



## Programme Study Plan

Web Developer

<b>Programme Code:</b>	SGWEB
<b>Programme Title:</b>	Web Developer
<b>ECTS credits:</b>	120/180
<b>Programme Approval:</b>	The programme study plan was approved by the Faculty Board of Arts and Social Sciences on 15 February 2021 and effective from the autumn semester of 2021.
<b>Language of Instruction:</b>	Swedish, but some courses and components may be offered in English.
<b>Degree Level:</b>	Bachelor
<b>Degree Type:</b>	General
<b>Prerequisites:</b>	General admission requirements, plus either - field-specific eligibility A4 (Mathematics 3b or 3c, Social Science 1b or 1a1 + 1a2) with Mathematics 2a or 2b or 2c instead of 3b or 3c, or - field-specific eligibility 4 (English B, Mathematics C and Social Science A) with Mathematics B instead of C.

### General information

The Web Development programme gives students the skills they need to create webpages and web-based systems. Upon completion of the programme, students are well prepared to work as web developers, system developers, or, if they follow the three-year programme, interaction designers.

Students can complete their studies after two years with a Higher Education Diploma in Information Systems, or move on to earn a Bachelor's degree in Information Systems after a third year, which is a specialization in interaction design. The two-year diploma prepares students for web development. The Bachelor's degree also prepares students for further studies in information systems at Master's level.

The programme is offered as part of the subject Information Systems. Students obtain theoretical and practical knowledge about the relation between humans, operations and IT systems, and web development is approached from these different angles. The focus is on the technical development of interactive web products such as webpages, e-services, applications and systems based on different communication formats (text, graphics, animation, sound and images/video). Students also develop knowledge about interaction design, which involves the evaluation and design of systems based on the needs of users.

### **Aims and Objectives**

The aim of the programme is that students acquire knowledge and understanding of the approaches, theories and methods of information technology and communication studies related to the web and interaction design areas.

#### National objectives: Higher Education Diploma

##### *Knowledge and understanding*

For a Higher Education Diploma the student shall

- demonstrate knowledge and understanding in the principal field (main field of study) of the study programme, including awareness of the disciplinary foundation of the field and knowledge of some applicable methodologies in the field.

##### *Competence and skills*

For a Higher Education Diploma the student shall

- demonstrate the ability to search for, gather and critically interpret the relevant information in order to formulate answers to well defined issues in the main field of study,
- demonstrate the ability to present and discuss his or her knowledge with different audiences, and
- demonstrate the skills required to work independently with specific tasks in the main field of study.

##### *Judgement and approach*

For a Higher Education Diploma the student shall

- demonstrate knowledge about and be equipped to deal with ethical issues in the main field of study.

##### *Independent project (degree project)*

A requirement for the award of a Higher Education Diploma is completion by the student of an independent project (degree project) in the main field of study.

#### National objectives: Degree of Bachelor

##### *Knowledge and understanding*

For a Degree of Bachelor the student shall

- demonstrate knowledge and understanding in the main field of study, including knowledge of the disciplinary foundation of the field, knowledge of applicable methodologies in the field, specialised study in some aspect of the field as well as awareness of current research issues.

*Competence and skills*

For a Degree of Bachelor the student shall

- demonstrate the ability to search for, gather, evaluate and critically interpret the relevant information for a formulated problem and also discuss phenomena, issues and situations critically,
- demonstrate the ability to identify, formulate and solve problems autonomously and to complete tasks within predetermined time frames
- demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences, and
- demonstrate the skills required to work independently in the main field of study.

*Judgement and approach*

For a Degree of Bachelor the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues,
- demonstrate insight into the role of knowledge in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the need for further knowledge and ongoing learning.

*Independent project (degree project)*

A requirement for the award of a Degree of Bachelor is completion by the student of an independent project (degree project) for at least 15 credits in the main field of study.

**Programme Structure**

The programme may either result in a higher education diploma (120 ECTS credits) equivalent to two years' full-time studies, or in a bachelor's degree (180 ECTS credits) equivalent to three years' full-time studies.

The first term of the programme comprises foundational courses in Information Systems. Second semester courses are focused on web development. During the third semester, students take a course in web development that includes web programming, as well as modules in database design, object-oriented modelling and software development.

Students who plan to complete their studies after the second year choose optional courses of 22.5 ECTS cr and carry out an independent project of 7.5 ECTS cr for their diploma.

Students who want to continue towards a Bachelor's degree study optional courses of 30 ECTS cr in the fourth term (of which 7.5 ECTS cr can preferably be a higher education diploma project). All students, irrespective of degree ambitions, also have the opportunity to study abroad in the fourth term. The diploma project can in this case be completed at a distance.

In the third year students first specialize in interaction design 15 ECTS cr and take elective courses 15 ECTS cr ( term 5) and then conclude the programme in term 6 with elective courses 15 ECTS cr and a degree project 15 ECTS cr.

Bachelor degree students can continue towards a one-year Master (60 ECTS cr.) or a two-year Master (120 ECTS cr.) in Information Systems.

### **Programme Curriculum**

All students study the same required courses in terms 1-3. Programme courses can have different titles and be offered in a different order than listed below.

#### Term 1:

*Required courses totalling 30 ECTS cr.*

Prototyping: Testing and Communicating Design Concepts, 7,5 ECTS cr.

Introduction to the development of user-friendly computer systems.  
Focus on the user-system interaction.

Enterprise and IT, 7,5 ECTS cr.

Methods and models for developing business systems. Basic concepts such as business, information systems, IT, business process, method and modelling are treated theoretically and practically.

Acquisition of Information Systems, 7,5 ECTS cr.

