

Degree profile of <b>Hjánám í støddfrøði</b> <i>Minor in mathematics</i>	
Type of degree & Length	<b>Minor degree</b> (120 ECTS/ 2 years)
Institutions	Fróðskaparsetur Føroya, Megindeildin fyri náttúruvísindi og heilsuvísindi, Náttúruvísindadeildin, Føroyar.  <i>University of the Faroe Islands, Faculty of Natural and Health Sciences, Department of Science and Technology, the Faroe Islands</i>
Accreditation organisation	The Ministry of Education, Research and Culture (MMR), the Faroe Islands.
Period of reference	Accreditation from August 2016 for a period of 8 years
Cycle /Level	Part of:  Bachelors level QF for EHEA: 1st cycle EQF level: level 6

<b>A</b>	<b>PURPOSE</b>	
	To provide students with a general knowledge of mathematical sciences with special focus on mathematics teaching and foundations and applications of mathematics, providing the students with competences for teaching mathematics in upper secondary school as well as a basis for further related studies in mathematics.	
<b>B</b>	<b>CHARACTERISTICS</b>	
1	DISCIPLINE(S) / SUBJECT AREA(S)	Mathematical sciences and applications (75:25).
2	GENERAL / SPECIALIST FOCUS	General education in mathematical sciences.
3	ORIENTATION	An academic programme oriented towards mathematical education, applications of mathematics and further studies in mathematics.
4	DISTINCTIVE FEATURES	<ul style="list-style-type: none"> <li>– The programme includes 30 ECTS of elective courses in topics applying mathematics.</li> <li>– Students can get credit transfers from other educations and it is possible to study part time.</li> <li>– The programme is taught in Faroese, Danish (Nordic) and English.</li> </ul>
<b>C</b>	<b>EMPLOYABILITY &amp; FURTHER EDUCATION</b>	
1	EMPLOYABILITY	Combined with a major in another relevant topic, the education gives competences for teaching mathematics in upper secondary school
2	FURTHER STUDIES	The education can be combined with a major in other topics as part of a bachelor degree. Course work from this education can, by credit transfer, be incorporated as part of a bachelor degree in mathematical or natural sciences at other universities. A Bachelor's degree with a minor in mathematics may provide

		access to Master programmes in mathematics.
<b>D</b>	<b>EDUCATION STYLE</b>	
1	LEARNING & TEACHING APPROACHES	Lectures, problem solving, project writing, group work, student presentations, discussions, individual study and autonomous and distant learning.
2	ASSESSMENT METHODS	Written exams, oral exams, problem assignments and projects submitted during the semester.
<b>E</b>	<b>PROGRAMME COMPETENCES</b>	
1	GENERIC	
	<ul style="list-style-type: none"> <li>• <b>Learning:</b> Identify own learning needs and structure own learning in different learning environments.</li> <li>• <b>Creativity:</b> Capacity to generate new ideas and to formulate and solve problems.</li> <li>• <b>Teamwork:</b> Ability to participate in academic collaboration and to assume responsibility for tasks.</li> <li>• <b>Autonomous work:</b> Ability to work autonomously.</li> <li>• <b>Knowledge acquisition:</b> Ability to search for, process and analyse information from a variety of sources.</li> <li>• <b>Problem solving:</b> Ability to identify, pose and solve problems using required knowledge.</li> <li>• <b>Abstract and analytical thinking:</b> Ability to apply abstract and analytical thinking, using known facts and logic in order to derive a conclusion.</li> <li>• <b>Project work:</b> Ability to participate in and manage small projects, working alone or in collectives.</li> <li>• <b>Communication skills:</b> Ability to communicate efficiently and to present complex information in a concise manner orally and in writing using appropriate technical language.</li> </ul>	
2	SUBJECT SPECIFIC	
	<ul style="list-style-type: none"> <li>• <b>Mathematical knowledge:</b> Ability to demonstrate knowledge of the basic philosophy, foundations, theories and methods of mathematics and detailed knowledge of specific mathematical topics.</li> <li>• <b>Mathematical skills:</b> Ability to choose methods for analysing and solving mathematical problems, and to determine if a given argument is rigorous or heuristic.</li> <li>• <b>Application of mathematics:</b> Ability to apply mathematical theories and methods in other disciplines and settings and to analyse and evaluate theoretical and practical problems in order to apply suitable mathematical models.</li> <li>• <b>Teaching skills:</b> Ability to teach mathematics in upper secondary school and to reflect on the ways in which teaching skills are put into practice and to use knowledge from advanced or current mathematical topics to create teaching material and plans.</li> <li>• <b>Learning ability:</b> Ability to learn new topics in mathematics, using the acquired knowledge of mathematical sciences.</li> <li>• <b>Problem solving skills:</b> Ability to use – among other techniques – the generalisation and abstraction method to solve complex problems.</li> <li>• <b>Computational skills:</b> Ability to use appropriate mathematical software to solve theoretical and practical problems.</li> <li>• <b>Communication skills:</b> Ability to communicate mathematical theories and methods in writing and orally and reason in a rigorously mathematical way.</li> <li>• <b>Collaborative skills:</b> Ability to participate in professional and interdisciplinary collaboration using a mathematical approach.</li> </ul>	
<b>F</b>	<b>COMPLETE LIST OF PROGRAMME LEARNING OUTCOMES</b>	
	<p>On the completion of the program the student will have demonstrated the capability to:</p> <ul style="list-style-type: none"> <li>• Determine the correctness of mathematical reasoning.</li> <li>• Use formal logic and naive set theory on mathematical assertions.</li> <li>• Formulate, implement and produce mathematical reasoning within the basic topics of mathematics.</li> <li>• Read and understand mathematical literature in Danish and English.</li> </ul>	

