

Plataformas e Serviços X-Ops - 2025/26

Project

Overview

The project is an integral part of this course. You will work in teams to **design, implement, and** evaluate an **intelligent CI/CD pipeline** that incorporates **AI-augmented quality gates**. The pipeline will automate key DevOps activities—build, test, deploy—while integrating static analysis, automated testing, and AI-assisted validation mechanisms. Teams will be challenged to embed **AI-based tools (e.g., LLM-powered code analysis or test generation agents)** into their pipelines to enhance quality control, detect code smells, automate refactoring, and monitor security and performance metrics.

This project emphasizes the convergence of **DevOps, DevSecOps, AIOps, and AI4SE practices**, encouraging teams to manage not only the technical pipeline setup but also the collaboration dynamics, continuous feedback, and evolution of software in fast-paced delivery environments.

Goals

1. To create something useful;
2. To practice **Agile methods** in an immersive academic context;
3. To design and implement a **CI/CD pipeline** with integrated **SAST and DAST security gates**;
4. To apply **AI-driven tools** for **automated testing, code review enhancements, and anomaly detection**;
5. To simulate a **real-world DevSecOps environment**, automating quality, security, and deployment checks;
6. To foster teamwork, project ownership, and agile collaboration using **EduScrum methodology**;
7. To critically evaluate the role of AI in modern software engineering pipelines, assessing its strengths, limitations, and ethical implications;
8. To gain valuable experience and enjoy the journey.

Restrictions

There are several **hard** restrictions on the project:

1. The final report must be written in accordance with the [IEEE template](#)
2. The solution must feature a **well-justified architectural style**;

3. All project activities should be **organized and regularly updated** in the **Jira** tool, with access granted to the instructor;
4. Each team is required to adopt at least one **AI-based tool** to support programming and code development; the choice of the tool is entirely up to the team, allowing for autonomy and experimentation;
5. In each sprint, one team member must take on the role of **Product Owner**. The Product Owner is responsible for **managing and prioritizing the Product Backlog**, ensuring that the team focuses on the most valuable tasks. The role must be rotated so that **each team member serves as Product Owner once**, and this must be documented in the team's project deliverables.

In addition, consider the following **soft** restrictions when choosing the project topic:

1. Each team should be composed of **2 or 3 students**. Any exceptions must be approved in advance by the professor
2. All team members are expected to actively participate in team activities, including attending in-person lectures;

Team Formation

Deadline: **26.09.2025**

How to apply: <https://forms.gle/M8rRVArF2fYxVwtN6>

Project Setup

Deadline: **07.12.2025**

Once your team is formed, you must create a **Jira dashboard** for your project. Suggested boards include: **Product Backlog**, **To Do**, **In Progress**, **Done**, **Artifacts**, **Daily SCRUM**, and **Team Contract**. Additionally, make sure to **grant access to the instructor** using the following email: *ngpombo@ubi.pt*.

Jira Board Structure:

- **Product Backlog**: List of all features, enhancements, and requirements to be addressed throughout the project;
- **To Do, In Progress, and Done**: Columns representing the current status of project tasks and activities;
- **Artifacts**: Links to external project-related files, such as **wireframes**, **mockups**, **modelling diagrams**, **GitHub repository**, and other relevant documents;

- **SCRUM:** Evidence of SCRUM compliance – including **daily team meetings, sprint planning, sprint reviews, and retrospectives** – must be provided. This evidence can be textual, image-based, or a combination of both.

- **Team Contract:** A content outlining key team agreements, including: a) expectations for team meetings, b) team and individual responsibilities, c) strategies for managing challenges and resolving conflicts, and d) any additional considerations important for team functioning.

Methodology

The project will follow the **SCRUM methodology** and will be divided into **four sprints each lasting two weeks**. The first sprint will begin on September 29.

During the practical classes in the first week of each sprint, each team must present a **summary of the work completed during the previous sprint**. Each team will be responsible for managing its own sprint backlog. Additionally, in each sprint, teams may introduce improvements to features addressed in previous sprints

Expected Outcomes

By the end of the project, each group is expected to have produced the following artifacts:

- A fully functional **Intelligent CI/CD pipeline prototype**;
- Integration of **AI-enhanced quality gates** (code analysis, testing, security scans).
- An **observability layer** (dashboards, monitoring, AI-powered alerts).
- Project documentation (architecture, sprint logs, reflections on AI use).
- Live demonstration showcasing the pipeline flow and AI-assisted improvements.
- Final **project report** (up to 10 pages) summarizing methods, results, and lessons learned.

Assessment

C1) Application of the SCRUM Methodology - 15%

Assessment of the team's ability to apply SCRUM practices consistently and effectively throughout the project, including:

- Clear definition and regular updates of the **Product Backlog** and **Sprint Backlogs**;
- Structured execution of **Sprint Planning, Daily Standups, Sprint Reviews, and Sprint Retrospectives**;
- Visible progress through **incremental delivery** of working software components;
- Documented **evidence of SCRUM rituals**, including text/image-based logs in Jira or equivalent tools;
- Proper role rotation with clear assignment and documentation of the Team Captain and Product Owner roles per sprint.

C2) In-Class Participation and Intermediate Presentations - 30%

Evaluation of individual and group engagement during class sessions and check-in presentations:

- Active **participation** in weekly team activities and in-person sessions (attendance and contribution);
- Demonstrated understanding and **domain mastery** through applied tasks and discussions;
- **Coherence** and **consistency** between deliverables;
- Quality of intermediate presentations, assessed based on:
 - Clarity and structure of communication;
 - Correct use of technical terminology and modelling notation;
 - Visual organization and ability to explain design decisions;
 - Objective and critical reflection on project progress and challenges.

C3) Application of XOps Principles - 55%

The project will be evaluated based on the quality, completeness, and rigor in **applying DevOps and XOps principles**, including the integration of software quality assurance, security, and automation best practices across all stages of the **CI/CD pipeline and software delivery lifecycle**. Additionally, the effective and critical use of AI-augmented tools in enhancing code quality, testing, and operational monitoring will be a key assessment criterion.

NOTE#1: *This project will be graded on a 0 to 20 scale;*

NOTE#2: *Under the continuous assessment (ensino-aprendizagem) model, this project accounts for 12 points of the final course grade (i.e., 60%). The final contribution of the project to the course grade will be calculated using the formula: $Final\ Score = A1 \times 12 / 20$*

Under the exam-based assessment model, the practical component related to this project will be individual, with an assignment defined by the course instructor.