Carnegie Mellon University
Master of
Software Engineering

17-442/17-642: Software Management Theory

M, 8:20 - 9:40AM, W., 8:20 - 9:40AM. All times and dates are Eastern Standard Time

Recitations – only for students in the on-line program, Tr. 6:00PM - 6:50PM

A4, Spring 2021, 6 Units

Instructor	Email	Office Location & Hours
Prof. Eduardo Miranda	mirandae @ andrew.cmu.edu	After class, or by appointment. Remote

Course Description. This course will look at software development from an organization behavior perspective. It its designed for students who want to understand the relationship between business context, software development processes, knowledge creation, culture and organizational structure with the purpose of becoming change agents or manage the software development function at the department, business unit level or above.

The course will also highlight the need to follow good work principles in order to avoid ethical failures as evidenced by recent affairs.

The course consists of instructor lectures, student presentations and the analysis of a case study. It involves weekly readings and short quizzes to keep up with the pace of the lectures.

Prior Knowledge. Exposure to software development activities, undergraduate course in Software Engineering

Learning Objectives. After completing this course, students will be able to:

- Explain the main theories of leadership, motivation and team dynamics
- Explain common coordination mechanisms, organizational knowledge creation and control
- Explain the fundamentals type of organization structures
- Understand the many variables to be contended with in a given organization design, the relationships between them and how to intervene in a congruent manner

- Apply systems thinking to the evaluation of future consequences arising from the decisions made today

Learning Resources. Reading material will be provided. Representative readings include:

Mintzberg, The Essence of Structure
Nonaka, Dynamic Theory Organizational Knowledge Creation
Allen, The Flow of Communication in Space
Ouchi, Conceptual Framework for the Design of Organizational Control Mechanisms
Larman, Feature Teams
Wenger, Communities of Practice
Hersleb, Architectures, Coordination, and Distance: Conway's Law and Beyond
Andrew, Collaborative Software Development Based on Sociotechnical Networks
Stol, Inner sourcing tutorial
Larman, Systems Thinking
Braun, System Archetypes

Use of Zoom in the Class. In our class, we will be using Zoom. The links will be made available on Canvas. Please make sure that your Internet connection and equipment are set up to use Zoom and able to share audio and video during class meetings. Let me know if there is a gap in your technology set-up as soon as possible, and we can see about finding solutions.

Sharing video: In this course, being able to see one another helps to facilitate a better learning environment and promote more engaging discussions. Therefore, our default will be to expect student to have their cameras on during lectures and discussions. However, I also completely understand there may be reasons students would not want to have their camera son. If you have any concerns about sharing your video, please email me as soon as possible and we can discuss possible adjustments. Note: You may use a background image in your video if you wish; just check in advance that this works with your device(s) and internet bandwidth.

During our class meetings, please keep your mic muted unless you want to ask a question or share something with the class or your breakout group.

Course and Grading Policies

Lectures in which the group is due to present or discuss an assignment, as indicated in the syllabus are mandatory. Being absent, without cause sanctioned by the instructor, will result in the forfeiture of the grade. The grading philosophy is explained on Figure 1.

- Low stakes, incremental, self regulated ➡ Many small evaluations

- Allows for less than perfect
- Tolerates a few mishaps. There are no excuses accepted, except for major cause ➡ The total of the points adds to more than 100%, so you can get a few bad grades or miss an assignment, and still get an "A"

- Penalizes consistent failure to perform ➡ If you consistently miss deliveries, skip classes and get bad grades you will fail the course

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Figure 1 Grading philosophy

Final grades in the course will be assigned according to the following scale:

- Maximum number of points = 120
- 110+ points, "A+"
- 100+ points, "A"
- 90+ points, "A-"
- 80+ points, "B+"
- 70+ points, "B"
- 65+ points, "B-"
- 55+, "C"
- "D"

Attendance, quizzes, and assignments

- 10 quizzes, 0 – 5 points each, 50 points maximum
- Assignment 1, Teach your peers, 0 – 30 points

- Assignment 2, ING Agile Transformation, 0 – 35

- Instructor discretion, 5 points

CANVAS Quizzes

- These quizzes serve a triple purpose:
    - To track class attendance
    - To make sure the students look back at the material presented in class and the readings
    - To verify the understanding of the concepts and clarify when necessary
- For regular students, quizzes must be taken on the day the class was taught and within the next day by distance students. Each quiz, once started, must be completed in a 10 minutes window
- "Open book"
- Typically, 2 to 3 multiple choice questions referring to what was presented in the slides in the previous lecture and the indicated readings
- Two types of questions:
    - Questions testing knowledge of terminology, categories and classifications
    - Questions testing principles and generalizations. These questions can have more than one correct response, but there are some better than others
- Grading
    - 1 point for taking the quiz
    - Up to 4 points for correctly answering questions

