YWCC Capstone HANDBOOK

NJIT New Jersey Institute of Technology

Ying Wu College Of Computing

NJIT CAPSTONE

YWCC CAPSTONE

About

Capstone is a project-based learning experience where students work in multi-disciplinary teams to address a real world problem faced by a business, government agency or non-profit. Since launching in 2002, NJIT students have completed more than 1,200 projects supporting more than 700 organizations.

The student teams work directly with a contact at a company or student-led startup to learn about the issues they are trying to resolve and develop an actionable solution.

Through the program students gain real-world work experience, problems solving skills and valuable team experience. The company mentor or sponsor meets with the students throughout the semester to monitor progress and answer questions.

This program is a perfect way to use the ecosystem of a research university, a cohort of bright undergraduate and graduate students to augment a company's resources and maintain a lead over their competition.

This digital handbook is an additional resource for students that is intended to provide all necessary information relating to the course. Please refer to Canvas or the course Discord server for updates.

TABLE OF CONTENTS

About....1
TABLE OF CONTENTS....2
Getting Started....4
1. First Week To-Do List....4
2. Review this Tour First....4
3. Pass the Tour Test....4
4. Apply to a Project Category/Option....5
Course Schedule....5
General Timeline....5
Deadlines....5
Application Approval Timelines....6
Capstone Communication....7
Course Webex....7
Capstone Project Options....8
Capstone Key Events....11
OPEN HOUSE....11
DELIVERABLES TRAINING....14
MIDTERM PRESENTATIONS....17
CAPSTONE SHOWCASE....18
Capstone Deliverables and Submissions....21
CAPSTONE NON-DISCLOSURE AGREEMENT (NDA)....21
OPEN HOUSE FEEDBACK FORM....21
SCOPE AND TIME MANAGEMENT....22
PROGRESS REPORTS....25
MIDTERM VIDEO PRESENTATION....25
FINAL SHOWCASE & FINAL REPORT....26
Track Evaluations....27
INDUSTRY PROJECTS SCORECARD....27
STUDENT STARTUPS SCORECARD....27
CISCO PROJECT & ACADEMY SCORECARD....28
RWC COACHES SCORECARD....28
OPERATIONS TEAM SCORECARD....29

Project Manager Resources.....31
PROJECT MANAGERS EXPECTATIONS SUMMARY.....31
PM INTERVIEW FORM - what to expect.....32
PROJECT MANAGERS TRAINING.....33
Honors and Graduate Students.....35
HONOR STUDENTS.....35
GRADUATE STUDENTS.....35
Capstone Support and Add-ons.....36
CAPSTONE OPEN UNIVERSITY.....36
CAPSTONE AWS ACADEMY.....36
CAPSTONE JOB OPPORTUNITIES.....36
Accomplishments and Recognition.....37
CAPSTONE IN THE NEWS.....37
CAPSTONE SOCIAL MEDIA.....37

Getting Started

Mandatory Self-Guided Tour

1. First Week To-Do List

a. Carefully review the Capstone Self-Guided tour and Canvas
b. Attend the first week virtual class during your class time at https://njit.webex.com/meet/oe2
c. Pass the Individual Tour Test
d. Join Capstone Discord as soon as possible and change your DISCORD name on this server to your FULL REAL NAME to be verified and receive communication.
e. Apply to a project category/option

2. Review this Tour First

This tour will prepare you to take the test to be eligible to apply to a project.

Capstone Self-Guided Tour-2.pptx

3. Pass the Tour Test

This test is based on the Self-Guided Tour PPT and Canvas information. The minimum passing score is 70%.

Please refer to Canvas for the link and play this Kahoot using your **FULL REAL NAME.**

4. Apply to a Project Category/Option

This application is due the first Sunday of the semester at 12 AM. You cannot apply unless you have successfully completed the Tour Test with a minimum score of 70%. If you failed to apply by the deadline, you will lose 1% and you will be limited to industry/start-up projects at the Open House itself automatically

Apply here: https://fs7.formsite.com/eljabiri2/4pubewo4pi/index.html

Course Schedule

General Timeline

Please refer to the following document for a general timeline Capstone Timeline.pptx.

Be sure to check the Course Calendar on Canvas for deliverable and Progress Report deadlines.

Deadlines

1. Joining Capstone Discord Server (and change name to your FULL NAME) : [DATE]
2. Complete Capstone Tour Test: [DATE]
3. Submit your application to a project option: [DATE]
4. Submit Capstone NDA prior to Open House: [DATE]

Application Approval Timelines

The following teams will be announced in the Announcements channel in Discord.

1. Enterprise Teams
    a. Capstone Operations Team
    b. Capstone Media & Communications Team
    c. Capstone Media & Communications Support Team
    d. Capstone Data Organization Team
    e. Capstone Software Automation Team
2. Industry Project Managers
3. Startup Founders
4. RWC Coaches
5. Cisco Coaches
6. Software Engineering Coaches
7. CISCO students

Startup members and Industry team members will be approved at the Open House.

Capstone Communication

Course Webex

The following Webex link is for Dr. Eljabiri's virtual office and it is the training environment for all virtual classes and general or project manager training meetings

https://njit.webex.com/meet/oe2

Course Discord

Discord is the main communication system of our capstone program across all capstone activities throughout the semester.

Please join our Discord server no later than the specified date by midnight and change your nickname on the server to your **FULL OFFICIAL NAME** as soon as you join. *You will not be verified until you make this change*.

Regular Classes & Events

1. **First Week: Introduction to Capstone** (Virtual on Webex)
2. **Capstone Open House** [DATE]
3. **Post Open House Week: Capstone Deliverables Training** (In Class)
4. **Capstone Showcase Final Presentations** [DATE] 12-6 PM

Capstone Project Options

A. Software Engineering Track

Under this project-based track, you have two options:

a. Industry-Sponsored Projects

A list of all industry project proposals will be available after [DATE]

Software Engineering Projects.pptx

This is the link to view industry-sponsored proposed projects:

Industry-Sponsored Projects Folder

b. Student Startup Projects

Students' startup/entrepreneurial projects are significant components of the YWCC Capstone program. We need as many startup projects as possible this semester due to the substantial increase in course enrollment. If you have an innovative idea that has potential to solve a real-world problem and become a proof-of-concept for a new business, do not hesitate to propose it and lead it as a STUDENT STARTUP CAPSTONE PROJECT FOUNDER.

