

Web Programming Course Concept

Target audience:

The target audience of the web programming course are students of E-Government and other programmes, for whom skills of writing interactive and internet-based applications are of avail. No programming skills are required; the only requirements are user skills for Windows computers and internet browser as well as Internet basic skills.

Educational objectives:

The students know the basics of computer-aided communication via local networks (LAN) and the internet (WAN) using elementary communication protocols (Ethernet, WAN-protocols, TCP/IP, HTTP, HTTPS, FTP, IRC, NNTP, SMTP), client/server concepts, particularly browser/web server communication.

Using examples, they themselves learn the possibilities of formal description languages (HTML, CSS, XML) and are able to develop web pages and applications using free tools (Phase 5, Proton, Eclipse).

The students are able to set up a web server including programming environment and database as a test and development system (XAMPP plus Python).

The students are familiar with a broad spectrum of client and server based programming languages (Javascript, Java, Python, PHP) and are able to write their own interactive internet pages in one specific programming language (PHP). They know the advantages and disadvantages of each environment.

The students are familiar with the common data management tools (CSV text files, relational databases including SQL basic skills). They are able to set up simple information systems (PHP with MySQL) and use office communication systems together with internet-based information systems (using together Excel – web server – internet programmes, Word as HTML editor).

The students get to know how to integrate ready internet environments (CMS using the example of JOOMLA, Wiki using the example of MEDIAWIKI, study platforms using the example of MOODLE, collaborative environments using the example of PHPROJEKT or BSCW) into their test environment.

The students are able to write simple graphic applications (data visualisation using PHP IMAGE functions and SVG).

The students learn how to cooperate on larger projects and are able to extend an existing internet applications system (web-based statistics routines, GPS application, HRV analysis, own information system, own collaboration system) on their own as well as to write simple web applications on their own.

Instruction methods

Lecture:

The conveyance of basic knowledge is carried out within a framework of a seminar-like lecture. Blackboard drawings and PowerPoint sheets are used as media. In addition to the lecture itself also short elaborations by the students, plenum discussions and other moderation techniques, such as brainstorming using cards, are used. To strengthen the knowledge acquired at each lecture there are advanced exercise questions the students are supposed to answer outside the lecture.

All media are available to the students through a learning platform on the internet (students' area).

Practical training:

During the practical programming and configuration exercises the students gain deeper knowledge of the course contents under supervision using tasks largely determined in advance. The students elaborate the solutions in teams of two to three persons. The discussion about solution approaches and the work-sharing shall also be learned during the exercises.

Semester project:

During the second half of the semester the students shall work on a subject from a given question list on their own in teams or propose their own subject. The solution approach is up to the students, help is only offered after specific requests. The solution to a usually more complex programming task or to a configuration or implementation problem has to be presented in an executable state by the end of the semester. This involves a short presentation as well as a written summary / documentation.

Course certificate:

Test: At the end of the semester the students shall sit a test (questions in vignette technique, multiple-choice with a single correct answer). As regards their contents the test questions are taken from the questions included in the advanced material. The test result constitutes 50% of the overall grade.

Project: The results of the semester project (documentation, presentation, executable solution) shall be graded according to a simple scoring model and constitute 50% of the overall grade.

Attendance: Regular attendance of the practical training is a prerequisite for the course certificate.

Pedagogical principles:

For a module in internet or web programming often internet or web programming skills in at least one programming language and knowledge of operating systems or data management systems are required or the module is only offered during the master programme. The course web programming for E-Government students shall already be offered during the first semesters. Therefore, there is no programming knowledge to resort to; the first semesters' students are also expected to benefit from more far-reaching guidance and fine structuring. The conveyance of contents using practical examples is also preferred to the theoretical introduction.

Possible solution approaches as to contents would be a narrow but deep study of a small range of web techniques or alternatively a less deep but a thematically broadly set course. The last alternative shall be preferred here.

Thus the students have the possibility of studying a certain technique after the course as a follow-up independently depending on their liking. Furthermore the students early receive the qualifications and tools necessary to prove themselves during internships with companies or in their part-time jobs, e.g. with an advertising agency.

Annex: Article for the module notes

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| Web programming | | | 1 st semester |
| Scope: 4 SWS 150 hours | Credits 5 ECTS | Learning form: Lecture 2 Practical exercises 2 | Course certificate: Attendance practical exer- cises Test Semester project |
| Lecturer: Claus Brell | | | |
| Requirements: none | | | |
| Course targets: Knowledge and skills for writing of interactive internet applications | | | |
| Contents (lecture and practical training): - net and communication protocols, TCP/IP to HTTPS - client/server techniques, web server and browser - HTML, CSS - deviding contents and structure in documents - implementation of a test system using XAMPP - development tools Proton, Phase 5, Eclipse - basics of interactive applications programming - client programming using Java script - client programming using Java Aplets - server programming using CGI scripts - server programming using Python - server programming using PHP (focus) - graphic programming in PHP and using SVG - data management CSV and XML - practical basics of relational databases, SQL - programming of web-based information systems using PHP and MySQL - CMS and Web2.0 applications - "customizing" of web applications | | | |
| Literature and internet pages: Lecture notes. Tittel, Ed & Burmeister, Mary: <i>HTML 4 für Dummies: Ohne Programmierkenntnisse-Geniale Webseiten im Handumdrehen erstellen</i> . Wiley. 2008 (HTML, Javascript, CGI) Krause, Jörg: <i>PHP 5, Webserverprogrammierung unter Windows und Linux</i> . 2. Auflage. Hanser. 2005 (PHP, MySQL) Bornträger, Axel: <i>MySQL 5</i> . Francis`, 2006 Weigand, Michael: <i>Objektorientierte Programmierung mit Python</i> . MITP. 2004 Coar, Ken & Bowen, Rick: <i>Apache Kochbuch</i> . O`Reilly. 2004 Brell, Claus: <i>Der PC im Netz</i> . Francis`.2003 (net and communication protocols) Internet sources: http://de.selfhtml.org (HTML syntax) http://www.selfphp.de (PHP syntax) http://www.torsten-horn.de/techdocs/java-eclipse.htm (introduction to Eclipse) http://www.sql-und-xml.de (SQL and XML basic knowledge) http://l-training.de/informationstechnik (networks and data communication) | | | |