The course deals with different description/modelling techniques and interaction principles for a requirement specification. It also addresses how requirement specifications can be used in the different stages of the acquisition process and their role in the tendering procedures of IT-solutions and business systems linked to agreements.

Introduction to programming, 7,5 ECTS cr.

The basic principles and techniques of a modern programming language are treated along with how to solve problems in the programming phase of fulfilling requirement specifications.

#### Term 2:

*Required courses totalling 30 ECTS cr.*

Introduction to Object-Oriented programming, 5 ECTS cr.

Central theories and methods of object-oriented and graphic program development.

HTML and CSS for Web Development, 5 ECTS cr

The course deals with how to structure a web page with Hypertext Markup Language (HTML) and how to present the content of the HTML-page with Cascading Style Sheets (CSS).

Systems Implementation Techniques, 5 ECTS cr.

The differences between traditional software development for desktop environments and software development for web environments are treated with an emphasis on distinguishing features and unique challenges.

JavaScript for Web Development, 5 ECTS cr

The course deals with how to create interactive and dynamic web pages for web browser interpretation.

Portable Formats, 5 ECTS cr.

How to structure and organize information for the purpose of information systems exchange.

Serverside programming in JavaScript, 5 ECTS cr

The course deals with how Node.js can be used on the server to create web applications which include permanent two-way communication between server and client and interaction between HTTP clients and HTTP servers.

### Term 3:

*Required courses totalling 30 ECTS cr.*

Database Design, 7,5 hp

The course deals with design of relational databases from requirement specifications through conceptual modelling, logic design to physical design. A basic conceptual apparatus is created with terms such as database system, database manager, user, relational model, integrity, relational algebra, as fundamental building blocks. Normalisation as a tool is used in the design of relational databases.

Object-Oriented Modeling, 7,5 hp

The course integrates systems analysis, systems design and implementation design. The first part of the course deals with the semantics of a graphic language to express object-oriented concepts. Course content is based on the class, status and interaction of models. The second part of the course has a special focus on the systems design process and here students develop their skills in object-oriented modelling.

Software Development, 7,5 hp

The aim of the course is that students acquire an overriding understanding of the flow leading from idea to delivered system. The course deals with both imperative- and object-oriented analysis and design. The course also deals with basic aspects on test and project management. A survey of the process and its systems development is provided and object-oriented design is realised in an object- oriented program language. Also imperative development is treated in laboratory sessions.

Development of web applications, 7,5 hp

The course is divided into two parts: a client part and server part. The client component deals with how a selected JavaScript library can be used to create web applications to be interpreted on the client side. The server component deals with how a selected script language can be used to create web applications to be interpreted on the server side.

Term 4:

*Higher Education Diploma (final term)*

*Required courses totalling 7,5 ECTS cr plus elective courses totalling 22,5 ECTS cr.*

Information Systems – Smaller Thesis Work, 7,5 ECTS cr

Students practice and demonstrate ability to integrate and apply the knowledge and skills acquired in previous courses independently to a project in a chosen specialization area.

*Bachelor's Degree*

*Elective courses totalling 30 ECTS cr*

Students have the opportunity to study abroad in term 4. Karlstad University has exchange agreements with universities around the world. Students are also encouraged to consider courses offered at Karlstad University or at any other institution of higher education in Sweden.

*Elective courses, recommended:*

Web Design II, 15 ECTS cr

Business by Web and Web Analytics, 7,5 ECTS cr

Graphical Interface Design 7,5 ECTS cr

C#NET, 7,5 ECTS cr

Information Systems – Smaller Thesis Work 7,5 ECTS cr

Information Systems: Practical Training 7,5 ECTS cr

Information Systems: International Practical Placement, 15 ECTS cr

Term 5

*Required courses 15 ECTS cr and elective courses 15 ECTS cr*

User Tests, Prototyping and Evaluation, 7,5 ECTS cr.

User test methodology is developed: evaluating design proposals through prototyping and user tests, and formulating credible evaluation reports.

Interaction Design, 7,5 ECTS cr.

Students have the opportunity to deal with different problems and learn about different theories on Human-Computer Interaction (HCI) and their applications to systems development.

*Elective courses, recommended:*

Information Systems: Practical Training 7.5 ECTS cr

Business by Web and Web Analytics 7.5 ECTS cr

Developing Applications for Mobile e-Services 7.5 ECTS cr

Design Patterns, Java, and UML, 7.5 ECTS cr

**Term 6**

*Required courses 15 ECTS cr and elective courses 15 ECTS cr*

Information Systems: Bachelor's Degree Project, 15 ECTS cr.

Students practise and demonstrate their ability to integrate and apply knowledge and skills independently to a qualified project in a chosen area.

*Elective courses, recommended:*

Information Systems: Practical Training, 7.5 ECTS cr

Future web standards, 7.5 ECTS cr

Web Design II, 15 ECTS cr

Business by Web and Web Analytics, 7.5 ECTS cr

Software Testing Foundations, 7.5 ECTS cr

Systems Integration 7.5 ECTS cr

**Degree Titles**

Upon successful completion of terms 1-4, students who leave the programme are awarded:

Higher Education Diploma

Specialization: Information Systems

Upon successful completion of terms 1-6, students are awarded:

Degree of Bachelor of Science

Major: Information Systems

**Transfer of credits**

According to the Higher Education Ordinance Ch. 6 Sec. 6–8 students have the right to transfer credits from other universities upon approval.

**Additional Information**

Local regulations for the Bachelor's and Master's level at Karlstad University stipulate the rights and obligations of staff and students.

Previous revisions:

7 September 2017, Reg.no HS 2017/657, valid from the autumn semester of 2018.

15 November 2019, Reg.no HS 2019/1127, valid from the autumn semester of 2020.