

Maths 121: Analysis

Dr. Paschalis Karageorgis (Pete)

Office: Hamilton Building, 3rd floor, Room 20.32c

E-mail: pete@maths.tcd.ie

Lectures We will have four lectures each week:

Monday	Tuesday	Thursday
10-11 in EELT2	5-6 in M17	10-11 in PLLT, 11-12 in AB2037

Tutorials Friday 3-4 in Salmon (for TP students); Friday 3-4 in Maxwell (for everyone else).

Topics We will cover the following topics, yet not necessarily in the order listed.

- A short introduction to mathematical logic and proofs
- Definition and properties of min/max/inf/sup
- Logarithms, powers and roots
- Definition and properties of limits; limits at infinity
- Definition and properties of derivatives
- Definition of continuity; continuous and discontinuous functions
- Bolzano, Intermediate value and Mean value theorems
- Applications of derivatives in optimization problems
- Definition and properties of (in)definite integrals
- Techniques of integration; the Fundamental Theorem of Calculus
- Infinite and power series; tests for convergence
- Taylor's Theorem; binomial and exponential series
- Applications of integrals in computations of area
- Surfaces of revolution and their volumes
- Partial derivatives
- Double integrals and polar coordinates
- Fubini's Theorem

Textbook Although there is no official textbook for the course, some typical references are

1. *Calculus* by Michael Spivak,
2. *Principles of mathematical analysis* by Walter Rudin.

Roughly speaking, we will follow these two references, but not very closely.

Homework Homework assignments will be handed out in class every other week.

Exams We will have one exam at the end of the Michaelmas term; one exam at the end of the Hilary term; and a final exam.

Grading Homework counts for 10% of your final grade. The remaining 90% comes from either your final exam or else your average on the three exams, whichever is larger. In short, your overall grade for the course will be determined using the formula

$$0.1 \cdot H + 0.9 \cdot \max \left\{ \frac{E_1 + E_2 + E_3}{3}, E_3 \right\},$$

where H is your grade on homework and E_i is your grade on the i th exam.

Web page Notes, homework assignments and solutions will be posted on the course web page

<http://www.maths.tcd.ie/~pete/math121>