

**SYLLABUS OF MATH-104 INTRODUCTION TO ANALYSIS
SPRING 2019 SECTION 001**

BASIC INFORMATION

Instructor: Semeon Artamonov artamonov@berkeley.edu

Lectures: Monday-Wednesday-Friday 1:00PM-2:00PM (Berkeley time) at Hearst Mining 310

Textbook: K. A. Ross "Elementary Analysis: Theory Of Calculus" (ISBN 978-1-4614-6270-5)

Office hours: Monday 4-5PM, **Wednesday 3-4 PM, Friday 3-4PM** (or by Appointment) at 1055 Evans Hall

Course website: <https://math.berkeley.edu/~art/S19-Math-104.html>

Math-104 GSI: To be assigned in January

HOMEWORK

Homework assignments will be given on Fridays and normally will be due by the beginning of the class on the following Friday. A random subset of problems from each assignment will be graded and the average homework grade will contribute to the total grade. For each student I will drop the two lowest homework grades from taking the average at the end of the semester.

Late homework assignments will not be accepted. If you have to miss a class you should do one of the following:

- Submit homework in class at any lecture before the due date.
- E-mail homework **typed in LaTeX** by 5PM on the due date. Scanned versions will not be accepted.

EXAMS

Midterm I: **Friday, February 22** (in class)

Midterm II: Friday, March 22 (in class)

Final Exam: Tuesday, May 14 at 8:00AM (to be confirmed in April)

Missing the final exam generally implies failing the course. Please double check <https://registrar.berkeley.edu/scheduling/academic-scheduling/final-exam-guide-schedules> to make sure that you have no final exam conflicts, back-to-back exams etc., and switch sections if necessary. It is entirely your responsibility to organize your schedule in such a way that you will have enough time between the exams.

In case of an emergency during the exam (e.g. fire alarm, earthquake), leave your exams facing down on the table and follow the emergency instructions. You are not allowed to take the exam materials with you when evacuating.

GRADES

The contribution to the total grade: Homework — 15%, Midterms — 20% each, Final Exam — 45%. In order to pass the course you need to have the total score 60% or higher. Missing final exam implies failing the course or, in some cases, receiving an "I" (incomplete grade). The cutoffs between the passing letter grades will be determined using historical averages as a guideline.

If you have a proper reason to miss a midterm, please e-mail me at least one week before the exam, and your grade will be rescaled with no penalties. Otherwise, your grade will be calculated as follows:

If you missed one midterm: Homework — 20%, Midterm — 25%, Final Exam — 50% (the total is 95%)

If you missed two midterms: Homework — 25%, Final Exam — 55% (the total is 80%)

READING SCHEDULE

Outside reading is an essential part of the course, below you can find a list of reading assignments for each week. It is crucially important to read the following sections of the textbook within a week after each lecture.

Wed, Jan. 23	Axioms of Natural Numbers, Principle of Mathematical Induction	§1
Fri, Jan. 25	Rational and Algebraic Numbers	§2
Mon, Jan. 28	The set of Real Numbers	§3,6
Wed, Jan. 30	The Completeness Axiom	§4
Fri, Feb. 1	Archimedean Property and The Symbols $\pm\infty$	§4-5
Mon, Feb. 4	Limits of Sequences	§7
Wed, Feb. 6	Proofs in Mathematics	§8
Fri, Feb. 8	Limit Theorems for Sequences	§9
Mon, Feb. 11	Monotone Sequences	§10
Wed, Feb. 13	Cauchy Sequences and Subsequences	§10-11
Fri, Feb. 15	Bolzano-Weierstrass Theorem	§11
Mon, Feb. 18	No Class, Holiday	
Wed, Feb. 20	\limsup and \liminf	§12
Fri, Feb. 22	Midterm I	
Mon, Feb. 25	Infinite Series	§14
Wed, Feb. 27	Infinite Series (continued) and convergence tests	§14-15
Fri, Mar. 1	Definition of Continuous Functions	§17
Mon, Mar. 4	Properties of Continuous Functions	§17-18
Wed, Mar. 6	Intermediate Value Theorem and Uniform Continuity	§18-19
Fri, Mar. 8	Uniform Continuity (continued)	§19
Mon, Mar. 11	Limits of Functions	§20
Wed, Mar. 13	Power Series	§23
Fri, Mar. 15	Uniform Convergence	§24
Mon, Mar. 18	Weierstrass M-test	§25
Wed, Mar. 20	Differentiation and Integration of Power Series	§26
Fri, Mar. 22	Midterm II	
Mon, Mar. 25	No Class, Spring Break	
Wed, Mar. 27	No Class, Spring Break	
Fri, Mar. 29	No Class, Spring Break	
Mon, Apr. 01	Derivatives and Basic Properties	§28
Wed, Apr. 03	The Mean Value Theorem	§29
Fri, Apr. 05	L'Hopital's Rule	§30
Mon, Apr. 08	Taylor's Theorem	§31
Wed, Apr. 10	Applications of Taylor's Theorem	§31
Fri, Apr. 12	Definition of The Riemann Integral	§32
Mon, Apr. 15	Basic Properties of The Riemann Integral	§32-33
Wed, Apr. 17	Intermediate Value Theorem for Integrals	§33
Fri, Apr. 19	Fundamental Theorem of Calculus	§34
Mon, Apr. 22	Improper Integrals	§35
Wed, Apr. 24	Metric Spaces and Metric Topology	§13
Fri, Apr. 26	Metric Topology (continued)	§13
Mon, Apr. 29	Continuous Maps of Metric Spaces	§21
Wed, May 1	Connected Spaces	§22
Fri, May 3	Exponents and Logarithms	§37