ICE-EM Access Grid Room Project

Subject Information Form

Note: Subject Information form
This form must be both electronically completed and transmitted.

Administration

1. Department and Institution

   Mathematical and Physical Sciences
   University of Newcastle

2. Subject name and code

   Mathematical Modelling of Infectious Diseases
   MATH4101

3. Handbook entry URL, subject homepage URL, host honours student hand-out URL

   - Handbook entry URL
     `http://www.newcastle.edu.au/course/MATH4101.html`

4. **Lecturer** name and contact details

Name:	Roslyn Hickson
Phone:	(02) 4921 6081
Email:	Roslyn.Hickson@newcastle.edu.au
Homepage:	http://www.newcastle.edu.au//staff/research-profile/Roslyn_Hickson/

5. **Honours coordinator** name and contact details

Name:	Martin Savelsbergh
Phone:	(02) 4921 5534
Email:	Martin.Savelsbergh@newcastle.edu.au

6. Start date, end date, number of teaching weeks

Start date:	29/07/2013
End date:	08/11/2013
Number of teaching weeks:	Twelve

7. Contact hours per week

   Two hours: including lectures and lab time for computational experimentation.

8. Description of electronic access arrangements for students (for example, Black Board)

   Notes, exercises and assignments will be emailed to students. Assignments are submitted as pdf's and returned with annotations.

Academic

1. Overview of subject content

   Mathematical modelling is a powerful tool that can be applied to many areas. In this course, we will explore infectious disease modelling. The emphasis of this course with be on the mathematical modelling, including the development of appropriate models, and their use either as predictive tools or as a tool to increase understanding of fundamental epidemiological processes. We will start with quite simple mathematical models which yield important insights to disease dynamics and control, and build to more complex models which better reflect complicated infectious disease dynamics. The focus will be on simulation of these models, as opposed to analytical analysis.

   This course is suitable for students who are familiar with systems of ODEs, and preferably who have some experience with computer programming. MATLAB will be used extensively throughout the course.

2. Detailed syllabus, preferably week by week

   The course will aim to cover the following topics. There may be some variation depending on the interests and backgrounds of students.

   Week 1 Modelling principles and introduction to epidemiology

   Week 2–5 The classic SIR model (compartments for sub-populations of those Susceptible, Infectious and Removed, resulting in a system of ODEs) and variations – SIS, SIRS, SEIR, etc

   Week 6 Parameterisation of models: what to do with data

   Week 7 Implicit assumptions of compartment models

   Week 8–10 Controlling infectious diseases

   Week 11–12 Introduction to Stochastic models

   As this is the first time this course has run, there may be changes to the program depending on the speed with which the material is covered.

3. Detailed breakdown of assumed prerequisite knowledge, including host prerequisite subject URLs

   Understanding of ODEs. Lack of fear of computer programming (i.e. MATLAB).

4. Assessment

   - Exam/assignment/class work breakdown

Exam	40 %
Assignment	40 %
Class work	20 %

   - Assignment due dates
     06/19/2013, 18/10/2013
   - Approximate exam date
     11/11/2013

5. Required student resources

   - Text/printed notes
     Textbook: “Modeling Infectious Diseases: in humans and animals” by Keeling and Rohani.
   - Software (local access)
     Matlab

Institutional Honours Details

1. Weight of subject in total honours assessment at host department

   Course is 10 units from a total of 80 units for the Honours year.

2. Thesis/subject split at host department

   50 units for courses and 30 units for thesis.

3. Honours grade ranges at host department

   H1 = 85 %
   H2a = 75 %
   H2b = 65 %
   H3 = 50 %