

Fundamental Mathematical Structures

About the course

Subject	Matematik / Mathematical Physical Modelling / Mathematical Computer Modelling
Activitytype	master course
Teaching language	English
Registration	<p>Tilmelding sker via stads selvbetjening indenfor annonceret tilmeldingsperiode, som du kan se på Studieadministrationens hjemmeside</p> <p>Når du tilmelder dig kurset, skal du være opmærksom på, om der er sammenfald i tidspunktet for kursusafholdelse og eksamen med andre kurser, du har valgt. Uddannelsesplanlægningen tager udgangspunkt i, at det er muligt at gennemføre et anbefalet studieforløb uden overlap. Men omkring valgfrie elementer og studieplaner som går ud over de anbefalede studieforløb, kan der forekomme overlap, alt efter hvilke kurser du vælger.</p> <p>Registration is happening through stads selvbetjening within the announced registration period, as you can see on the Studyadministration homepage.</p> <p>When registering for courses, please be aware of the potential conflicts between courses or exam dates on courses. The planning of course 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.</p>
Learning outcomes/ assessment criteria	<p>Knowledge</p> <ul style="list-style-type: none">● Knowledge of specific mathematical structures within set theory, topology, analysis and algebra.● Knowledge of common features of and differences between such structures.● Knowledge of different types of reasoning and proofs, and their importance.● Knowledge of the construction and formalisation of such structures. <p>Skills</p> <ul style="list-style-type: none">● Skills to recognise fundamental mathematical structures.● Skills to know and use symbols and other representations in accordance with the given formalism.● Skills to read, understand and reproduce proofs in the context of the structures studied. <p>Competencies</p> <ul style="list-style-type: none">● Competency to apply mathematical thinking in relation to the fundamental structures of the subject.● Competency to be able to follow, assess and carry out mathematical reasoning and proofs.● Competency to decode, interpret, differentiate between and link different mathematical representations.● Competency to be able to decode and apply mathematical symbolic language within a given formalism, and to assess the strengths and weaknesses of an axiomatic system.● Competency to be able to read and understand mathematical texts concerning the basis of the subject and fundamental structures, and to communicate these both orally and in writing.
Overall content	<ul style="list-style-type: none">● Various fundamental, abstract mathematical structures and their interrelations.● Introduction to formal logic, including the concept of a formal theory.● Set theory, algebraic structures, metric and topological spaces, geometric structures and aspects of measure spaces.
Detailed description of content	<p>The aim of the course is to buildup the students understanding of mathematical structures. What constitutes a mathematical structure? How is a structure formed? What are the properties? What are the general principles (to the extend such principles can be determined). The course has two parts. The first is a rather quick (re)-introduction of various mathematical structures. The second part is a comparative analysis of the structures encountered in the course and in other courses. What is the general pattern in structure formation etc.</p>
Teaching and working methods	<p>Lectures and calculation exercises with brief student presentations and discussions of the material. 3-7 small assignments are submitted either individually or in groups, for feedback.</p>
Expected work effort (ects-declaration)	<p>The course is a 10 ECTS course and the student is expected to work 250-260 hours with the course during the semester. Off these 70 hours (40 classes of 1h45m) are a combination of lectures and students supervised exercise solving. The students are expected to spend an equal amount of time (60 hours) in preparation for the</p>

class and 1.5 times this amount (90 hours) for working with the material after class. The remaining time is preparation for the exam.

Course material and reading list	Course notes written by Mogens Niss. The notes will be available from the Moodlepage of the course. The notes covers Formal logic Set Theory Algebraic structures Topological structures		
Form of examination	The course is assessed through an oral examination The oral examination may relate to written assignments/tasks prepared during the course. The examination duration is 30 minutes, including assessment.		
Form of re-examination	Re-examination takes the same form as the ordinary examination.		
Examination type	Individual examination		
Exam aids	All.		
Assessment	7-point grading scale		
Moderation	Internal (i.e. course lecturer and an internal examiner assess)		
Evaluation- and feedback forms	The course is evaluated according to the evaluation scheme developed by the study board for INM. This consists of a midterm evaluation and a final evaluation (both are discussions between the course professor and the class. The final evaluation is supplemented with a blinded written evaluation through survey exact. The teaching will be dialog based with ample possibilities for feed back both personally and as a class.		
The responsible course lecturer	Carsten Lunde Petersen (lunde@ruc.dk)		
Teacher	Carsten Lunde Petersen (lunde@ruc.dk) Eva Uhre (euhr@ruc.dk)		
Administration of exams	INM Studieadministration (inm-studieadministration@ruc.dk)		
STADS stamdata	Master course Workload : 10 ECTS Exam form : Mundtlig (ua)	Activitycode : U40275 / U40467 Grading : 7-point grading scale	Censorship : Internal censor

