Carnegie Mellon University
Master of
Software Engineering

17-622: Agile Development

M, W, 2:00 – 3:20 PM, F, 12:30 – 1:50 PM, In-person expectation, 3SC 265
B22, Fall 2025, 6 Units

Instructor	Email	Office Location & Hours
Prof. Dr. Eduardo Miranda	mirandae @ andrew.cmu.edu	3SC 268, by appointment

Course Description. Agile development methods refer to a number of software development approaches that adopt self-organization, adaptive planning, evolutionary development, frequent deliveries and working closely with and incorporating feedback from customers throughout the development process as their principles of operation to achieve responsiveness. This course will introduce students to two well-known agile methods: Scrum and Kanban, connecting their practices to established group dynamics and knowledge management theories to explain why they work and under what circumstances.

The course has been designed for students seeking to acquire a working knowledge of agile project management methodologies, tools, and techniques with a focus on:

- Understanding, validating and defining the work to be done
- Estimating the effort required
- Planning the work
- Tracking and controlling progress
- Reflecting

The course is organized around Scrum and Kanban, two of the most popular agile development method, and follows a learn by doing paradigm so students taking it must be prepared to work in groups during class. Each lecture is typically followed by a class activity in which the concepts learned are put into practice.

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

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

- Apply the Scrum framework

- Describe the scope of work by means of user stories and story maps
- Estimate the amount of work to be done using the planning poker technique
- Conduct design based planning
- Plan releases using the MoSCoW method
- Use a milestone plan to guide execution
- Make recommendations for improvement
- Understand key ways to measure the success of the processes selected
- Describe the Kanban method

Learning Resources. Reading material is provided.

User Stories Primer, Leffingwell, 2009

Priming Kanban, Boerg, 2012

Improving task breakdown comprehensiveness in agile projects with an Interaction Room, Grapenthin, 2015

Time boxing planning: Buffered Moscow rules, Miranda, 2011

Essential Scrum – Chapters, Rubin, 2013

Context Diagraming, J. Means, 2005

Challenges of Traditional and Agile Software Processes, Sanchez, 2018

The Scrum Guide, Schwaber, 2017

Planning Poker, Trendowics, 2018

Introduction to Disciplined Agile Delivery, Ambler, 2018

Course and Grading Policies. The course features two parallel tracks. A traditional lecture track, where the topics are presented and discussed, and a learn by doing track, the class activities, in which the concepts presented are put into practice through a running assignment performed in groups. See Figure 1. The grading philosophy is explained on Figure 2.

