Technology
Arts Sciences
TH Köln

Course Manual WEB1

Web Engineering 1 (Backend)

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General information

Long name	Web Engineering 1 (Backend)
Approving CModule	WEB1_BaMT
Responsible	NN Lehrbeauftragter
Valid from	summer semester 2022
Level	Bachelor
Semester in the year	summer semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr.-Ing. Luigi Lo Iacono ehemaliger Professor Fakultät IME

Literature

Gerti Kappel, Birgit Pröll, Siegfried Reich: Web Engineering, John Wiley & Sons, 2006

Brian P. Hogan: HTML5 & CSS3, O'Reilly, 2011

Stefan Koch: JavaScript: Einführung, Programmierung und Referenz, Dpunkt, 2011

Web-Links auf einschlägige Standards und vorlesungsspezifische Schwerpunktsetzungen (z.B. Go, Python, Frameworks)

Final exam

Details	In a final examination (written, optional oral), the students demonstrate their competences summarily. The examination includes exemplary parts of the course.
Minimum standard	Achieving the individual minimum score per exam, typically 50% of the maximum score.
Exam Type	EN Klausur

Requirements	- Knowledge and competence in the development of computer programs and in the handling of a programming language (e.g. Java, Python or Go) as well as common development tools (e.g. IDE) are assumed. - Knowledge and skills in relation to basic algorithms (sorting, searching) and data structures (lists, sets, maps) are required. - Knowledge and skills in IP-based computer networks and in the handling of HTTP are required.
Language	German, English if necessary
Separate final exam	Yes

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	- Anatomy of Web-based systems (reference model) - Architectural patterns (MVC and variations) - Architectural styles (SOA, REST) - Backend concepts of web-based systems (3-tier and variations) - Backend components (server operating systems, Web server, template engine, request router, caches, logging) - Backend technologies (XML, JSON, OpenAPI, standard software) - Protocols (HTTP, WebSockets, SPDY, QUIC) and forms of communication (polling, long polling) - Present and create relations and dependencies between backend systems/components and frontend systems/components. - Web application security (authentication, common vulnerabilities and resulting attacks, SQL injection, cross-site scripting, vulnerability causes and countermeasures)
Skills	- Analyse and structure tasks in the environment of web-based developments, assign relevant standards and transfer them to system designs - Implementing backend systems/components of a Web-based system - Explain backend systems/components, tasks and technical parameters, and structure them - Analyze backend systems/components using suitable tools and present results in a comprehensible manner - Planning, setting up and operating backend systems/components - Estimate and analyze the performance of backend systems - Derive information from original English sources and standards

Special requirements

none

Accompanying material	Lecture slides, lecture exercises, web resources, tutorials, open source tools and technologies
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	1
Exercises (shared course)	0
Tutorial (voluntary)	0

− Practical training

Learning goals

Goal type	Description
Knowledge	- Anatomy of Web-based systems (reference model) - Architectural patterns (MVC and variations) - Architectural styles (SOA, REST) - Backend concepts of web-based systems (3-tier and variations) - Backend components (server operating systems, Web server, template engine, request router, caches, logging) - Backend technologies (XML, JSON, OpenAPI, standard software) - Protocols (HTTP, WebSockets, SPDY, QUIC) and forms of communication (polling, long polling) - Present and create relations and dependencies between backend systems/components and frontend systems/components. - Web application security (authentication, common vulnerabilities and resulting attacks, SQL injection, cross-site scripting, vulnerability causes and countermeasures)
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Special requirements

none

Accompanying material	Server, Web resources, tutorials, open source tools, frameworks and libraries
Separate exam	Yes

Separate exam

Exam Type	undefined
Details	Several appointments have to be attended. In each appointment, independently developed solutions to subtasks are to be presented in the technical discussion, if necessary with the use of assistance and/or completion of missing or wrong solution parts. The subtasks add up to the total solution of the development task accompanying the lecture (both parts WEB1 and WEB2).
Minimum standard	Successful participation in 80% of all appointments. Correct solution of all subtasks and complete implementation of the web application (development task accompanying the lecture).

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	2
Tutorial (voluntary)	0