KLADDE

Aflyst 16/12. pga ingen tilmeldte - Fundamental Mathematical Structures (Advanced Topics in Mathematics)

Title	Aflyst 16/12. pga ingen tilmeldte - Fundamental Mathematical Structures (Advanced Topics in Mathematics)
Semester	F2025
Master programme in	Mathematical Bioscience / Physics and Scientific Modelling
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at ruc.dk Læs mere om uddannelsen og find din studieordning på ruc.dk

REGISTRATION AND STUDY ADMINISTRATIVE

Registration	Sign up for study activities at stads selvbetjening within the announced registration period, as you can see on the Studyadministration homepage. When signing up for study activities, please be aware of potential conflicts between study activities or exam dates. The planning of activities at Roskilde University is based on the recommended study programs which do not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programs, an overlap of lectures or exam dates may occur depending on which courses you choose.
Number of participants	
ECTS	10
Responsible for the activity	Jesper Schmidt Hansen (jschmidt@ruc.dk)
Head of study	Jesper Schmidt Hansen (jschmidt@ruc.dk)
Teachers	

Study administration	INM Registration & Exams (inm-exams@ruc.dk)
Exam code(s)	U60167

ACADEMIC CONTENT

Overall objective	The overall objective of the course is to give the student an understanding of an advanced mathematical topic relevant to the Mathematical Bioscience and Physics and Scientific Modelling programmes. This includes topics on pure mathematics and/or applied mathematics.
Detailed description of content	The course aims at giving the students an understanding of the axiomatic deductive structure of mathematics by introducing the students to classical fundamental examples of axiomatic deductive structures. Examples are propositional logic, set theory, abstract algebra, general topology, Real analysis, Probability theory, Euclidean geometry, Differential geometry and more. The concrete incarnation of the course will discuss a number of selected such fundamental structures.
Course material and Reading list	The course will introduce to and enlarge on a number of selected fundamental structurese.g. such as presented in the lecture notes by prof. Mogens Niss, which are freely available upon request
Overall plan and expected work effort	The course will be taught as a mixture of lectures, discussions and problem solving. The course load is 10 ECTS corresponding to approx. 270 hours of work. Of these approximately 84 hours will be classes, 80 hours should be preparations for classes, another 80 hours post processing of classes. The remaining time will be dedicated to repairing the portfolio elements for the final exam and the final exam.
Format	
Evaluation and feedback	The course includes formative evaluation based on dialogue between the students and the teacher(s).

Students are expected to provide constructive critique, feedback and viewpoints during the course if it is needed for the course to have better quality. Every other year at the end of the course, there will also be an evaluation through a questionnaire in SurveyXact. The Study Board will handle all evaluations along with any comments from the course responsible teacher.

Furthermore, students can, in accordance with RUCs 'feel free to state your views' strategy through their representatives at the study board, send evaluations, comments or insights form the course to the study board during or after the course.

Programme

The course will cover approximately 4 fundamental structures across approximately equal amounts of classes.

ASSESSMENT

Overall learning outcomes

After completing the course, the students will be able to:

- Demonstrate knowledge and understanding of the topic on an advanced level.
- Critically validate the topic's strengths and limitations.
- Independently obtain further understanding the specific topic.
- Communicate and present the topic's element to both experts and non-experts.
- Engage (alone or in a research team) in further development of the topic.

Form of examination

Individual written portfolio and oral exam

The character limit of the portfolio is 1,200-12,000 characters, including spaces. Examples of written products are exercise responses, talking points for presentations, written feedback, reflections, written assignments. The preparation of the products may be subject to time limits.
The character limits include the cover, table of contents, bibliography, figures and other illustrations, but exclude any appendices.

Time allowed for exam including time used for assessment: 30 minutes. The assessment is an assessment of the oral examination. The written product(s) is not part of the assessment.

Permitted support and preparation materials for the oral exam: All.

Assessment: 7-point grading scale
Moderation: Internal co-assessor

Form of Re-examination

Samme som ordinær eksamen / same form as ordinary exam

Type of examination in special cases

The exam is a 30 min oral exam including grade decision. At the exam the student draws a portfolio element to present without further preparation. The presentation should be timed to 10 min. In order to leave am-le time for further questions across the entire curse curriculum.

The students are offered to have their portfolio elements commented prior to the exam by the course professor after hand-in times decided by the course professor.

Handing-in of portfolio elements for commenting is highly advised, but is not obligatory.

Examination and assessment criteria (implemented)

The assessment criteria for the written part of the exam

- present concrete mathematical structures in the field of set theory, topology, analysis and algebra
- formulate proofs of common features and differences between such structures
- exercise mathematical reasoning in relation to the subject
- compare and differentiate between different types of mathematical arguments and proofs
- critically and independently judge the validity of a mathematical proof

The assessment of the oral exam is based on the student's ability to meet the criteria mentioned above and their ability to

- clearly present and communicate the scientific content of the portfolio
- engage in a scientific dialogue and discussion with the assessor and co assessor

Furthermore, whether the performance meets all formal requirements in regard to both for the written og oral exam

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