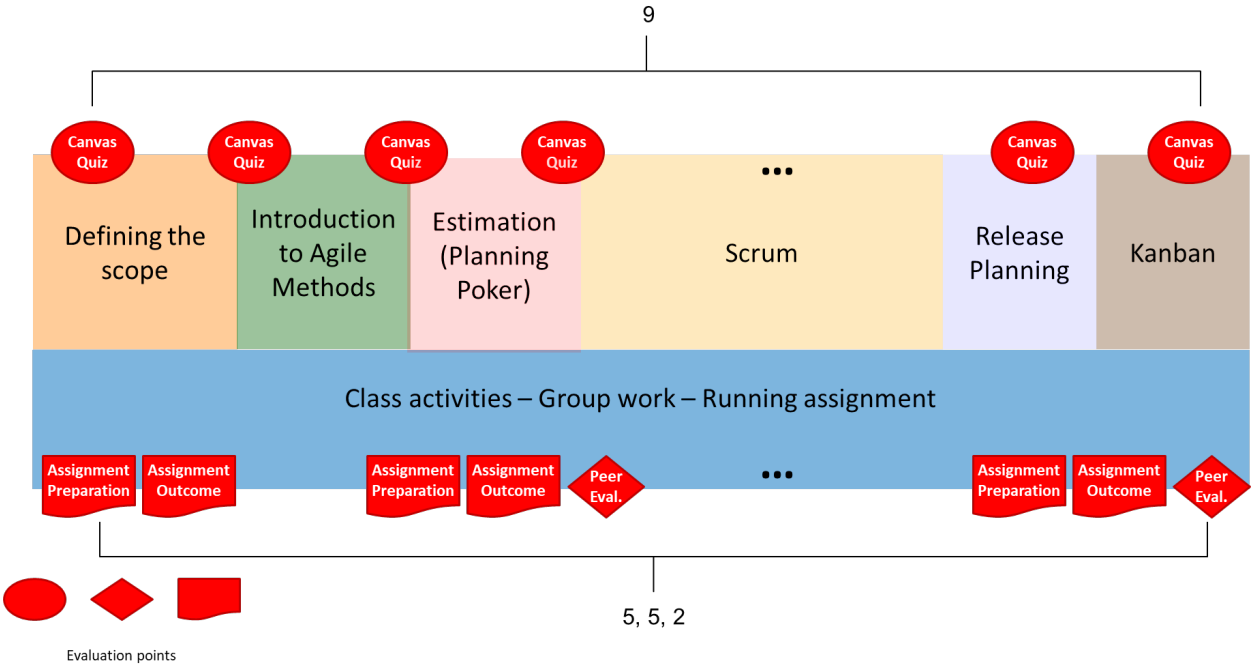

Figure 1 Course architecture

- Low stakes, incremental, self regulated, few exceptions → 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 or quiz, and still get an "A"
- <u>Penalizes consistent failure to perform</u> → If you consistently miss deliveries, skip classes and get bad grades you will fail the course

Figure 2 Grading philosophy

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

- Maximum number of points = 103
- 99+ points, “A+”
- 90+ points, “A”
- 80+ points, “A-”
- 75+ points, “B+”
- 70+ points, “B”
- 65+ points, “B-”
- 55+, “C”
- “D”

Attendance, quizzes, and assignments

- Class activities are mandatories
- 9 quizzes, with different gradings, 33 points maximum, see attendance policy for quizes
- 2 peer evaluations, 0 - 10 points each, 20 points maximum
- 3 Individual assignment preparations, 0 – 5 points each, 13 points maximum
- 3 group assignment preparations, 0 – 5 points, 12 points maximum
- 5 group outcome assignment submissions, 0 – 5 points, 25 maximum

Canvas quizzes

These quizzes serve a double purpose:

- To track class attendance
- To make sure the students comprehend the material presented in class
- Duration 10 minutes
- “Open book”
- Typically 3 to 5 multiple choice questions referring to what was presented in the slides in the previous lectures 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
- Number of points depends on the quiz
- Declaring attendance is based on an honor system. The professor might void the quiz if you did not attend the class
- While discussions during class are welcomed and difference of opinions accepted, due to the ambiguity or lack of definitive definition for many of the concepts taught, answers will be evaluated with regards to what was taught in class.

Assignments

- Running assignment, read it early in its entirety to understand the work. Do not wait until the assignment is due
- There are 3 types of assignments: Individual preparation, group preparation, group results. All submissions for them must be:
  - In PDF format
  - Self-descriptive
  - Single file
  - 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 considered
- Preparations grading
  - Class feedback, no individual feedback
  - Good submissions, up to 5 points
  - Somehow incomplete, rushed, unprofessional submissions, 2 points
  - No submission, subpar submissions, very unprofessional, 0 points
  - Preparation submissions are generally due by 12:00 PM but some are not, please check the Canvas calendar
- Results grading
  - Group feedback
  - Good submissions, up to 5 points
  - Somehow incomplete, rushed, unprofessional submissions, 2 points
  - No submission, subpar submissions, very unprofessional, 0 points
  - No preparation -2 points
  - Unjustified absence, over 5 minutes late the student will forfeit the grade
  - Result submissions due by 11:59 PM, but some are not, please check the Canvas calendar

Peer evaluations

- Group members will evaluate each other's contribution to the group project. Things to consider include: timely responses to mails and other forms of communication, meeting attendance and punctuality, behavior towards others, and timeliness and quality of work. It is expected that most students will do their fair share. Peer evaluations amount to small percentage of your grade but 100% of your reputation
- Procedure

- There will be 2 peer evaluations
- Students will assess whether a team member was a good citizen of the group for the assignments covered. To determine the number of points for each evaluation, the percentage of positive responses will be multiplied by 10. Example, Susie is a member of a 5-person group, if she receives 5 positive votes, she will get a 100% x 10 = 10, but if she gets only 4 positive votes she will get 4 / 5 = 80% x 10 = 8 points
- Students must only mark students on their group and THEMSELVES. Failing to mark yourself or to fill the evaluation will result in lost points for the said student
- Evaluations accounting for more people than there is in the group will be discarded on they entirety and in consequence the student doing it, will also lose some points

