| Module Web & Mobile Development 17,5 ECTS |
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| Fallterm |

Overview:

| Web Development | 17,5 ECTS |
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**Module Prerequisites:** Basic knowledge of HTML, CSS, JavaScript, SQL and git is required. Students should be able to implement a static webpage. They should also be able to use SQL and a backend programming language like PHP to implement a web application that saves data to a database.

**Backend Development**
Course Code: MMTB3BDPIL
Credits: 3 ECTS
Prerequisites: Basic knowledge of HTML, CSS, JavaScript is required. Students should be able to implement a static webpage. They should also be able to use SQL and a backend programming language like PHP implement a web application that saves data to a database.
Course content: Ruby, Ruby on Rails, ActiveRecord as object relational mapper, Model-View-Controller pattern, Database Migrations, Asset Pipeline and JavaScript, URL routing, REST architecture. Unit testing in Web Development. Deploying a Rails project to a PAAS like dokku.

Learning Outcomes: Students
- design and implement the backend of a web application using a current backend framework, applying the Model-View-Controller pattern, using object relational mappers and an asset pipeline or JavaScript module bundler.
- write unit tests and end to end tests to ensure the application is working correctly.
- use git to manage the source code of their application.
- configure the application for the development, staging and production environment.
- can find their way around the code of an existing web application with a backend framework and contribute to the project.

**Frontend Development**
Course Code: MMTB3FDPIL
Credits: 3 ECTS
Prerequisites:  Basic knowledge of HTML, CSS, JavaScript is required. Students should be able to implement a static webpage and to use JavaScript for manipulating the page and sending fetch requests.
Course content: Cascade and specificity in CSS, selector performance. Choosing and using a CSS preprocessor. Modern layout techniques in CSS with flexbox and grid. Preparation of a style guide for a web application. Setting up and using a frontend development pipeline with current tools like npm and webpack. Building Single Page Apps with plain JavaScript. A first introduction to React.
Learning Outcomes: Students
- design and implement the front end of a web application as a single page app.
- 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.
- use current methods for structuring CSS.

- implement graphical designs of interface components in HTML and CSS. Create a style guide with components.
- implement appropriate technical measures to ensure accessibility of a website.

## Interface Design
Course Code: MMTB3IDEIL
Credits: 1,5 ECTS
Course Content:
end-to-end design process (UX & UI) of state-of-the-art interfaces in Figma: ideation and conceptualization, choosing a visual language, creating a style guide, final elaboration and presentation of the interfaces. communication of design decisions, handling feedback.

Learning Outcomes: Students
- use a tool like Figma to conceptualize and design digital projects
- use flowcharts and wireframes in the design process (UX)
- describe the role of interface guidelines in their work in their own words, and follow human-centered interface guidelines (UI) when designing a project
- design interfaces that work for several screen resolutions and platforms (desktop, tablet, mobile)
- create pattern libraries and simple style guides for their projects
- solicit and handle feedback for their design from clients, designers and engineers

## Multimedia Project 2 (MMP2a)
Course Code: MMTB3MMPPT
Credits: 3 ECTS
Prerequisites: must be combined with Backend Development (MMTB3BDPIL) and Interface Design (MMTB3IDEIL)
Course content:
Web project carried out in teams of two students; independent preparation of the project; software development within the study week (first week of February); use of git for teamwork; execution of simple user tests

Learning Outcomes: Students
- Choose a project idea for a web project.
- plan and implement a software project in teamwork. They carry out the implementation within a given time frame.
- use the version control system git for the administration of the source code in teamwork. They work with feature branches and pull/merge requests.
- find and use existing software packages and incorporate them into their own software project.
- They describe the project in text, image and video in the portfolio website of the school.
- Conduct a user test of the finished project.

## Content Management Systems
Course code: MMTB3CMSIL
Credits: 3 ECTS
Prerequisites: Basic knowledge of HTML, CSS, JavaScript is required. Students should be able to implement a static webpage. They should also be able to use SQL and a backend programming language like PHP implement a web application that saves data to a database.
must be combined with Web Operations (MMTB3WOPIL)
Course content:
Different variants of web content management systems: Database and file -based CMS; theme and plug-in development (using Build Tools & Bundler); Full workflow from first customer contact to the delivery of the final product.
Learning Outcomes: Students
- describe different web content management systems and their application scenarios in their own words.

- advise customers and supervise the development of the website from ordering the domain to maintenance.
- implement websites in teamwork with the help of a current Web CMS.
- adapt themes or develop them from scratch. Adapt or program plugins.
- implement the technical requirements of Search Engine Optimization (SEO), and support the work of SEO officers by installing appropriate tools.
- read PHP code and find their way around a large application. They pick up the conventions prevailing there and apply them in their own code.

## Web Operations
Course code: MMTB3WOPIL
Credits: 1,5 ECTS
Prerequisites: Basic knowledge of the (UNIX) command line is required: simple command like cs, ls, rm, setting file permissions.
Course contents:
Ssh, UNIX, Webserver Apache, nginx. DNS and purchase of a domain.
Learning Outcomes: Students
- log into a unix server using ssh
- install and configure a production web server on a VM,
- buy a domain and configure their web server to use the domain,
- configure https and create a certificate with letsencrypt,
- Install PHP, a relational database and a CMS,

## Software design patterns
Course code: MMTB3SDPIL
Credits: 2,5 ECTS
Prerequisites: Basic knowledge of the (UNIX) command line is required: simple command like cs, ls, rm, setting file permissions.
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 on the application of design patterns.
Learning Outcomes: Students
- can apply their knowledge of design patterns and their advantages/disadvantages to subproblems in order to design software architecture in a modular way.
- can optimize parts of software architectures using design patterns (refactoring).
- can understand basic software architectures using UML and communicate in technical language.
- can carry out improvement steps in the code without introducing new functionality (refactorings).