analysis Peer evaluations Second social photo
Week 5	O. 30 / N. 1	UML / UI design / Balsamiq Interaction Devices Presentations		Final project plan Final business case
Week 6	Nov. 6 / 8	Testing / Implementation Maintenance / Show prototypes Presentations	Sprint 3	Updated req's / Final Risk Analysis Software / UI design draft 1 Third social photo
Week 7	Nov. 13 / 15	Meet about projects / Elephants Show prototypes Presentations / Prototypes		Software / UI design draft 2 Second peer evaluations Execution test
Week 8	Nov. 20 / 22	Final meetings Open Class Thanksgiving	Sprint 4	Final requirements Software / UI prototype draft 1 Fourth social photo
Week 9	Nov. 27 / 29	Full Presentations  Full Presentations	Sprint 5 (mini)	Peer evaluation 3 Software / UI prototype final WIC (Draft)
Week 10	Dec. 4 / 7	Wrapping up / open class / Meeting w / instructors Poster Session		Poster designs  Final WIC