- Peer evaluations are due by 11:59PM, EST, on the dates indicated in Canvas

- **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	Lecture topic	Assignment
1	Mon., Oct 21	Course introduction, project vs. product oriented development. Agile methods, Scrum, Kanban	
2	Wed., Oct 23	What is agile software development?	
3	Fri., Oct 25	Introduction to Scrum	
4	Mon., Oct 28	Context diagram & story boards	
5	Wed., Oct 30	User stories & story maps (1)	
6	Fri., Nov 1	No class	
7	Mon., Nov 4	User stories & story maps (2)	Individual preparation - Context diagram & storyboards
8	Wed., Nov 6	Estimation (1)	
9	Fri., Nov 8	Class activity 1 - Concept of operation	
10	Mon., Nov 11	Estimation (2)	Group Results - Context diagram & storyboards
11	Wed., Nov 13	Scrum ceremonies (1) - Backlog refinement, Sprint planning, Daily Meeting	Individual Preparation - User stories & Story map
12	Fri., Nov 15	Class activity 2 - User stories and story mapping	
13	Mon., Nov 18	Scrum ceremonies (2) - Review meeting, Retrospective meeting	Group Results - User stories & Story Map
14	Wed., Nov 20	Class activity 3 - Planning Poker	Group Preparation - Planning Poker
15	Thursday 21	No class	Group Results - Planning Poker
16	Fri., Nov 22	Class Activity 4 - Sprint planning	Group Preparation - Sprint planning
17	Mon., Nov 25	Burndown & burnup charts. Project tracking	Group Results - Sprint Planning
18	Wed., Nov 27	Thanksgiving Break	
19	Fri., Nov 29	Thanksgiving Break	
20	Mon., Dec 2	Release planning & MoSCoW Rules	Individual Preparation (Quiz) - Sprint execution
21	Wed., Dec 4	Class Activity 5 - Sprint execution	Group Preparation - Sprint execution
22	Fri., Dec 6	Kanban	Group Results - Lessons learned and execution metrics

Attendance. Within the first week of our course, please look ahead and determine if you need to miss class for any excusable reason religious observance, job interview, university-sanctioned event, etc.) and notify me as soon as possible. You will be expected to attend all class sessions (unless otherwise discussed with the instructor); the instructor or TA will record attendance. Additionally, you will be expected to participate fully in all in-class discussions, exercises, and case studies. Make meaningful contributions when and where you can. Please note that I expect that you will abide by all behaviors indicated in The Word, including any timely updates based on current conditions.

Facial coverings. Please follow the COVID guidelines published by the University.

Accommodations for Students Disabilities. If you have a disability and have an accommodations letter from 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.

Generative Artificial Intelligence (AI) Tools and Academic Integrity. To best support your own learning, you should complete all graded assignments in this course yourself, without any use of generative artificial intelligence (AI). Please refrain from using AI tools to generate any content (text, video, audio, images, code, etc.) for an assignment or classroom exercise. Passing off any AI generated content as your own (e.g., cutting and pasting content into written assignments, or paraphrasing AI content) constitutes a violation of CMU's academic integrity policy. If you have any questions about using generative AI in this course please email or talk to me.

Student Well-Being. The last few years have been challenging. We are all under a lot of stress and uncertainty at this time. I encourage you to find ways 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 semester is no exception.

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.

If you are worried about affording food or feeling insecure about food, there are resources on campus who can help. Email (cmu-pantry@andrew.cmu.edu) or call (412-268-8704) the CMU Food Pantry Coordinator to schedule an appointment.

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus. We, at CMU, will work to promote diversity, equity, and inclusion not only because diversity fuels excellence and innovation, but because we want to pursue justice. We acknowledge our imperfections while we also fully commit to the work, inside and outside of our classrooms, of building and sustaining a campus community that increasingly embraces these core values.

Unfortunately, incidents of bias or discrimination do occur, whether intentional or unintentional. They contribute to creating an unwelcoming environment for individuals and groups at the university. Therefore, the university encourages anyone who experiences or observes unfair or hostile treatment on the basis of identity to speak out for justice and support, within the moment of the incident or after the incident has passed. Anyone can share these experiences using the following resources:

- **Center for Student Diversity and Inclusion**: csdi@andrew.cmu.edu, (412) 268-2150
- **Ethics Reporting Hotline**. Students, faculty, and staff can anonymously file a report by calling **844-587-0793** or visiting **cmu.ethicspoint.com**.

All reports will be documented and deliberated to determine if there should be any following actions. Regardless of incident type, the university will use all shared experiences to transform our campus climate to be more equitable and just.