The criteria to approve a startup project proposal is:

I. **Competitive Advantage:** The proposal has a unique problem or an innovative approach to solving an existing problem. It must have the potential to be marketable.

II. **Sufficient Background:** The proposal is driven by the founder's experience, knowledge, and passion in the project domain.

III. **Clarity and Persuasiveness:** The proposal is clear, convincing, carefully thought out, and logical.

IV. **Feasibility:** The proposal has a feasible project that aims to produce at least the proof-of-concept of the new product or solution within the semester-long time frame.

V. **Rewarding Learning Experience:** The proposal is inspiring and relevant to YWCC students' curriculum and training as it provides a valuable learning experience equivalent to other capstone projects.

B. Network Engineering Track

a. CISCO Academy + CISCO Project

Please refer to the following documents for more information.

CISCO Track.pptx
CISCO_SPRING_2023 - UPDATED JAN 31.xlsx

C. Capstone Enterprise Track

a. Operations Team

b. Media & Communications Team

c. Automation Team

D. Capstone Teaching/Coaching Track

a. Software Engineering Coaching Project

b. Network Engineering Coaching Project

c. RWC Coaching at NJIT: Saturday program for middle/high school students

i. RWC Coaches Orientation

ii. RWC Brochure

iii. Articles about RWC

iv. RWC YouTube Videos

1. https://youtu.be/LdfH614kYCg
2. https://youtu.be/hIS8CV1IfUw
3. https://youtu.be/E2PXd98c6BM
4. https://www.youtube.com/watch?v=tGfreQFAtOc
5. https://www.youtube.com/watch?v=LcJPqsoD2vU

6. https://www.youtube.com/watch?v=k5sR0oDsgaw

v. **RWC Schedule: TBD**

d. **RWC International Traveling Coaches**

i. **South America/Colombia Brochure**

ii. **RWC YouTube Video: Our First Trip to South America/Colombia 2015**

iii. **Articles about the Program**

iv. **Support Website**

Capstone Key Events

OPEN HOUSE

You are officially invited to our mandatory Capstone Projects Open House. Details about Open House location, date and time will be announced at the start of the semester.
Dress code: Business casual

Before the Open House:

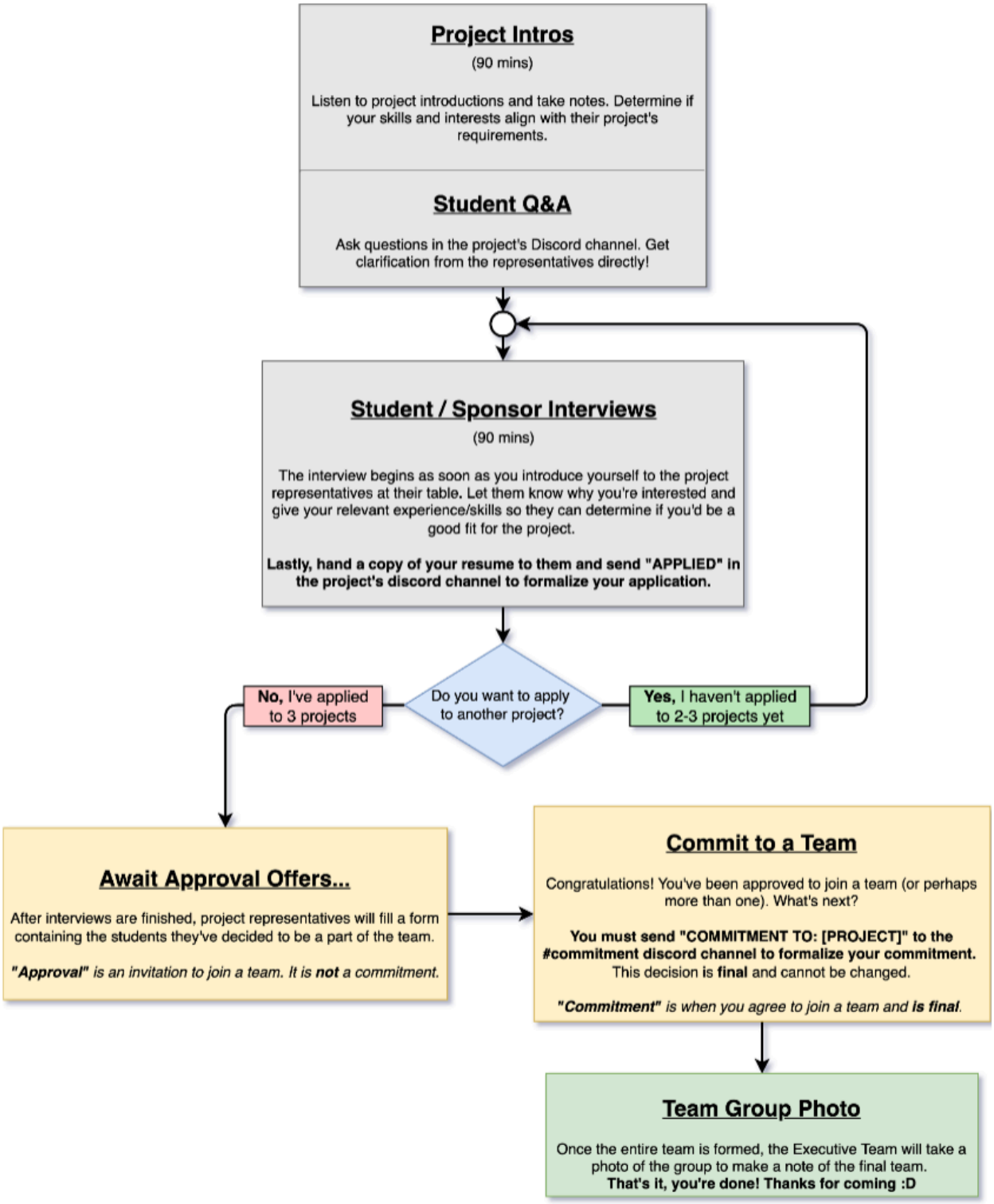
- Students will receive all project proposals with sponsors' contact information.
- Sponsors will receive all students' names, contact information, and background information.
- Communication or approvals between students and sponsors are only allowed once the open house starts.

