FIRST YEAR SEMINAR IN MATHEMATICS – AUTUMN TERM 2019

COURSE INFORMATION

Course content. The classes will consist partly of lectures, partly of students' oral presentations and discussion. The lectures will cover the following topics, each of which corresponds approximately to a 90 minutes class. The remaining time will be used for oral presentations and discussions.

	Topic	Section
1	Introduction. Logic, proofs	1.1–1.3
2	Set theory	2.1–2.3
3	Functions and relations	3.1, 3.4
4	Equivalence relations, induction	1.3, 3.3
5	The Peano axioms	7.1
6	Arithmetic operations	7.2
7	Integers	7.3
8	Rational numbers	7.4
9	Cauchy sequences	7.5
10	Real numbers	7.5, 7.6
11	The completeness property	7.7

Time and venue. All classes takes place on Wednesdays, 10:30–12:00 in room A13 Liberal Arts and Sciences building A, between the 2nd October 2019 and the 5th February. There will be no classes on the 9th October and the 1st January.

Examination. The examination consists of *written homework* and *oral presentations*.

- *Homework:* There will be a number of homework assignments during the course. Collaboration in solving the homework is encouraged, but each participating student must submit written solutions individually. Students may be requested to present their homework solutions at the blackboard to the class. The homework will be graded on the basis of both the written solutions and the blackboard presentations.

  For each homework assignment, a list of problems will be given, out of which students may choose a specified number of problems to hand in. Each problem is classified as either *basic* or *advanced*. The proportions of advanced respectively basic homework assignments handed in affect the total score given on the course (see below, under Grading).
- *Oral presentations:* Each participant will be requested to give one or several oral presentations of some topic(s) related to the course. A list of suggested topics will be distributed, and the participants should choose their topics in consultation with the instructor.

Grading. A total score (0–100 %) is calculated as the weighted average of the scores obtained on the different parts of the examination, as follows:

- **70 %** : homework;
- **30 %** : oral presentations.

Additionally, to obtain a score of 80 % or higher, a student must submit solutions to *at least 30 %* of the advanced homework problems. To obtain a score of 90 % or higher, a student must submit solutions to *at least 50 %* of the advanced homework problems.

The final grade is determined by the total score:
F: 0–59 %, C: 60–69 %, B: 70–79 %, A: 80–89 %, S: 90–100 %.

Course withdrawal. A participant who whishes to withdraw from the course must submit a course withdrawal request form to the instructor, no later than the *29th November* 2019. In the case of withdrawal, the student obtains the grade *Absent*. Otherwise a grade will be given on the scale *S-A-B-C-F*.

Textbooks. The main text for this course is:

- Steven Galovich: *Introduction to mathematical structures*, Harcourt Brace Jovanovich Publishers, San Diego, 1989. *ISBN-13: 978-0155434684*.

Other relevant literature includes:

- Solomon Feferman: *The number systems. Foundations of algebra and analysis*, Chelsea Publishing Company, New York; 2nd edition 1989.
- Edmund Landau: *Foundations of analysis*, Chelsea Publishing Company, New York; 3rd edition, 1966.
- Seymour Lipschutz: *Schaum's outline of set theory and related topics*, McGraw-Hill Education; 2nd edition, 1998. *ISBN-13: 978-0070381599*.

Teaching assistant. The teaching assistant for this course is Mr Kazumasa Narita. You are welcome to contact him to with questions about the course content, as well as for advise for your oral presentations.

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