Maths 212, Syllabus Metric Spaces and Topology

- Instructor: Dr. Paschalis Karageorgis (Pete).....pete@maths.tcd.ie
- Office: Hamilton Building, 3rd floor, Room 20.32c tel. 608-3946
- **Homework:** I'll assign seven or eight problems each Thursday and ask you to turn in three or four problems a week later. However, the final exam will be based on *all* the problems I have assigned (together with definitions and statements of theorems).
- Course web page: http://www.maths.tcd.ie/~pete/ma212
- Grading: 10% homework, 90% final exam.
- References: A large part of the course will follow
 - 1. W.A. Sutherland, *Introduction to metric and topological spaces*, Oxford University Press (1975).

Some other good references on the subject are

- 2. J. R. Munkres, Topology: a first course, Prentice Hall (1975).
- 3. W. Rudin, Principles of mathematical analysis, McGraw-Hill (1976).

Towards the end of the course, I will also provide notes on some additional topics.

• **Course outline:** In the first and main part of the course, we will focus on metric and topological spaces. Some basic concepts include open and closed sets, closure, density, connectedness and compactness. We will also study properties of functions in metric spaces such as continuity, uniform continuity and the intermediate value property.

In the second part of the course, we will study some additional topics from functional analysis and algebraic topology. We will introduce Banach and Hilbert spaces, we will establish Picard's theorem and we will study some basic homotopy theory.

• **Course notes:** Perhaps the best resource is your class notes; make sure you get notes for each class you miss. If needed, some additional notes can be found at

http://www.maths.tcd.ie/~dwilkins/Courses/212