Agenda:

- Sponsors make brief 2-MINUTE introductions about their organizations, projects, and skills sets expectations.
- Students approach sponsor tables to present themselves and ask questions based on the proposed projects.
- Students register their names with sponsors they are interested in working with using F-T-F communication and corresponding sponsor's Discord channels. Sponsor interviews them during the same open house, approves them, and then has an initial meeting with them to exchange contact information and agrees on the first formal meeting.

At the Open House:

- During the Open House, all sponsors must interview their applicants and approve their best 4-5 people team using an online form that will be shared with all sponsors. All approvals MUST be received during the Open House, using the provided online link.
- Sponsors/students must decide on their projects/teams/PMs by 4:30 PM and complete the online team selection form you will be provided with. If there are still some vacancies, we will work with the sponsors and the students to fill all available spots in the next few days.
- Sponsors' decisions will be available instantly
- Student confirmations will be required & available at the DISCORD STUDENTS CONFIRMATION channel.
- It is required that the student needs to confirm their acceptance of the sponsor project placement/approval on the same day of approval (by midnight) on the DISCORD CONFIRMATION CHANNEL. In that case, the student's approval will be automatically canceled, and their spot will be available for other students.



Open House outline diagram

DELIVERABLES TRAINING

All Capstone students are required to attend a Deliverables Training lecture.

Presentation Material

Viral Video: https://my.visme.co/v/rxmm63no-3nn8e1

Presentation Slides: https://prezi.com/view/kphxDgyAJIaj60ACYtIf/

Judges Evaluation Rubric

Criteria	Weight
1- Ability to breakdown complex problems into manageable pieces (using WBS and Gantt).	**5**
2- Ability to identify project risks and suggest strategies to minimize them.	**5**
3- Ability to define project stakeholders, scope & requirements (including the use of FDD).	**10**
4- Ability to visualize the design of the proposed solution identifying key components and their relationships (examples: class diagram, ERM, network diagram, system architecture, etc.)	**5**
5- Ability to implement the solution successfully using software and/or hardware technologies or other project-related tools (via prototypes).	**30**
6- Ability to test (validate and verify) the quality of the executed solution using user feedback and other testing techniques.	**5**
7- Presentation skills (communication): ability to explain, convince, engage and impress.	**5**
8- Presentation skills (organization): ability to organize the presentation in a meaningful way from start to end.	**5**

9- Presentation skills (personal skills): knowledge, confidence, enthusiasm, tone of voice, eye contact, humor, body movement, posture, use of time and avoiding the use of empty words.	**5**
10- Presentation skills (collaboration): equal workload & time, clarity of individual contributions, unification and coordination (including smooth transitions).	**15**
11- Presentation skills (Tools effectiveness): PPT (introductions, summaries, text, color, images, white space, transitions, works cited, spelling, grammar, etc.), Camtasia, demos and other creative techniques.	**5**
12- Team professionalism and appearance.	**5**
Total	**100**

Scope Document Template

Project Name: Password Rotation for shared application accounts	**Sponsor:** United Parcel Service, UPS
Business Unit Project Director: John Doe	**Business Unit Project Leader:** Jane Doe
IT Project Director: John Doe	**Project Manager:** Paige Turner
Requested Start Date: February 4, 2015	**Requested End Date:** May 6, 2015
Projected Start Date: February 19, 2015	**Projected End Date:** May 6, 2015
Objective: The goal of this project is to provide automation of password retrieval and rotation for shared application accounts.	

Narrative:

Password rotation is required for all applications and shared user accounts for auditing purposes and transaction history stored. Shared user accounts need to be provided with a way to retrieve passwords and document requests by only authorized individuals within a definite period of time. The password retrieval is restricted for each account based on previous authorization to avoid unauthorized password retrieval and provide individual password expiration. The retrieval transaction will be logged, and reports will be available for auditing purposes.

Risks:

Security leaks due to outdated passwords, compromised password retrieval, and people inputting information incorrectly.

Dependencies:

The members of the project will be using .NET MVC 5, .NET WCF Interface, provided mock data.

Boundaries: *(In Scope / Out of Scope)*

This project focuses on developing a web face for password retrieval, rotation, and other administration activities regarding user accounts.

Project Deliverables:

The system will provide a web platform for password rotation, retrieval, and other admin purposes.

Users will be authenticated according to their given role and can request password retrievals that must be approved beforehand.

Passwords will be rotated every 24 hours as a minimum.

Project Assumptions:

UPS IT standards will be followed.

Application must function on both mobile and desktop environments.

There will be adequate time and resources allocated for the project.

Estimated Budget: The project will take 10 weeks to be completed.			
Signatures			
Sponsor	**Date**	**Project Manager**	**Date**

MIDTERM PRESENTATIONS

- **Date/Time:** [To Be Announced]
- **Location:** Video submission on Canvas (one submission per team by PM)
- **Judges:** Operations Team
  - Rubric: See above
- **Time Limit:** 10 minutes maximum per presentation
- **Requirements**:
  - All team members must participate
  - All team members must use video and audio
- **Samples and good examples:**
  - https://drive.google.com/drive/folders/1WHimVqBlLlVNTH5equbPbvXPrGArpVCL?usp=sharing
- **Common mistakes you should avoid:**
  - Remember to include a live demo of your solution/product prototype. Snapshots are NOT accepted.
  - Don't forget to explain all MDDDE ingredients (Manage, Define, Design, Develop and Evaluate)
  - Don't forget to explain how your team implemented the SCRUM method

- Don't exclude any team member from participating in the presentation.
- Remember to introduce all your team members (photo/video and audio).
- Stay within your 10-minute time limit for your presentation.
- Don't confuse the required FDD (Feature Driven Diagram) with functional decomposition (NOT needed)

CAPSTONE SHOWCASE

Showcase Orientation Meeting:

- **Date and Time:** Please consult the course calendar
- **Webex:** https://njit.webex.com/meet/oe2
- Mandatory for PMs and optional with 2% extra credit for all other students

Resources from Orientation Meeting:

- Showcase orientation recording (Spring 2023): https://njit.webex.com/meet/oe2

Final Presentation Information:

