PBWEB WebTech – Web Technologies

Timing: 2nd Semester of study **Scope:** 5 ECTS

Content: The student should gain knowledge about issues and basic/fundamental techniques for working with projects based on modern and upcoming technology. Thereby gain experience in designing experiences and developing prototypes. The course covers the idea and concept development, design and testing of applications, as well as implementation and testing of solutions.

Learning objectives: After completing the module, students should be able to

Knowledge

Students should achieve knowledge and understanding of the following theories and methods:

- Different platforms, browsers and devices for web technologies
- Standard systems for the development of solutions for the modern web
- Distribution channels and marketing applications for the modern web
- Possibilities and limitations of technology

Skills

The student should acquire skills to:

- Evaluate the different solution strategies for the marketing and realization of a modern web solution, including choosing the right path in application development
- Applying modern development techniques for the realization of prototype solutions
- Design functionality and user interfaces for modern web solutions

Competencies

The student should be able to:

- Describe and reflect on the methods used in the development project
- Apply concepts, techniques and methods to design and evaluate an interdisciplinary and professional application-production work
- Independently evaluate productions in a media relevant commercial strategic context
- Evaluate the design, usability and value of applications for the modern web.

Teaching form:

Project work and participatory teaching, including:

- Formulation, analysis and contribution to the resolution of a research problem within the theme of the course.

As an integrated part of the project work, the student must contribute to the teaching experience and take responsibility for their own learning process.

The examination:

Internal oral exam of 20 minutes duration based on a prototype project.

Assessment:

7-point grading scale. Grading is based on an overall assessment of the oral presentation, prototype and examination.

Course Description – Full Stack Development

Timing: 2nd Semester Web Development Professional Bachelor Scope: 15 ECTS

Content:
The course introduces students to full stack web development using the MEVN stack (MongoDB, Express.js, Vue.js, and Node.js) combined with REST API design and implementation. The course covers both client- and server-side development, emphasizing the development of scalable, maintainable applications using TypeScript.

Students will acquire knowledge, skills, and competences related to structuring full stack applications, including authentication and authorization, state management, and data handling with Object-Relational Mapping (ORM) tools. Furthermore, the course addresses REST API development, testing, and management, including querying and endpoint validation.

Additional topics include best practices such as the single responsibility principle (SRP), component-based principles (CBP), and code-splitting for performance optimization. Students will also gain practical experience with testing for both frontend and backend components.

Finally, the course provides insight into architectural considerations, discussing the advantages and disadvantages of REST API-based web architectures in comparison to alternative approaches, enabling students to make informed technology choices based on project scope and requirements

Learning objectives

Knowledge

The student has knowledge of:

- the role of full stack development in modern web applications
- the MEVN stack and its components
- authentication and authorization methods, including JWT and session-based auth
- state management principles and tools (e.g., Composable Functions)
- code-splitting techniques for performance optimization (CBP, SRP)
- testing concepts and their role in software quality
- basic HTTP concepts: methods, requests, responses, and status codes
- database structure and ORM usage, including the differences between NoSQL and SQL
- the terms “API” and “REST API” and how they are related
- how REST APIs fit into the world of web development
- basic HTTP terminology, HTTP methods, requests, responses and statuses

Skills

The student can:

- design and implement a full stack application for a given problem domain
- secure a full stack application by implementing authentication and user management
- use state management (local and global) to manage data flow efficiently
- apply CRUD operations using an ORM tool
- optimize applications with code-splitting and component-based structuring (CBP/SRP)
- write and execute tests for frontend and backend components
- apply tools for querying data from a REST API

Competencies
The student can:

- choose a suitable technology stack for full stack development
- apply software development principles to create scalable, maintainable applications
- work independently and collaboratively in full stack development projects
- evaluate and implement best practices for authentication, security, and performance
- translate theoretical knowledge into practical, real-world full stack solutions
- choose a suitable technology stack to host the development process of a full stack application
- independently transform knowledge and skills to practical solutions within the field of full stack development
- participate in the development process of a full stack web application

The examination

Internal oral exam of 30 minutes duration based on a project 10 min presentation, 15 min dialogue, 5 min voting.

Assessment

7-point grading scale. Grading is based on an overall assessment of the oral presentation, project and examination.