

# SCHOOL OF MATHEMATICS, UNSW

## MATH5655: Homology & Homological Algebra (2005, S2)

**Lecturer:** Daniel Chan

**E-Mail:** *danielc@unsw.edu.au*

**Webpage:** [web.maths.unsw.edu.au/~danielch](http://web.maths.unsw.edu.au/~danielch)

**Office:** Red Centre (East Wing) Room 4104

**Office Phone No.:** 9385 7084

**Consultation Hours:** TBA (see webpage)

Most of the information you need to know about the course can be gotten from the webpage above, including a copy of this handout.

### Assessment

The assessment will consist of two assignments each worth 20% and a final exam worth 60%. The assignments are designed to be relatively easy and you are expected to get close to full marks for them.

### Additional Assessment Policy

Click on Additional Assessment in Later Years on the webpage  
<http://www.maths.unsw.edu.au/ForStudents/index.html>.

### Contents/References

This course should be a nice complement to Norm Wildberger's algebraic topology course but you need not have taken his course to understand this one. We will go through the first two chapters of Munkres below on simplicial homology and its topological invariance, the second chapter will be mainly without proofs. Some topological applications will be made to fixed point theorems but the emphasis will be on the interesting algebraic gadgets that come out of the theory, e.g. chain complexes and categories. We will then show how these gadgets are useful in algebra itself when we study the Ext functor and group cohomology. This material can be found in Jacobson and also in Northcott.

- Munkres, "Elements of algebraic topology"
- Northcott, "A first course in homological algebra"
- Jacobson, "Basic algebra II"
- Fraleigh, "A first course in abstract algebra"

- Croom, “Basic concepts of algebraic topology”
- Hilton, Wylie, “Homology theory: an introduction to algebraic topology”
- Maclane, “Homology”
- Wallace, “An introduction to algebraic topology”