MODULE WEB AND MOBILE DEVELOPMENT 12,5 ECTS
BACHELOR FALLTERM

Backend Development

3 ECTS

Course Content:

Ruby, Ruby on Rails, ActiveRecord as an Object-Relational Mapper, Model-View-Controller Pattern, Database Migrations, Asset Pipeline and Webpacker, URL Routing, REST Architecture. Unit Testing, End to End Tests, and Test-Driven Development in Web Development. Use of git and merge/pull Requests in teamwork in Web Development.

Learning Outcomes: Students will be able to:

- o Design and implement the backend of a web application using a current backend framework, employing the Model-View-Controller Pattern, utilizing Object-Relational Mappers, and an Asset Pipeline or JavaScript module bundler.
- o Write unit tests and end-to-end tests to ensure the correct functioning of the application.
- o Utilize git in teamwork, applying branches and merge/pull requests and code reviews to ensure code quality.
- o Configure the application for development, staging, and production environments.
- o Navigate and contribute to the code of an existing web application with a backend framework.

Frontend Development

3 ECTS

Course Content:

Current tools and topics of Frontend Development, Single Page Apps, Build Pipeline (npm, webpacker), and Design Patterns for Javascript; CSS Cascade, Specificity, Selectors; Methods for structuring CSS such as object-oriented or functional CSS, BEM, Tailwind; Style Guides; Accessibility, Web Content Accessibility Guidelines (WCAG), ARIA.

Learning Outcomes: Students will be able to:

- o Design and implement the frontend of a web application as a Single Page App.
- o Describe the purpose and functionality of the build pipeline for a frontend project in their own words. They use the pipeline of an existing project or set up the pipeline for a new project.
- o Utilize current methods for structuring CSS.
- o Translate graphical designs of interface components into HTML and CSS. They create a style guide with components.
- o Implement appropriate technical measures to ensure the accessibility of a website.

Interface Design

1.5 ECTS

Course Content:

Deepening of Interface Design for Web and Mobile; UI Patterns, Interface Guidelines, Information Design, Wireframes, Flowcharts, Navigation, Use Cases, Layout, Grids, Workflows, and Tools for Interface and Interaction Design.

 Learning Outcomes: Students will be able to:

- o Describe the role of Interface Guidelines for their work in their own words and follow relevant Interface Guidelines when designing a project.

- o Design and implement interfaces for web applications for use on desktop, tablet, and smartphone.
- o Use wireframes, flowcharts, and online tools for communication with team members, designers, and clients.
- o Request the necessary designs from designers in the appropriate formats, convert, and adapt them.

Software Design Patterns

2.5 ECTS

Course Content:

Introduction to object-oriented software design; Basics of UML notation; Design Patterns: Creational Patterns (e.g., Factory, Singleton), Structural Patterns (Adapter, Composite, Decorator, Facade Proxy), Behavioral Patterns (Iterator, Mediator, Observer, State, Strategy) and application examples; Basics of Refactoring; Practical exercises applying Design Patterns.

Learning Outcomes: Students will be able to:

- o Apply their knowledge of Design Patterns and their advantages/disadvantages to sub-problems to modularize software architecture.
- o Optimize parts of software architectures using Design Patterns (Refactoring).
- o Understand basic software architectures using UML and communicate in professional language.
- o Perform improvement steps in the code without introducing new functionality (Refactoring).

Multimedia Project 2 (MMP2a)

3 ECTS

Course Content:

Web or game project conducted in teams of two students from the MultiMediaTechnology program; independent selection and execution of the project; independent preparation of the project; software development during the studio week; application of software project management; use of git for teamwork; conducting simple user tests; topics fall within the fields of Web & Mobile Development or Game Development & Mixed Reality.

Learning Outcomes: Students will be able to:

- o Develop a project idea for a simple programming project within technical constraints as a team. They develop a concept with reference to the target audience.
- o Plan and program a simple software project as a team. They carry out the implementation within a given timeframe.
- o Use the version control system git to manage the source code as a team.
- o Find and utilize existing software packages (e.g., libraries, packages) and integrate them into their own software project.
- o Use an issue tracker to prioritize features and bugs. Based on this, they make decisions about which issues need to be addressed to create a functional project within the given time.
- o Apply methods and tools for team and time management independently, individually adapted, and situation-specifically for their project.
- o Understand the group dynamic aspects in teamwork and perceive them in their own teamwork, question, analyze, and consciously shape them.
- o Present the finished project to instructors and students and conduct user tests. They describe the project in text, images, and video on the portfolio website of the program.