- **Date and Time:** Please consult the course calendar
- **Location:** To be announced
- **Judging:** Panels of Industry Judges
  - Tip: The focus will be on the product instead of the process. NO MDDDE will be required beyond the poster.
  - Rubric:

Problem Identification & Analysis (5 pts) - Clear definition of the problem being solved and methods used to capture the various aspects of the problem being solved				**Total Points Earned**
Unclear; few details **0-1 pt**	Partially clear; details missing **2 pt**	Mostly clear; detailed **3 pt**	Clear; very detailed **4-5 pt**	
Sources of Information (5pts) - Described references (e.g. books, magazines, websites, reports, and other resources) used, including sponsors and professionals in the field				
Did not refer to any sources **0 pt**		Cited relevant sources **5 pt**		
Team Solution (60pts) - Prototype delivery, completion with a clear explanation of the solution				
Difficult to understand **0-15 pt**	Some parts confusing **16-30 pt**	Understandable **31-45 pt**	Easy to understand by all **46-60 pt**	
Vision (30pts) - Degree to which the team's proposed solution answers their problem, whether through an elegant and robust solution as specified by stakeholders, or through creative/innovative means				
Inelegant solution / does not answer problem **0-7 pt**	Somewhat elegant/robust existing solution OR somewhat creative/innovative new solution **8-15 pt**	Fairly elegant/robust existing solution OR fairly creative/innovative new solution **16-23 pt**	Highly elegant/robust existing solution OR highly creative/innovative new solution **24-30 pt**	

Implementation (40pts) - Consideration of factors for implementation (user-friendliness, how easy is it to integrate, cost, ease of manufacturing, how future users interact with the product, etc., and for industry projects only, sponsor requests if applicable)				
Minimal factors considered **0-10 pt**	Some factors considered **11-20 pt**	Factors well considered; some question about the proposed solution **21-30 pt**	Factors well-considered and feasible solution proposed **31-40 pt**	
Presentation Engagement (30pts) - Engagement and delivery of the presentation, in addition to professional appearance				
unprofessional presentation; minimal engagement **0-7 pt**	professional presentation OR engaging / enthusiasm **8-15 pt**	professional presentation AND engaging / enthusiasm **16-23 pt**	very professional AND exceptionally engaging / enthusiastic **24-30 pt**	
Presentation Organization (30pts) - Content and organization of the presentation				
unclear OR disorganized **0-7 pt**	partially clear; minimal organization **8-15 pt**	mostly clear; mostly organized **16-23 pt**	clear AND well-organized **24-30 pt**	

- **Time Limit:** 8 minutes maximum per presentation
- **Requirements:**
  - Dress code: Business casual
  - Everyone must stay for all presentations in their respective room
- **Schedule:** To be announced
- **Example Recording:** FINAL PRESENTATIONS - Summer 2020
  - Password: capstoneFALL2020

Capstone Deliverables and Submissions

CAPSTONE NON-DISCLOSURE AGREEMENT (NDA)

Submit the Capstone NDA on Canvas if you are doing an industry or capstone enterprise project. This document will be your admission ticket to the Open House.

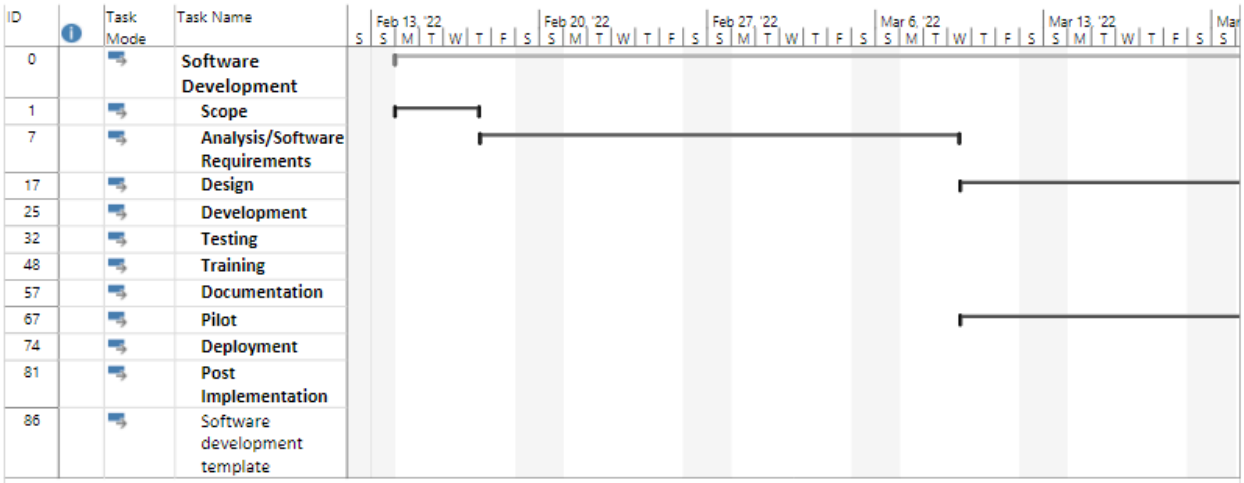
Please Note:

1) This NDA is only for students joining industry projects AND the enterprise team members. It is not required from RWC coaches, CISCO students, or startup teams (in general).
2) You need to submit this NDA online in response to this assignment. Electronic signatures are perfectly fine. You can complete, print, sign/date, scan, and upload, or do the process online.
3) You need to complete the first page by adding your name and your address and the last by signing and dating.

SCOPE AND TIME MANAGEMENT

Each team must submit a signed Scope document and Time Management document. The due dates of these documents will be announced at the start of the semester.

