

## MA41002: Mathematical Biology I Course Guide 2011-2012

### Organisation

The MA41002 module runs for 11 teaching weeks meeting 3 times per week. The module leader, who is responsible for the organisation and teaching of the module, is

Dr Hiroko Kamei  
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You should make an appointment to see the module leader if you have a problem regarding the course. You may bring matters of concern about the course to the attention of the Mathematics Division Staff/Student Committee, which meets once each semester. A volunteer from level 4 will act as class representative to sit on the Staff-Student Committee; their name will be posted on BlackBoard.

### Syllabus

#### Single species population dynamics

Discrete time models: graphical analysis, fixed points, linear stability analysis.  
Continuous time models: logistic equation, steady states, linearisation, stability.  
Harvesting and fisheries.

#### Population dynamics of interacting species

Host-parasitoid system (discrete time).  
Predator-prey and competition models (Continuous time).  
Phase plane analysis of 2D systems.  
Elementary bifurcations.

#### Molecular and cellular biology

Biochemical kinetics: Michaelis-Menten kinetics.  
Metabolic pathways: activation and inhibition.

### Assessment

There will be 2 assignments during the course which will count towards 20 % of your total degree mark. The course is also assessed by a two-hour degree examination, which is taken in the December Degree Examination Diet. This will count towards 80 % of your total degree mark. You required a combined mark of 40 % to pass the module.

### Your Commitment

You should attend all lectures and workshops except on medical grounds or with the special permission of the lecturer concerned. If you are unable to attend the degree examination or complete elements

of the coursework on time (e.g. hand in assignment solutions) then you should inform the Module Leader and submit a medical certificate. Medical certificates should be submitted to your School Office (for students advised by Mathematics this is the Office for the School of Engineering, Physics and Mathematics and is in the Fulton Building).

## **Feedback**

At the end of each section of the module you will be asked to complete a confidential questionnaire regarding the content and presentation of the module. This is an important element in the University's Academic Standards procedures.

## **Recommended Books**

The main texts for this module are:

*Essential Mathematical Biology,*

by N. F. Britton

Publisher: Springer.

*Mathematical Biology: I. An Introduction,*

by J. D. Murray

Publisher: Springer.

*Mathematical Models in Biology ,*

by L. Edelstein-Keshet

Publisher: McGraw-Hill Companies.

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