Assignments

- Group assignments, one file per group consolidating all the material produced by the group
- Submissions must be:
    - In PDF format
    - First page must include name or names of the students and group number as applicable
    - Self-descriptive
    - Self-contained
    - Include all elements required by the preparation instructions

- "Professional grade", you should not submit anything you would not submit or present in a business setting. Readability, presentation and grammar will be graded
- Due date:
  - 11:59PM/23:59 of the day before the class in which the material is to be used

Instructor discretionary grading

Points granted by the instructor to reward excellent performance which is not captured by the instruments above as it is serendipitous and personal, such as

- Making an appropriate observation
- Volunteering a response to a question
- Asking a pertinent question
- Helping other students

Do not expect to gain these points for doing what a good student should do. These points will be given to those going above and beyond.

Recording of Class Sessions. All synchronous classes will be recorded via Zoom so that students in this course (and only students in the course) can watch or re-watch past class sessions. Please not that breakout rooms will not be recorded. I will make recordings available on Canvas as soon as possible after each class session (usually within 3 hours of the class meeting). Recordings will live in our Canvas website. Please note that you are not allowed to share these recordings. This is to protect your FERPA rights and those of your fellow students.

Course Schedule. The following schedule provides a general overview of topics and assignments and will be not updated during the course. For actual dates and changes, please refer to the online syllabus in Canvas.

No.	Date	L/A	Topic	Quiz/Reading Due
1	Monday, March 22, 2021	L	Introduction	
2	Wednesday, March 24, 2021	L	Coordination, control and team knowledge	Mintzberg, The Essence of Structure
3	Monday, March 29, 2021	L	Coordination, control and team knowledge	Nonaka, Dynamic Theory Organizational Knowledge Creation Allen, The Flow of Communication in Space
4	Wednesday, March 31, 2021	L	Organizational forms	Ouchi, Conceptual Framework for the Design of Organizational Control Mechanisms
5	Monday, April 5, 2021		No class	Lorsch, Notes on Organizational Design
6	Wednesday, April 7, 2021	A	Teach you peers date - Process analysis presentation, 3 teams	McShane, Team Dynamics
7	Monday, April 12, 2021	A	Teach your peers date - Group Teams, Group cohesion and Development, Group structure	Robins, Early Theories of Motivation Williams, Motivation
8	Wednesday, April 14, 2021	A	Teach your peers date - Group performance, Group leadership, Group decision making, Group conflicts	Schemerhorn, Leadership Essentials
9	Monday, April 19, 2021	L	Projects, functions, component and feature teams, communities of practice, Spotify	Larman, Feature Teams Wenger, Communities of Practice
10	Wednesday, April 21, 2021	L	Team topologies - Guest lecturer Manuel Pais	Hersleb, Architectures, Coordination, and Distance: Conway's Law and Beyond
11	Monday, April 26, 2021	L	Inner sourcing, distributed teams, socio technical congruence	Andrew, Collaborative Software Development Based on Sociotechnical Networks Stol, Inner sourcing tutorial
12	Wednesday, April 28, 2021	A	ING Case study	
13	Monday, May 3, 2021	L	System thinking	Larman, Systems Thinking
14	Wednesday, May 5, 2021	L	System thinking archetypes	Braun, System Archetypes

Accommodations for Students Disabilities. If you have a disability and have an accommodations letter form the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.

Academic Integrity. Honesty and transparency are important to good scholarship. Plagiarism and cheating, however, are serious academic offenses with serious consequences. If you are discovered engaging in either behavior in this course, you will earn a failing grade on the assignment in question, and further disciplinary action may be taken.

For each major assessment, you will be asked to sign a statement affirming that you will not cheat, plagiarize, or receive unpermitted assistance on the work that you turn in. For a clear description of what counts as plagiarism, cheating, and/or the use of unauthorized sources, please see the University's Policy on Academic Integrity.

If you have any questions regarding plagiarism or cheating, please ask me as soon as possible to avoid any misunderstandings. For more information about Carnegie Mellon's standards with respect to academic integrity, you can also check out the Office of Community Standards & Integrity website.

Student Wellness. As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. CMU services are available, and treatment does work. You can learn more about confidential mental health services available on campus at the Counseling and Psychological Services website. Support is always available (24/7) from Counseling and Psychological Services: 412-268-2922.

This semester is unlike any other. We are all under a lot of stress and uncertainty at this time. Attending Zoom classes all day can take its toll on our mental health. Make sure to move regularly, eat well, and reach out to your support system or me if you need to. We can all benefit from support in times of stress, and this is semester is no exception.

Respect for Diversity. It is my intent that students from all diverse backgrounds and perspective be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know if any of our class meetings conflict with your religious observations so that I can make alternate arrangements for you.