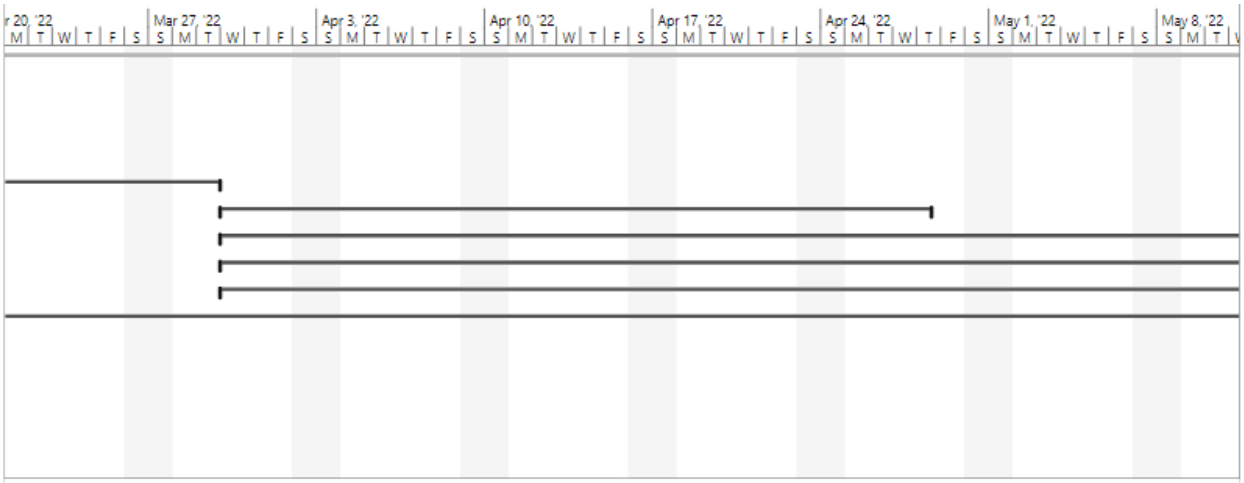
- Scope Document Example: See template above
- Time Management Example:



Project: Software Development
Date: Thu 2/16/23

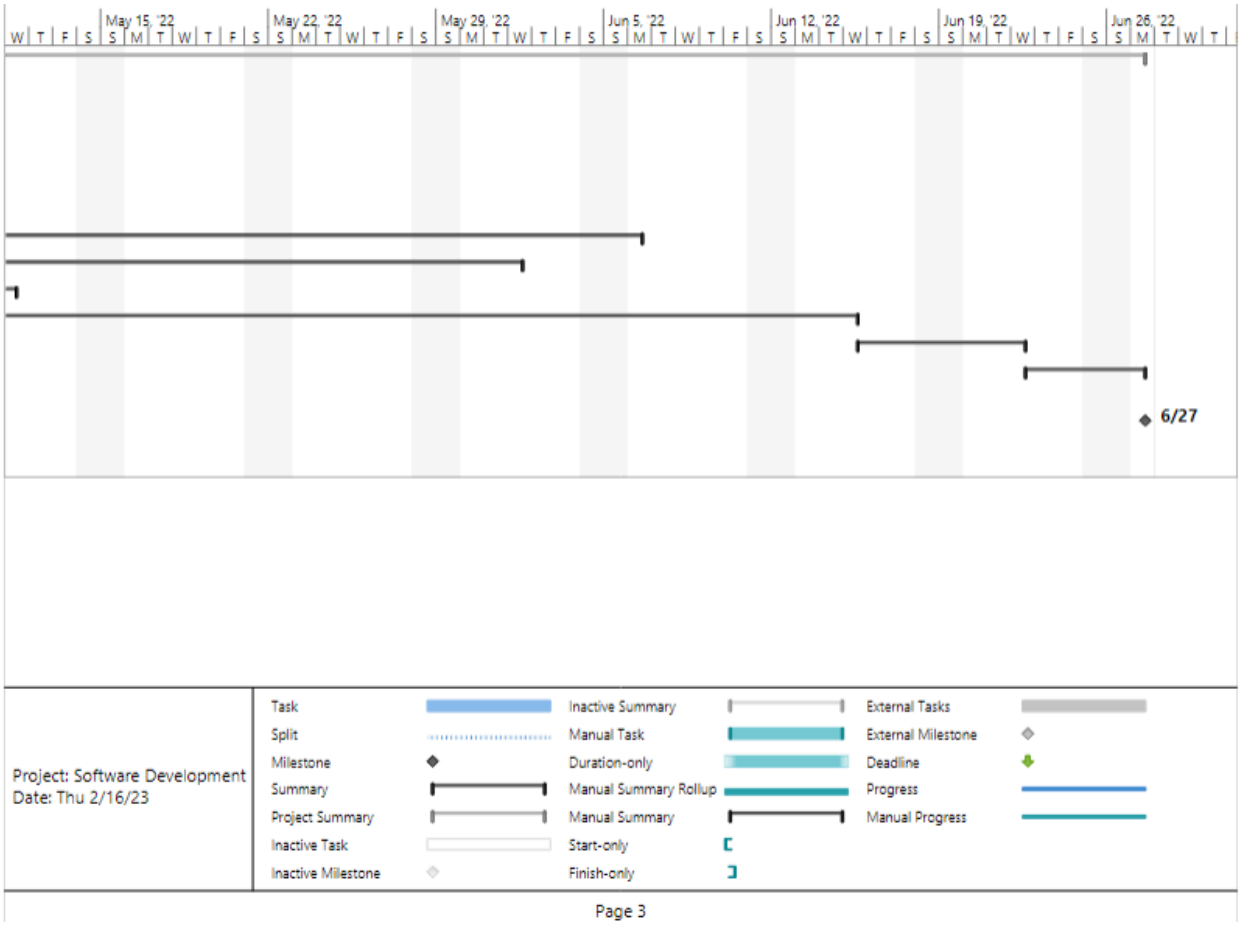
Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

Page 1



Project: Software Development
Date: Thu 2/16/23

Task	Inactive Summary	External Tasks
Split	Manual Task	External Milestone
Milestone	Duration-only	Deadline
Summary	Manual Summary Rollup	Progress
Project Summary	Manual Summary	Manual Progress
Inactive Task	Start-only	
Inactive Milestone	Finish-only	



For time management diagrams, you can use any techniques or software tools of your choice, including but not limited to: Gantt Charts, Trello, Jira, Excel, and/or MS project. etc., as long you have the following in your chart/diagram:

- WBS
- List of project activities
- Estimates of durations (including starting and ending times)
- Independencies
- Milestones (such as phases, sprints. etc.)
- Buffer
- Total duration (as opposed to deadline)
- Initial assignment of tasks to team members

And YES, the time management chart/diagram can be updated, upgraded, and fine-tuned (progressive elaboration)

PROGRESS REPORTS

Progress reports are required to be submitted by the team's Project Manager weekly, according to the course calendar deadlines.

