# UMA 101 : UNDERGRADUATE ANALYSIS & LINEAR ALGEBRA
## AUTUMN 2023

**Instructor: GAUTAM BHARALI**

bharali@iisc.ac.in
https://math.iisc.ac.in/∼bharali/teaching.htm

---

**THIS IS THE LAST TIME THAT A HANDOUT WILL BE PASSED OUT IN HARD COPY!**
All future announcements/assignments will be posted on the course webpage.

**Joining code for Microsoft Teams:** It is **mandatory for students to join the UMA101 online team!** See the hard-copy handout or e-mail me.

**Textbook:** Tom M. Apostol, *Calculus, Vol. 1*, 2nd Edition, Wiley (India Edition). (**Note.** If you feel that your engagement with mathematical problem-solving in Class XII has been lower than the norm, then you may want to work through the exercises in any edition of **Thomas & Finney's** book (available in the Undergraduate Library). But Thomas & Finney is **not a substitute** for Apostol.)

**Course summary:** This course is intended as a first course in Calculus, treated **rigorously**, plus a brief introduction to Linear Algebra. The aim of the course is to expose students to the meanings of the basic concepts of mathematical analysis as they are used in modern mathematics and across the quantitative sciences.

The emphasis of this course will be on **problem solving**, which—at the 1st-year level at IISc—means both solving problems that involve calculations as well as giving brief proofs.

**Syllabus:** Essentially, we shall cover portions of Chapter I, Chapters 1–7, Chapter 10, and Chapters 15–16 from Apostol's textbook. However, **we will not cover these topics in the order in which they occur in the book.** Please look at the course webpage for a tentative sequence of topics, which will grow as the course progresses.

**Assignments and quizzes:** In the course of the lectures, I shall post homework assignments on the course webpage. On **most** weeks, a new assignment will be posted by **11:59 p.m. on Tuesdays.** It is **essential** for your own understanding of the course material that you attempt these problems prior to the tutorial of the upcoming Tuesday. Please note:

- The tutorials will be the forum in which you will discuss any problems on the homework assignment that you had difficulties with. **Attendance at the tutorials is mandatory!** You are encouraged to talk to the teaching assistant (TA) leading your tutorial for hints on problems on which you got stuck.

- At the end of (almost) every tutorial, your TA will give you a 10-minute quiz (or of 15 minutes sometimes). This quiz will be based on the most recent assignment, and will feature either a problem picked directly from that assignment **or** adapted from it with minor modifications.

- The homework assignments are a necessary but not sufficient condition for understanding the material covered. It is in your interest to practice more problems drawn from the relevant section of exercises given in Apostol's book.

**Tutorials:** These will be held in parallel 11:00–11:50 a.m. on Tuesdays. Locations and TAs will be announced sometime during Week 2 of the course.

**Assessment:** Your assessment will be based on:
Mid-semester exam: *30%* or *25%*,   Quizzes: *20%* or *25%*,   Final exam: *50%*,

where the relative weights of the mid-semester exam and the quizzes will be finalised sometime after the mid-semester exam has been graded.