Course days:

Hold: 1

Mat: Fundamental Mathematical Structures - Lecture 1

Time	05-02-2019 13:15 til 05-02-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)
Teacher	Carsten Lunde Petersen (lunde@ruc.dk)

Content	Class 1 Introduction including the plot of the course followed by Introduction to formal logic Statement forms, logical connectives, tautologies.
Reading list	From the notes by Mogens Niss entitled Formal logic Introduction to the chapter & p.1-8

Mat: Fundamental Mathematical Structures - Lecture 2

Time	08-02-2019 10:15 til 08-02-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 3

Time	12-02-2019 13:15 til 12-02-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 4

Time	15-02-2019 10:15 til 15-02-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)
Content	First day of the Self study in groups
Reading list	Solving exercises handed out in Class

Mat: Fundamental Mathematical Structures - Lecture 5

Time	19-02-2019 13:15 til 19-02-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 6

Time	22-02-2019 10:15 til 22-02-2019 12:00
Forberedelsesnorm	Ikke valgt

Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 7

Time 26-02-2019 13:15 til
26-02-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 8

Time 01-03-2019 10:15 til
01-03-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 9

Time 05-03-2019 13:15 til
05-03-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 10

Time 08-03-2019 10:15 til
08-03-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 11

Time 12-03-2019 13:15 til
12-03-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)
Teacher Eva Uhre (euhre@ruc.dk)

Mat: Fundamental Mathematical Structures - Lecture 12

Time	15-03-2019 10:15 til 15-03-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 13

Time	19-03-2019 13:15 til 19-03-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 14

Time	22-03-2019 10:15 til 22-03-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 15

Time	26-02-2019 13:15 til 26-02-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-089 - teorirum 27 (66)

Mat: Fundamental Mathematical Structures - Lecture 16

Time	29-03-2019 10:15 til 29-03-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 17

Time	02-04-2019 13:15 til 02-04-2019 17:00
Forberedelsesnorm	Ikke valgt

Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 18

Time 05-04-2019 10:15 til
05-04-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 19

Time 09-04-2019 13:15 til
09-04-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 20

Time 12-04-2019 10:15 til
12-04-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 21

Time 16-04-2019 13:15 til
16-04-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 22

Time 23-04-2019 13:15 til
23-04-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 23

Time	26-04-2019 10:15 til 26-04-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 24

Time	30-04-2019 13:15 til 30-04-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 25

Time	03-05-2019 10:15 til 03-05-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 26

Time	07-05-2019 13:15 til 07-05-2019 17:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 27

Time	10-05-2019 10:15 til 10-05-2019 12:00
Forberedelsesnorm	Ikke valgt
Forberedelsesnorm d-vip	Ikke valgt
Location	27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 28

Time	14-05-2019 13:15 til 14-05-2019 17:00
Forberedelsesnorm	Ikke valgt

Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 29

Time 21-05-2019 13:15 til
21-05-2019 17:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 30

Time 24-05-2019 10:15 til
24-05-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Lecture 31

Time 31-05-2019 10:15 til
31-05-2019 12:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location 27.1-052 - lokale 2 (20)

Mat: Fundamental Mathematical Structures - Examination

Time 14-06-2019 08:00 til
14-06-2019 14:00
Forberedelsesnorm Ikke valgt
Forberedelsesnorm d-vip Ikke valgt
Location (when shared activity) 27.1-052 - lokale 2 (20)

Content

The course is assessed through an oral examination

The oral examination may relate to written assignments/tasks prepared during the course. The examination duration is 30 minutes, including assessment.

Mat: Fundamental Mathematical Structures - Reexamination

Time 19-08-2019 08:00 til
19-08-2019 17:00
Forberedelsesnorm Ikke valgt

Forberedelsesnorm d-vip Ikke valgt

Location 05.2-032 - teorirum (65)

Content Re-examination takes the same form as the ordinary examination.

STADS Master course

stamdata Workload : 10 ECTS

Exam form : Mundtlig (ua)

Activitycode : U40275 / U40467

Grading : 7-point grading scale

Censorship : Internal censor