

1. Web application

Learning outcome

You design and build **user-friendly**, **full-stack** web applications.

Clarification

User friendly: You apply best practices when creating user interfaces and basic user experience testing and development techniques.

Full-stack: You design and build a full stack application using a commonly accepted front end Javascript framework and back end application implementing relevant communication protocols, persistence of data by usage of ORM and addressing asynchronous communication issues.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	4 Points	2 Points	1 Points	0 Points	5 Points

2. Software quality

Learning outcome

You use software **tooling and methodology** that continuously monitors and improve the software quality during software development.

Clarification

Tooling and methodology:

Carry out, monitor and report on unit integration, regression and system tests, with attention for security and performance aspects, as well as applying static code analysis and code reviews.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	4 Points	2 Points	1 Points	0 Points	5 Points

3. Agile method

Learning outcome

You can implement the software process for your project according to a given agile software development method.

Clarification

Agile method: You are aware of most popular agile methods and their underlying agile principles. You are able to implement the process of your software project according to a chosen methodology.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	3 Points	2 Points	1 Points	0 Points	5 Points

4. CI/CD

Learning outcome

You **implement** a (semi)automated software release process that matches the needs of the project context.

Clarification

Implement:

You implement a continuous integration and deployment solution (using e.g. Gitlab CI and Docker).

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	4 Points	2 Points	1 Points	0 Points	5 Points

5. Cultural differences and ethics

Learning outcome

You **recognize** and **take into account** cultural differences when working with multi-site teams and are aware of ethical aspects in software development.

Clarification

Recognize: Recognition is based on theoretically substantiated awareness of cultural differences and ethical aspects in software engineering.

Take into account:

Adapt your communication, working, and behavior styles to work with other developers from different cultures;

Address one of the standard Programming Ethical Guidelines (e.g., ACM Code of Ethics and Professional Conduct) in your work.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	3 Points	2 Points	1 Points	0 Points	5 Points

6. Requirements and Design

Learning outcome

You translate (non-functional) requirements to extend existing (architectural) designs and can validate them using **multiple types of test techniques**.

Clarification

Multipletypes of test techniques: You apply user acceptance testing and stakeholder feedback to validate the quality of the requirements. You evaluate the quality of the design (e.g., by testing or prototyping) taking into account the formulated quality properties like security and performance.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	3 Points	2 Points	1 Points	0 Points	5 Points

7. Business processes

Learning outcome:

You can explain **simple** business processes and **relate** them to the development of your software project.

Clarification:

Simple: predominantly sequential processes with one or two alternative paths.

Relate: understanding the relationships between the process and software.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	3 Points	2 Points	1 Points	0 Points	5 Points

8. Professional (IP)

Learning outcome

You act in a **professional manner** during software development and learning.

Clarification

Professional manner:

You independently recognize and decide where your knowledge falls short to solve a software problem and communicate which new knowledge and skills you need to learn.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	4 Points	2 Points	1 Points	0 Points	5 Points

8. Professional (GP)

Learning outcome

You act in a professional manner during software development and learning.

Clarification

Professional manner:

You develop software as a team effort according to a prescribed software methodology and following team agreements. You are able to track your work progress and communicate your progress with the team.

You independently recognize and decide where your knowledge falls short to solve a software problem and communicate which new knowledge and skills you need to learn.

Advanced	Proficient	Beginning	Orienting	Undefined	Total Points
5 Points	3 Points	2 Points	1 Points	0 Points	5 Points