

School of Mathematics

Course 212 — Metric Spaces and Topology 2005-06
(Option for SF Mathematics, JS Mathematics, JS & SS Two-subject Moderatorship)

Lecturer: Dr Paschalis Karageorgis

Requirements/prerequisites: 121

Duration: 24 weeks

Number of lectures per week: 3

Assessment: Regular assignments counting 10% of final grade.

End-of-year Examination: One 3-hour examination (90%)

Description: The aim of the course is to provide an introduction to metric and topological spaces in sufficient depth that students will be comfortable with the use of these concepts in many other branches of mathematics. The course will begin by introducing concepts of interior and closure, open and closed sets, convergence and continuity, first in the contexts of subsets of Euclidean spaces, then in the context of metric spaces, and finally in the context of topological spaces. Further topological properties such as compactness and connectedness will be investigated. The course will conclude with an introduction to algebraic topology, including the concepts of homotopy and the fundamental group. If time permits, applications will be given to the topology of the plane, including Fundamental Theorem of Algebra and the two-dimensional case of Brouwer's Fixed Point Theorem.

Additional information can (or will) be found at <http://www.maths.tcd.ie/~pete/ma212>
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).

If needed, some additional notes can be found at <http://www.maths.tcd.ie/~dwilkins/Courses/212/>

October 13, 2005