



DEGREE PROFILE OF B.Sc. í KT-verkfrøði <i>Bachelor of Science (B.Sc.) in Software Engineering</i>

TYPE OF DEGREE & LENGTH	Single degree, three-year programme, B.Sc. (180 ECTS).
INSTITUTION(S)	Fróðskaparsetur Føroya, Náttúruvísindadeildin <i>University of the Faroe Islands, Faculty of Science and Technology.</i>
ACCREDITATION ORGANISATION(S)	Uttanríkis- og Mentamálaráðið (UMMR). <i>Ministry of Foreign Affairs and Culture.</i>
PERIOD OF REFERENCE	From 2020
CYCLE /LEVEL	Bachelor's '1st Cycle' according to the QF-EHEA and 'level 6' according to the EQF-LLL.

A	PURPOSE
	To educate software engineers to utilise scientific principles especially from the field of computer science and mathematics to produce and maintain effective and dependable programs for organisations, commercial and public administrations; to provide a solid foundation for further education and scientific research within computer science, software engineering or related field in the rapidly developing field of ICT.

B	CHARACTERISTICS	
1	DISCIPLINE(S) / SUBJECT AREA(S)	The main disciplines are: Mathematics and Statistics, Computer science and programming; other courses in engineering and project (12:62:25): <ul style="list-style-type: none"> • Mathematics and statistics (22,5 ECTS) • Computer science and programming (112,5 ECTS) • Other courses in engineering and project (45 ECTS)
2	GENERAL / SPECIALIST FOCUS	General focus is on Introduction to Computer Science, Discrete mathematics, Data science and Statistics, Machine learning, Computer networks and Data Communication, Algorithms and Data Structures, Linux and other systems, databases, web- and mobile applications, IT-security, Engineering economics and project management. Special focus is on software development through a series of courses in various programming languages. Students gradually develop their competences in basic programming to object-oriented programming and ultimately in designing and to work with larger projects within software engineering.
3	ORIENTATION	Academic programme with basic courses in computer science and mathematics and with a practical orientation with courses in programming.

4	DISTINCTIVE FEATURES	<p>This programme focuses on a close collaboration with specialists within the Faroese IT industry who teach some of the courses and guide students in their Bachelor's dissertation. Approx. 5-10 % of the programme is a remote study in collaboration with Mid Sweden University.</p> <p>Language of instruction is mainly Faroese and English. Study material is mostly in English, occasionally in Danish. Language of instruction during remote study is to some extent Swedish (assignments and course notes), whereas study material and communication is in English.</p>
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C EMPLOYABILITY & FURTHER EDUCATION		
1	EMPLOYABILITY	<ul style="list-style-type: none"> • IT development, programming and project management. • IT operation and IT safety. • Web applications, games, ads, and apps. • Teaching IT, developing and operating educational IT tools. • Participate in research and consulting engineering, collecting data and analysing data, and computer simulation. <p>Software engineers qualify to work with computer models and large amount of data within telecommunication, banking and insurance, genetic research, research within climatology and energy conservation.</p>
2	FURTHER STUDIES	<p>A B.Sc. in Software Engineering qualifies for a M.Sc. within IT engineering, Computer science or related fields of study; admission to DTU M.Sc.: Computer Science and Engineering, Digital Media engineering, Telecommunication and MIUN-International M.Sc. in Computer Science. Graduates have also been accepted to further IT- and Computer Science programmes at ITU.dk, KU.dk (DIKU-M.Sc. in Computer Science). Further studies at other universities are also possible.</p> <p>It is necessary to ensure that all pre-requisites have been met for the individual programme prior to applying, given that institutions will differ in their terms of admission.</p>