MIDTERM VIDEO PRESENTATION

- **Date and Time:** Consult the course calendar
  - Late submissions will be subject to a 5% daily penalty for up to 5 days. After that date, no submissions will be accepted.
- **Location:**
  - Video submissions on Canvas (one submission per team by PM)
- **Judging:** Executive Team
  - Rubric: Consult the judging rubric above
- **Time Limit:** 10 minutes maximum per presentation
- **Requirements:**
  - All team members must participate
  - All team members must use video and audio
- **Samples and good examples are at:**
  - https://drive.google.com/drive/folders/1WHimVqBlLlVNTH5equbPbvXPrGArpVCL?usp=sharing
- **Common mistakes you should avoid:**
  - Remember to include a live demo of your solution/product prototype. Snapshots are NOT accepted.
  - Don't forget to explain all MDDDE ingredients (Manage, Define, Design, Develop and Evaluate)

- ➢ Don't forget to explain how your team implemented the SCRUM method
- ➢ Don't exclude any team member from participating in the presentation.
- ➢ Remember to introduce all your team members (photo/video and audio).
- ➢ Stay within your 10-minute time limit for your presentation.
- ➢ Don't confuse the required FDD (Feature Driven Diagram) with functional decomposition (NOT needed)

FINAL SHOWCASE & FINAL REPORT

(See Final Presentation information under “Key Events”)

Final Report Information:

- ❖ Deadline will be announced
- ❖ Every Project Team (Industry and E-Teams) needs to produce a typed final formal report. This report is due on the date scheduled on the syllabus. Submit to Canvas by PM only and include the names of all “contributing” team members in the title page. The final report is worth 100 points (10%) towards your final grade this semester.
- ❖ **Undergraduate Requirements (exclude Honors):**

REPORT REQUIREMENTS
• Each chapter of the report must have one (1) single author. Team members cannot collaborate on chapters. • Each chapter should average 3 pages. A full report should include all chapters but there is no minimum number of pages and there is no maximum. This will vary depending on the number of chapters. However, we are more concerned about the quality rather than quantity in your deliverables. • Author of each chapter should be explicitly stated in the footer of every page.

- Only members of your team not exempt from the report will complete the report. This is uncommon.

REPORT OUTLINE

- Title Page: Title, Sponsor, Team Members (indicate excused from report or not), Course Name & Section, Instructor, Date
- Chapters 1-6, as included (see below).
- References (as applicable)

FINAL REPORT CHAPTERS

The report consists of multiple chapters. Teams will complete the chapters as follows. For teams with less than four (4) students completing the report, if there are N non-excused team members completing the report, the report must consist of N+1 chapters. Chapters 1 to 4 are mandatory for 3-people teams. Chapters 1 to 3 are mandatory for 2-people teams For teams with four (4) people completing the report, all first four chapters and chapter 6 are mandatory. Teams of 5 people are required to do all 6 chapters

CHAPTER 1: INTRODUCTION

Project Background, Problem Definition, Glossary of terms used, Iteration or Revision Updates

CHAPTER 2: PROJECT MANAGEMENT

Task Analysis, Roles, WBS/Gantt, Risk Identification and Management

CHAPTER 3: DEFINE

Stakeholders, Requirements Gathering, Project Scope
Extra Credit: FDD Requirement Grouping and Use Case Diagrams

CHAPTER 4: DESIGN

ER, Class, Network Diagrams. Implementation Details.
Extra Credit: Survey of at least three (3) alternative solutions and a comparison between them

CHAPTER 5: DEVELOPMENT

Outputs / Screenshots and description of your Solution. No source code.

Extra Credit: Develop a brief User Manual for the intended user of your solution
CHAPTER 6: EVALUATION AND CONCLUSION
Solution Testing, Verification, Validation. Team conclusions: What did you learn, what would you do differently, were you successful?
GRADING OF REPORTS
Reports are graded according to the following criteria: • Adherence to assigned format. • Completeness. Do not leave out important details. • Presentation, Formatting, Spelling and Grammar. You will lose points for poor form. • Detail in analysis. Do not give a superficial report. Give sufficient technical detail, while remaining at the project level. • Mastery. Your report should indicate that your team understands in detail the project, the problems it solves, and the process you used to do it. If your team has been productive during the semester, this report should be straightforward.
ACADEMIC INTEGRITY NOTICE
This assignment is subject to the NJIT Honor Code. All outside materials used in the construction of this report must be properly cited using an accepted citation format (MLA/APA preferred). Plagiarism will not be tolerated and will be reported to the Dean of Students. Include a Works Cited or Bibliography as needed.

❖ **Honors and Graduate Requirements:**

REPORT REQUIREMENTS
• 12pt Times New Roman Single Spaced • Each chapter of the report must have one (1) single author. Team members cannot collaborate on chapters. • Each chapter should consist of 5 pages. A full report should average 25 pages. This will vary depending on the number of chapters based on the size of the team.

- Author of each chapter should be explicitly stated in the footer of every page.
- Only members of your team not exempt from the report will complete the report.

REPORT OUTLINE

- Title Page: Title, Sponsor, Team Members (indicate excused from report or not), Course Name & Section, Instructor, Date
- Chapters 1-6, as included (see below).
- References (as applicable)

FINAL REPORT CHAPTERS

The report consists of multiple chapters. Teams will complete the chapters as follows. For teams with less than four (4) students completing the report, if there are N non-excused team members completing the report, the report must consist of N+1 chapters. Chapters 1 to 4 are mandatory for 3-people teams. Chapters 1 to 3 are mandatory for 2-people teams For teams with four (4) people completing the report, all first four chapters and chapter 6 are mandatory. Teams of 5 people are required to do all 6 chapters

CHAPTER 1: INTRODUCTION

Project Background, Problem Definition, Glossary of terms used, Iteration or Revision Updates.

This is similar to a paper abstract. Your introduction should tell the viewer what the project is about without assuming specific knowledge and without adding any particular material that might obscure the summary. It should anticipate and combine key elements described in more detail in the rest of the project report. Also, importantly, it should motivate the viewer about the project, to encourage them to read the whole report.