- Understand key mathematical disciplines, theories and concepts.
- Know what type of questions and answers that are characteristic of mathematics.
- Formulate and solve mathematical problems.
- Use mathematical language, mathematical symbol language and mathematical formalism.
- Use modern information technology for mathematical purposes – among these to apply symbolic software tools to solve and graphically display mathematical problems and to understand and interpret output from statistical software.
- Break down larger problems into smaller, more easily accessible sub-problems.
- Identify own learning needs and structure their own learning.
- Carry out calculations and algebraic manipulations with basic equations, inequalities, real and complex numbers as well as with the elementary functions.
- Be able to carry out differentiation in several variables and to use this for finding Taylor polynomials, doing approximations using Taylor's formula and to calculate extrema for functions in several variables.
- Work with parametrised curves, surfaces and regions and to calculate simple line-, surface and space integrals, and to understand connections between these topics including usage of Gauss' and Stoke's theorems.
- Demonstrate knowledge of basic concepts and techniques in linear algebra, and to be able to apply these in a variety of different settings – both within mathematics and as applications within other subjects – e.g. systems of linear equations, linear differential equations, geometry, Fourier analysis.
- Organise projects about mathematical concepts and methods both in pure and applied mathematical contexts – both as a collaboration in a team and as individual work.
- Solve n'th order linear differential equations and systems of linear differential equations.
- Distinguish between linear/non-linear systems and test the behaviour of simple non-linear systems.
- Know the differences between various types of convergence (absolute, conditional, point-wise, uniform) of infinite series and identify them.
- Estimate the number of terms that is needed in order to obtain a desired approximation of an infinite series.
- Find the Fourier series for simple periodic functions, clarify their convergence properties, and approximation-theoretic properties.
- Apply Fourier series and various other types of infinite series to solution of differential equations.
- Demonstrate understanding of the limitations and historical development of the foundations of mathematics.
- Work with recursive definitions and solve recurrences.
- Apply the concept of growth rate of a function, O-notation and l'Hopital's rule in both pure mathematical settings as well as in applied settings such as analysing algorithms.
- Recognize different types of relations and make use of them.
- Demonstrate knowledge and elementary application of axiomatic set theory – including Zorn's lemma, principle of well-order, axiom of choice.
- Analyse combinatorial problems using counting arguments.
- Recognize different types of graphs and apply key algorithms associated with graphs.
- Demonstrate familiarity with fundamental concepts in probability theory.
- Apply and interpret important statistical concepts, such as the formulation of models, parameter estimation, construction of confidence intervals and hypothesis testing, and compare different statistical methods.
- Identify and describe probability distributions, including Poisson, binomial, exponential and the Normal distribution.
- Demonstrate familiarity with fundamental concepts in algebra, including concepts from group theory and number theory.
- Recognize group structure and group actions, and analyse simple aspects of these.
- Display knowledge of the axiomatic foundation of, the similarities and difference between and historical aspects of different geometries (for instance plane geometry, neutral geometry, Euclidian

geometry, hyperbolic geometry).

- Use Didactical Transposition and levels of co-determination to analyse mathematics and resources on high school level, analyse exercises and construct exercises, projects and lessons using praxeological analysis, study and research paths and the theory of didactical situations.
- Discuss and reflect on the role of mathematics and mathematics teachers in today's society. Relate to scientific methods and ethics.
- Apply mathematical knowledge, understanding and techniques to other areas such as physics, astronomy, chemistry, biology, engineering, computer science, information and communication technology, economics, actuarial science, finance, economics, teacher education.
- Display deep knowledge and understanding of an advanced subject area, such as analysis, algebra and algebraic geometry, applications, differential equations, discrete mathematics and combinatorics, geometry and topology, mathematical education, mathematical physics, number theory, probability and statistics.