# MA221 – Analysis I : Real Analysis
# 2017 Autumn Semester

**Place & Time:** Mathematics Building, Lecture Hall LH-4, Tue Thu 2–3:30 PM

**Instructors:** Apoorva Khare and Gadadhar Misra
Emails : khare@ and gm@ @iisc.ac.in
Offices : Mathematics Department, Rooms R23 and L17 respectively
Phones : 2293-3124 and 2293-2712 respectively
Office Hours : Wed 2–4 PM

**Teaching Assistant**

Sourav Hait souravhait@iisc.ac.in Fri 5:30–7:30 PM Math Dept, Room N11

**Course website:** http://www.math.iisc.ac.in/∼khare/teaching.html

**Course Goals** (Follows closely Rudin Chapters 1–7 and 9.)

Construction of the field of real numbers and the least upper-bound property. Review of sets, countable & uncountable sets. Metric Spaces: topological properties, the topology of Euclidean space. Sequences and series. Continuity: definition and basic theorems, uniform continuity, the Intermediate Value Theorem. Differentiability on the real line: definition, the Mean Value Theorem. The Riemann-Stieltjes integral: definition and examples, the Fundamental Theorem of Calculus. Sequences and series of functions, uniform convergence, the Weierstrass Approximation Theorem. Differentiability in higher dimensions: motivations, the total derivative, and basic theorems. Partial derivatives, characterization of continuously-differentiable functions. The Inverse and Implicit Function Theorems. Higher-order derivatives.

**Required Text**

Walter Rudin, *Principles of Mathematical Analysis*, third edition.

**Optional Texts**

Tom Apostol, *Mathematical Analysis*.

**Grading & Exam Schedule**

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| Homework | 20% | |
| Midterm | 30% | Sep 19, Tuesday, in class |
| Final | 50% | Dec 7, Thursday, in class (Lecture Hall LH-4), 2-5 pm |

**Homework**

There will be 7 or 8 homework assignments that will count towards grades. Homework problems will be posted on the course webpage. Each student should hand in their independently written solutions, written in their own words.

**Miscellaneous**

(1) Please write MATH221 in the subject heading of all email correspondence with instructors/TA. This is in general effective in weeding out spam email.

(2) **Homework:** The TAs are responsible for the homework component of the class. As pointed out earlier, we are unable to accept late homework. Homework extensions only delay the grading of solutions.

Homework cannot be submitted by email/electronically as they need to be graded on a paper copy (the TAs do not have access to unlimited printing - so please print any typed-up homework before submission). Please submit HW on time, in the TA office, or in class. Please do not place your homework under the office doors of the TA/instructors. In the past, homework placed under office doors has sometimes been lost or misplaced.

(3) Please note that it is difficult to discuss mathematics questions by email due to the lack of an appropriate interface. You are encouraged to ask your technical questions during office hours. As the TAs have responsibilities other than this course, please go to them only during office hours (unless prior arrangements have been made).

(4) In the past poor time management and planning have led to homework being handed in late etc... To be fair to the TA's and your fellow students please do not unnecessarily burden the teaching team with unreasonable requests. Please be responsible and plan ahead if you have to be away from campus during the quarter.