Usually it should include such things as:

- The objectives of the project;
- the intended audience of the completed project;
- the scope of the project;
- the approach used in carrying out the project;
- Assumptions on which the project is based; and a broad overview of key outcomes.

CHAPTER 2: PROJECT MANAGEMENT

Task Analysis, Roles, WBS/Gantt, Risk Identification and Management

In this chapter, you must do a thorough analysis of:

1) Time management including your breakdown structure and Gantt chart with full analysis of your charts, the basis of your estimations and all conclusions. You should make the case how your plan allowed you to finish the project on time, what obstacles you have encountered and how you tackled them.
2) Software development life cycles strategies comparing traditional methods with Agile and Scrum and analyzing Scrum in the light of your project and how it was implemented. You should evaluate SCRUM and propose a future approach for similar projects.
3) Risk analysis including potential risks, how did you measure them and prioritize them and what strategies you tool to minimize their impact on your project including a Cybersecurity section.
4) Discuss briefly human resources and communication management in your project.

CHAPTER 3: DEFINE

Stakeholders, Requirements Gathering, Project Scope

In this chapter, you must:

1) Identify thoroughly each one of your stakeholders, their influence, and their interest and how you analyze each one of them and what approach you took to engage them.
2) Define your project scope beyond the scope document as well as the functional and non-functional requirements of your project in terms of requirements definition and specifications.
3) Describe your AS-IS system using use case diagrams and/or data flow diagrams.
4) Describe thoroughly at least three requirements gathering techniques you have used to determine user requirements of the project.
5) Write the project user stories of your project following the SCRUM format.

Extra Credit: FDD Requirement Grouping and Use Case Diagrams

CHAPTER 4: DESIGN

Discuss the implications of constraints on your solution and different design choices, and then give reasons for making the choices you did. You must develop a “literature review” and create an evaluation matrix to quantitatively evaluate potential solutions to the problem prior to the selection of your final design. This should include:

- Existing solutions relevant to the problem area, and why these are unsuitable or insufficient in this particular case;
- Methods and tools that your solution may be based on or use to solve the problem; and so on.

It is expected that you make extensive use of diagrams, such as entity-relationship diagrams, UML diagrams, state charts and/or other relevant techniques

ER, Class, Network Diagrams. Implementation Details.

Extra Credit: Survey of at least three (3) alternative solutions and a comparison between them

CHAPTER 5: DEVELOPMENT

This is the implementation section which explains your solution at a finer level of detail, all the way to the code level.
It can also depict any problems or challenges that you encountered during development and how you tackled them.

Please do not even attempt to describe all the code in the system, and never include large pieces of code in this chapter. Instead select and explain just the pieces of code which, for example:

- are especially critical to the operation of the system;
- you feel might be of particular interest to the reader for some reason;
- Illustrate a non-standard or innovative way of implementing an algorithm, data structure, etc..

You should also mention any unforeseen problems you encountered when implementing the system and how and to what extent you overcame them. Common problems are:

- difficulties involving existing software, because of, e.g., its complexity, lack of documentation; lack of suitable supporting software;
- Over-ambitious project aims.

Outputs / Screenshots and description of your Solution. **No source code**.

Extra Credit: Develop a brief User Manual for the intended user of your solution.

CHAPTER 6: EVALUATION AND CONCLUSION

Solution Testing, Verification, Validation and quality assurance. Team conclusions: What did you learn, what would you do differently, were you successful?

You should describe how you demonstrated that the system works as intended (or not, as the case may be). Include summaries of the results of all major tests that took place. This is also the place to describe the reasoning behind the tests to evaluate your results, what tests to execute, what the results show and why to execute these tests.

You must also critically evaluate your results in the light of these tests, describing its strengths and weaknesses. Ideas for improving it can be carried over into a necessary Future Work section. The real world has taught us that no project is perfect, and even a project that has failed to deliver what was intended can achieve a good grade, if it is obvious that you have learned from the mistakes, challenges and difficulties.

This chapter also gives you an opportunity to present a critical assessment of the project as a whole. This could include, for example, whether the methodology you have selected and the programming language used were adequate.

GRADING OF REPORTS

Reports are graded according to the following criteria:

- Adherence to assigned format.
- Completeness. Do not leave out important details.
- Presentation, Formatting, Spelling and Grammar. You will lose points for poor form.
- Detail in analysis. Do not give a superficial report. Give sufficient technical detail, while remaining at the project level.
- Mastery. Your report should indicate that your team understands in detail the project, the problems it solves, and the process you used to do it.

If your team has been productive during the semester, this report should be straightforward.

ACADEMIC INTEGRITY NOTICE
This assignment is subject to the NJIT Honor Code. All outside materials used in the construction of this report must be properly cited using an accepted citation format (MLA/APA preferred). Plagiarism will not be tolerated and will be reported to the Dean of Students. Include a Works Cited or Bibliography as needed.

Sponsor Evaluation Form (up to 35% of Final Grade):

- Deadline and Form Link will be announced

Track Evaluations

INDUSTRY PROJECTS SCORECARD

	Quantity	Per Item	Total
Attendance			By deduction
Scope and Gantt	1	50	50
Progress Reports	8	20	160
Midterm presentation	1	140	140
Final Presentation	1	250	250
Sponsor Evaluation	1	300	300
Final Report	1	100	100
		Total	**1000**
	Extra Credit Max		100
	Maximum Points		**1100**

STUDENT STARTUPS SCORECARD

	Quantity	Per Item	Total
Attendance & Participation	4	50	200
Scope and Gantt	1	50	50
Progress Reports	8	20	160
Midterm presentation	1	100	100

Final Presentation	1	350	350
Sponsor Evaluation			0
Final Report	1	140	140
		Total	**1000**
	Extra Credit Max		100
	Maximum Points		**1100**

CISCO PROJECT & ACADEMY SCORECARD

	Quantity	**Per Item**	**Total**
Scope and Gantt Chart	1	20	20
Progress Reports	8	20	160
CISCO ACADEMY	1	500	500
Midterm presentation	1	70	70
Final Presentation	1	150	150
Final Report	1	100	100
		Total	**1000**
	Extra Credit Max		100
	Maximum Points		**1100**