D EDUCATION STYLE		
1	LEARNING & TEACHING APPROACHES	<p>Teaching methods used are lectures, assignments and guidance in class and on-line, small exercises, weekly assignments, individual assignments to hand in – on occasion in groups. Moodle is used as a means for information and to some extent for the submission of assignments.</p> <p>The remote courses are taken in collaboration with Mid Sweden University. These courses are structured so that students may receive guidance for assignments etc. at UFI.</p>
2	ASSESSMENT METHODS	<p>Exam methods for on-site courses are (a) written exam, (b) oral exam, (c) submissions and oral exams, and (d) submissions and written exams. Exam methods used for the remote courses are (a) submissions and project, (b) submissions, exam in theory, and</p>

	project, or (c) submissions and written exam. These exams are taken on-line. Other forms of exams may be used on occasion.
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E PROGRAMME COMPETENCES	
1	GENERIC
	<p>Analytical skills: ability to think in abstract and analytical ways in order to come up with new ideas for e.g. innovation of new services or businesses.</p> <p>Communication skills: ability to communicate about IT-solutions with professionals as well as non-professionals.</p> <p>Research skills: capacity to take on smaller research projects at bachelor's level.</p> <p>International language skills: ability to work internationally and to communicate accurately and clearly in English both orally and in writing.</p> <p>Individual and team-work skills: capacity to work independently and in groups and to take responsibility for tasks.</p>
2	SUBJECT SPECIFIC
	<p>Management skills: ability to design, plan, and organise time and resources in projects within engineering.</p> <p>Cooperative skills: ability to collaborate in teams of designers and developers with projects within engineering.</p> <p>Mathematical skills: ability to use discrete mathematics and linear algebra to design and apply algorithms and data structures.</p> <p>Data research skills: ability to understand and apply data scientific concepts, statistical concepts, machine learning and statistical software in data science.</p> <p>Technological skills: capacity to learn, understand, and to apply and stay up-to-speed with ITC.</p> <p>Computer skills: ability to analyse, model, design, programme, and execute IT programs.</p> <p>Problem-solving skills: capacity to identify and solve problems and tasks within software and hardware.</p> <p>Project skills: capacity to write up at proposal for a project, to document and share information about progress while working with a project, to write a project report, and to present the result of the project orally.</p>

F COMPLETE LIST OF PROGRAMME LEARNING OUTCOMES	
	<p>On completion of the programme the student is able to:</p> <ul style="list-style-type: none"> • Analyse fundamental and to some extent advanced concepts within discrete mathematics and linear algebra, and to apply them in computer science. • Describe and apply computer technology, data communication, cable- and wifi-networks, the internet, web and remote application programs, databases, security, computer structure and computer programs, Linux-programs, algorithms and data structures, and commercial IT systems. • Design and develop simple procedure programs and to recycle programming codes based on Python language. • Design and develop advanced software based on object-oriented method and Java language, design pattern, UML-modeling language and the re-using of programming code. • Identify the difference between various programming languages (e.g. Python, Java, and C#). • Develop web- and portable IT operating systems. • Describe webserver and clients, web-design, web-memory, apps and online stores. • Design and set to work on web- and mobile operating systems based on open-source script language and commercial object-based systems, e.g., ASP.NET with MVC/C#, and develop simple apps for e.g. Android. • Describe data science, statistic theory and calculus of probability used within data analysis, research and computer science.

- Describe and apply the statistic programming packet R/RStudio and machine learning using Python/Jupyter Notebook.
- Describe up-to-date data science, statistics and the concept of reproducible research using advanced and user-friendly tools in RStudio/Jupyter Notebook.
- Depict data science, statistics, machine learning within computer science and other fields, e.g. public health, biology, and sociology.
- Describe fundamental and advanced concepts within IT-security and do a risk analysis of various IT systems.
- Design, execute and administer safe IT systems.
- Delineate engineering economics, make budgets and financial control.
- Plan and manage IT-engineering projects, manage resources in order to develop and supply safe IT projects within given time-limit and estimate of cost.
- Describe how research and development is carried out, presented, and published; collect and scrutinise literature and sources in general; describe various sources, primary and secondary sources, and quote correctly.
- Construct and investigate fundamental problems in order to present new knowledge and/or new application programs.
- Document programming codes.
- Demonstrate and combine knowledge within computer science, demonstrate competences regarding IT projects, communication and, to some extent, research in project work.