Internet applications and multimedia

Syllabus

## Pre-requisites

Required  knowledge and experience:

* **Technical English.** Learners will have to search, read and write in English.
* **Basics of programming.** Students will write programs and scripts for web applications.
* **Basic knowledge of computer graphics and video technologies.** This is optional: students will be provided the links to complete insufficient knowledge in case they had not passed appropriate courses before.

## Course Type (compulsory, elective, optional)

Elective

## Abstract

“Internet applications and multimedia” course is taught in 1–3 modules on the 4th year of bachellor programme for students of the Department of Computer Engineering. First two modules are dedicated to web-development and internet applications (Internet applications block), the third module is an intensive dip into videostreaming applying to web-based communication (video unit).

**Internet Applications block** focuses on learning the basics of the development of Internet applications like network basis of various projects: business projects, research projects, and so forth.

The student will:

* get an idea about the basic concepts and principles of the development of Internet applications and Internet programming,
* gain practical knowledge on the basics of the development of Internet applications and Internet programming and the basics of websites design in various design technologies and the basics of programming Internet applications of various software tools.

**Video unit** continues previously learned "Videotechnologies" and is also based on "Computer Graphics" course taught for Department of Computer Engineering students. It narrows the scope of topics to implementation of all knowledge from previously learned courses to practical solutions and project work resulted in completed, ready to present video/web-oriented projects.

The following main topics are covered: Manipulation with audio and video streams. Broadcasting, compression, quality control.  Advanced automatic video processing, live video decoration. Project work and practice. Workflow management. Case studies.

## Learning Objectives

**Internet Applications block** is focused on the technology of Internet applications development and Internet programming. As a result of studying the discipline a student must understand and be able to explain the basic concepts and principles for the development of Internet applications and Internet programming. Students will aquire basic skills in:

* Internet programming,
* web design and design technology,
* programming of various software tools for the Web.

**Multimedia unit** provides integration and implementation of skills and knowledge of computer graphics, web programming and videotechnologies for resultative video and web-oriented multimedia engineering projects.

More attention is paid to technical aspects than to artistic side of video and multimedia. Despite that, basics of composition, camera work and editing techniques are included to guarantee high overall level and complete coverage of work in the field.

## Learning Outcomes

**Internet Applications block**

Target competencies:

* Develop sites for different purposes (Business projects, research projects, on-line businesses, etc.);

As a result of studying the discipline a student must:

Target knowledge:

* basics for the development of Internet applications and Internet programming,
* principles of sites design and design technology,
* basic programming sites of various software tools.

Target skills:

* develop Web-applications using design technology and Internet programming.
* Internet programming in the development of Web-applications.

**Video unit** will prepare the learners to be able to, and have experience in:

* preparing and running live video broadcasts on the Internet
* managing production and broadcasting workflow
* decoration of live screen
* live video editing
* representation of records and media asset management
* provide interactive elements in media objects on the Web

## Course Plan

**Module 1:**

* Introduction and basic concepts of Internet applications.
* Technologies for creating Internet applications.
* Frames and shapes. HTML5, SSS3.
* Basics of JavaScript. Functions and objects in JavaScript. Scripting. JQuery library.
* Developing a simple adaptive Internet аpplication.

**Module 2:**

* Basic PHP syntax. Functions in PHP.
* Query processing using PHP. Database handling.
* Software for the development of complex Internet applications.
* CMS administration and adaptation (WordPress).
* Frameworks and their implementation for various network projects.
* Screen-adaptive internet applications.

**Module 3:**

* Manipulation with audio and video streams.
* Broadcasting, compression, quality control.
* Advanced automatic video processing, live video decoration.
* Integration of video services to web-projects.
* Project work and practice. Workflow management. Case studies.

## Reading List

Reading list will be provided for each lecture or assignment (if required). All required literature is available to HSE students electronically from university's library. Some *optional* sources may be in Russian.

## Grading System

Course lasts 3 modules and has an exam. There are three types of grades: theory, practical exercises, project work. Though the exam is scheduled in the last module, its grade is formed from the grades for theoretical part of course and exercises, that are marked as "included to examination grade" in the gradesheet.

Exercises, projects and research essays have the most of value in the final grade.

## Guidelines for Knowledge Assessment

This course will have tests (online), essays with public presentation and discussion, a lot of practice in individual and group format, assessed for countable results.

Most of the assessment is teacher-independent and self-assessed or automatic.

It is expected, that students mind the deadlines, submit completely finished works with appropriate references and clear of plagiarism.

In Internet applications block (in module 2) each student pursues a public presentation of a mid-term project (Internet application). The grade earned is counted in final assessment as a part of examination in the 3rd module.

## Methods of Instruction

Learners are supposed to come to classroom studies prepared and be ready to discussions on declared topic, not to listen boring lectures. All reading will be provided in advance, project and exercise deadlines thus make much sense.

All submissions are accepted online, online consultations are also available. Project work normally requires individual or small-group consultations and videoconferences (Hangouts) proved high efficiency comparing to all-class meetings. Recordings are left available online.

Course materials are available on course site and in social network for ease of communication and access.

All provided materials are free to distribute (3rd party materials are subject to check with their licenses), attendance to classroom studies is not strictly required but few cases.

## Special Equipment and Software Support (if required)

Learners are supposed to have their own laptops for practice to avoid dependency from university's classroom environment. Both Windows and Mac acceptable, Linux as second system will be required (virtual machine running from external drive is enough). BYOD concept (bring your own device) is not widely spread in HSE, but in this case it really makes sense. If this is not acceptable for any individual student, they may inform the teacher to obtain required equipment — it is possible.

Software:

* Adobe Dreamweaver
* Adobe Photoshop
* Adobe Flash
* FFMPEG, FFPROBE, FFSERVER
* VLC
* RED5
* Wowza trial
* VirtualBox
* Adobe Live Flash Media Encoder