RWC COACHES SCORECARD

	Quantity	Per Item	Total
Pre/Post Program Deliverables	5	20	100
Attendance & Participation	12	40	480
Midterm Presentation	1	20	20
Final Presentation	1	100	100
RWC students evaluation	1	100	100
Final Report	1	100	100
Overall RWC Director Assessment	1	100	100
		Total	**1000**
	Extra Credit Max		100
	Maximum Points		**1100**

OPERATIONS TEAM SCORECARD

	Points	Explanation
Attendance (overall + w/ team)	100	team meetings and capstone meetings
Weekly progress reports	100	10 each for 1%
Job performance in ROLE	300	HR, CRM, MIS, and logistics
Job performance in SHARED responsibilities	150	Open house, assessment of teams deliverables, midterm and showcase, etc.
Students Evaluation	100	Via an online form at the end of

		the semester
Instructor Overall evaluation	150	Professionalism, attitude, communication, leadership, creativity, passion, etc.
Team PM Overall evaluation	100	Commitment, collaboration and performance
	1000	**Total Score**

Project Manager Resources

PROJECT MANAGERS EXPECTATIONS SUMMARY

Hard working & successful project managers will receive substantial extra credit and special certificates and recommendation letters as we have high expectations from them due to their instrumental roles.

Project managers who do not take their responsibilities seriously are subject to job termination and replacement.

Key responsibilities include but are not limited to:

1) Project managers are supposed to be role models (i.e.: first who attend classes, first who attend their team meetings and first who respond and submit their deliverables on time).
2) Project managers should give specific project deliverables instructions to their team members and make sure that all individual responsibilities are crystal clear for each team member.
3) Project managers should be able to motivate their team members. They should create synergy and energy in their teams and create value from the diversity of members' capabilities and backgrounds.
4) Project managers should be excellent communicators all the time. They should also be organized and keep a record of members attendance, participation and report to class instructor regular progress reports as instructed. They should also eliminate free riding if a team member is insisting on not acting responsibly after all help, orientation and two internal warnings.
5) Project managers should create an online collaboration system that documents all team activities, strategies, deliverables and resources for every class and every presentation.
6) Project managers should be democratic, collaborative, resourceful and respectful to their team members. They should discuss with their team members the various strategies that the team should consider to tackle the challenges presented in the project.

7) Project managers should work collaboratively with the executive team – including team mentors, attend project managers training and participate in F-T-F and virtual project managers meetings that take place during class time
8) Project managers should always have a positive attitude despite all challenges. They should not see failure as an option and fight for the success for their teams, projects, sponsors and the capstone program.

PM INTERVIEW FORM - what to expect

Project Manager Evaluation Form	
Name of Project Manager:	Name of Evaluator:
Code	**Scale**
5	The Absolute Best Project Manager that we have knowledge of and experience with anywhere. Very Exceptional and Far Superior to others. Value added to the project / Achieved on almost always /
4	Above Average -- Noticeably competent / capable / proficient / adept / knowledgeable / skilled / High Quality / Achieved on a consistent basis /
3	Average: (satisfactory / acceptable / suitable / reasonable / no major problems / potential is there / dependable / meets the stands of the job
2	Marginal (Fair: improvement is necessary / deficient in certain area, but potential may be there)
1	Below Average (Needs significant or substantial improvement / really lacking / unsatisfactory)
0	Not observed or applicable
Project Manager's Rating	
___ Ability to manage Team/Project	__ Dependability (can be counted on, return calls/email)
__ Ability to motivate/ empower/	__ Ability to anticipate and analyze

influence others	problems
__ Professionalism	__ Timelines (attendance, punctuality, fulfillment of obligations)
__ Ability to achieve project goals	__ Ability to locate & utilize resources effectively
__ Written communications ability	__ Ability to work with others (attitude toward team members)
__ Oral communications ability	__ Ability to present options and/or reach decisions
OVERALL PROJECT PERFORMANCE OR END PRODUCT	
__ Tolerance and Adaptability	__ Awareness / Adherence to Schedule
__ Attitude toward sponsor / stakeholders	__ Focus on high quality results
Circle One: **Definitely recommend** **Somehow recommend under some conditions**	 **Recommend** **Not recommended**
Please note any specific comments here or on a separate sheet (weak points needing improvement, strong points, instances of going the extra mile.)	

PROJECT MANAGERS TRAINING

See Canvas for the Project Managers Training slides.

Honors and Graduate Students

HONOR STUDENTS

Earning Honors credit requires taking additional responsibility
To earn honors credit, students must choose any one of the following tracks:

1) Found a Startup Team
2) Lead a sponsored project as a Project Manager
3) Lead a CISCO project as a Project Manager
4) Develop & Coach a K-12 curriculum for RWC
5) Join the Capstone enterprise teams
6) Complete a full, highly detailed, graduate-level, and very rigorous final report

Honors Students are Highly Encouraged to take **Leadership Positions**. **The report option can be extremely demanding at the end of the semester**.
Project Manager, Startup Founder, Capstone enterprise teams

GRADUATE STUDENTS

Graduate students can only join industry-project teams as members or PMs. They work on the same projects as undergraduate students and are subject to the same evaluation system, except for the requirement to do a graduate version of the final report.

Capstone Support and Add-ons

CAPSTONE OPEN UNIVERSITY

Tech talks by students, for students

Capstone students have an opportunity to share their expertise with other students.

Guest speakers from alumni, industry and community

Learn the subjects your professor doesn't teach

Topics cover many student interests, including mobile development, software design patterns, blockchain, cybersecurity, and even learning to make a viral video.

1% Extra Credit for each full active attendance

CAPSTONE AWS ACADEMY

As part of the Capstone Open University, students are able to optionally join a self-paced AWS Academy Cloud Foundations course on Canvas. Details on this course will be announced at the start of the semester

Accomplishments and Recognition

CAPSTONE IN THE NEWS

Computing Students Provide Real-World Solutions for Bank of America in Capstone Project

Entire Computing Capstone Project Team Hired by Corporate Sponsor

Capstone Digital Flyer

CAPSTONE SOCIAL MEDIA

Website: https://ywcccapstone.com/

LinkedIn: https://www.linkedin.com/company/74773402