

Elements of set theory, spring 2014

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Lecturer

Fan Yang

Scope

10 sp.

Type

Intermediate studies

Prerequisites

No special prerequisites.

Description

Set theory is widely accepted as the foundation of mathematics. In this course, we will go through chapter 1-7 of Enderton's book [Elements of Set Theory](#). The following topics will be covered: axioms and operations on sets, relations and functions, natural numbers, construction of real numbers, cardinal numbers, axiom of choice, orderings and ordinal numbers.

Lectures

Weeks 3-8 and 11-18, Tuesday 12-14 in room B322 and Thursday 14-16 in room DK117.

Easter Holiday 17.-23.4.

	contents	handout	last modified
week 3 (Jan 14, 16)	chapter 1-2: introduction, axioms and operations	ST_1_ht.pdf	Jan 16, 22:30
week 4 (Jan 21, 23)	chapter 3: ordered pairs, relations and orderings, equivalence relations. chapter 7: partial orderings	ST_2_ht.pdf	Jan 24, 20:50
week 5 (Jan 28, 30)	chapter 3: equivalence relations, functions, axiom of choice	ST_3_ht.pdf	Jan 31, 13:40
week 6 (Feb 4, 6)	chapter 4: construction of natural numbers, transitive sets, ordering on ω , recursion theorem	ST_4_ht.pdf	Feb 6, 23:30
week 7 (Feb 11, 13)	chapter 4: arithmetic. chapter 5: integers	ST_5_ht.pdf	Feb 13, 23:30
week 8 (Feb 18, 20)	chapter 5: rational numbers, Dedekind cuts	ST_6_ht.pdf	Feb 20, 23:50
week 11 (Mar 11, 13)	chapter 5: real numbers	ST_7_ht.pdf	Mar 13, 17:00
week 12 (Mar 18, 20)	chapter 6: equinumerosity, finite sets, cardinal arithmetic	ST_8_ht.pdf	Mar 20, 16:40
week 13 (Mar 25, 27)	chapter 6: cardinal arithmetic, ordering cardinal numbers	ST_9_ht.pdf	Mar 27, 17:00
week 14 (Apr 1, 3)	chapter 6: ordering cardinal numbers, axiom of choice, countable sets, absorption law of cardinals	ST_10_ht.pdf	Apr 3, 21:40
week 15 (Apr 8, 10)	chapter 7: well orderings, isomorphisms, ordinal numbers	ST_11_ht.pdf	Apr 10, 17:00
week 16 (Apr 15) week 17 (Apr 24)	chapter 7: ordinal numbers, transfinite induction and recursion, debts paid	ST_12_ht.pdf	Apr 24, 17:20
week 18 (Apr 29)	chapter 7: debts paid, rank	ST_13_ht.pdf	Apr 29, 14:20

Exams

There will be a midterm exam and a final exam.

	Date	Time	Place
Midterm Exam	Feb 28	10-12	B120
Final Exam	May 9	10-12	B321

Bibliography

Textbook:	H. Enderton, Elements of Set Theory , Academic Press. (Errata)
References:	Introduction to Set Theory, Karel Hrbacek and Thomas Jech, 3rd Edition, Marcel Dekker.
	Set Theory for the Working Mathematician, Krzysztof Ciesielski, Cambridge University Press.

Exercise class

Group	Day	Time	Place	Teacher
1.	Friday	10-12	B321	Miguel Moreno

Exercises

	Date of exercise class
1.	Jan 24
2.	Jan 31
3.	Feb 7
4.	Feb 14
5.	Feb 21
6.	Mar 14
7.	Mar 21
8.	Mar 28
9.	Apr 4
10.	Apr 11
11.	Apr 25
12.	May 2
13.	No exercise class

Grading

To pass the course, you need to take two course exams (midterm and final). Attending only one exam (even if you score full marks) is not sufficient. From each of the two exams, you can score (4 questions \times 6 points =) 24 points. The passing mark for the course is around 24 points (the exact passing mark will be decided by the lecturer at the end of the semester according to the overall performances of the students).

By solving a certain amount of the exercise problems, you will be awarded extra points (see the table below for details). "Solving" here means that you have honestly tried to give solutions to the problems.

percentage of exercise problems solved	extra points
40%	1
50%	2
60%	3
70%	4
80%	5
90%	6

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