BI5135 Module handbook

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28/09/2018

Department of Biological Sciences

BI5135

Population Biology & Conservation

STUDENT HANDBOOK

2018-2019

Introduction

The study of populations of organisms is a key component of conservation biology. Population biology focuses on population growth rates and the factors which influence them. Core to this is the use of simple mathematical models which can help us to understand more complex situations in the natural world. This module will progress from simple single-species models through models of species interactions to spatial models and the application of population biology in conservation. The module can be split broadly into three components:

1) *Population biology theory*

   Lectures concentrating on population models with increasing complexity including population growth, metapopulation ecology and species interactions.

1) *Ecological modeling practicals*

   Computer practicals which build on the theory component of the course allowing you to build your own ecological models.

1) *Applications of population biology*

   Lectures which expand on the course content to include broader uses of population biology in conservation. Topics include, parasites and disease in theoretical models and applications, population viability analysis and the use of models to understand population harvesting and management.

The core content of the module will be delivered using lectures. These will be complemented with computer based practical classes and directed self-study time to prepare for the module assessment. Please see the module schedule below for details.

Teaching staff

	Contact Details
Dr Achaz von Hardenberg (AvH)	A.vonHardenberg@Chester.ac.uk
Dr Matt Geary (MG)	M.Geary@Chester.ac.uk

	Contact Details
Dr Simon Oliver (SO)	s.oliver@chester.ac.uk
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Module timetable # simple table creation here | Tables | Are | Cool | |————–|:————–:|——:| | col 3 is | right-aligned | $1600 | | col 2 is | centered | $12 | | zebra stripes | are neat | $1 | **University week**|**Type of session**|**Length**|**Topic**|**Teaching Staff**
10|Lecture|1hr|Population Growth|MG
10|PC Workshop|2hr|Introduction to R|AvH
11|Maths Support|1hr|Algebra|AvH **11**|PC Workshop|2hr|Basic population models|MG **12**|Lecture|1hr|Population dynamics|MG
12|PC Workshop|2hr|Population dynamics|AvH
13|Maths Support|1hr|Basic Calculus|AvH
13|Seminar|2hr|Population dynamics in Conservation|MG
14|**PERSONAL DEVELOPMENT WEEK**||| **15**|Lecture|1hr|Age/Stage Structured populations|AvH
15|PC Workshop|2hr|Age/Stage Structured populations|AvH
16|Lecture|1hr|Metapopulation Ecology|AM
16|PC Workshop|Metapopulation Ecology|AvH
17|Maths Support|1hr|Matrix algebra|AvH
18|Lecture|1hr|Competition and Mutualism|SO
18|PC Workshop|2hr|Competition and Mutualism|MG
19|Maths Support|1hr|Topics so far|MG
19|2hr|Enemy-victim interactions|MG
20|Lecture|1hr|Predators and prey|SO
21-23|**CHRISTMAS HOLIDAY**|||
24|Lecture|1hr|Parasites and Disease|SO
24|PC Workshop|2hr|Parasites and disease|MG
25|Lecture1hr|PVA|SO
25|PC Workshop|2hr|PVA|AvH
26|Lecture|1hr|Intro to Population Genetics|AM **26**|Seminar|2hr|Population Genetics|AM
27|Lecture|1hr|Population Genetics and climate change|AM
27|Seminar|2hr|Population Genetics and climate change|AM
28|No session this week|||
29|No session this week|||
30|**PERSONAL DEVELOPMENT WEEK**|||
31|Lecture|1hr|How to write a scientific paper|MG
31|PC Workshop|2hr|Assessment support|MG
32|Lecture|1hr|Ecological Modelling|MG
32|PC Workshop|2hr|Assessment support|MG
33|No session this week|||
34|Seminar|2hr|Conservation Ecology|MG
35|No Session this week|||
36|No Session this week|||
37- 39|**EASTER HOLIDAY**|||
40|No Session this week|||| **41**|No Session this week||| **42**|No Session|||

Assessment

Perform an investigation into the population biology of a species of conservation concern using ecological modelling methods.

Deadline - 12/3/15

This module is assessed using 100% coursework. This consists of one piece of written work in the style of a

journal article - a scientific report of an investigation into the population biology of a species of conservation concern using ecological modelling methods.

Your first task is to choose a focal species for your project. You should make this decision through reading scientific literature to identify an appropriate species. Bear in mind that you will need to make some assumptions and, if necessary, some simplifications to model the species effectively. The species should be one which will lend itself to the use of ecological modelling with sufficient data to parameterise any models.

You will be instructed in the methods of ecological modelling during the practical sessions in this course. In these sessions you will also have the chance to practice modelling methods using your focal species under the guidance of a member of staff.

You should format your report in the style of a scientific journal article according to the following guidelines:

The report should consist of the following sections:

- Abstract
- Introduction
- Materials and Methods
- Results
- Discussion
- References
- Appendix - Model Code

You may also wish to include figures and table which should be embedded into the relevant sections. Remember to support your ideas with references throughout the report. Each section of the report should contain specific information as follows,

Introduction

State the objectives of the work and provide an adequate background to justify and explain the study and study species. You should also include introductory paragraphs which explain the importance of population biology to conservation.

Material and methods

Provide sufficient detail to allow the work to be reproduced.

Results

This section should detail exactly what you found making use of tables and figures as appropriate. You should not discuss the context of your results here.

Discussion

This should explore the significance of the results of the work, not repeat them, and put them into a wider scientific context. Your discussion should finish with a paragraph or paragraphs which emphasise your main conclusions. Remember to make appropriate use of references here.

References

A list of references used in the report presented in alphabetical order of the last name of the first authors of the work.

Appendix

A file giving the code used to run the models in your report.

APA referencing should be used throughout in accordance with university guidelines.

Assessment Criteria

Your work will be assessed according to the following criteria:

- Scientific accuracy of information
- Content of article sections described above
- Quality of the ecological modelling approach (i.e. appropriate methods, data etc.)
- Quality of discussions and conclusions
- Appropriate use of references and reference formatting
- Adherence to assessment formatting instructions
- Presentation of tables and figures

Assessment submission

Both sections of the assessment should be submitted on **23/3/17** before 4:00 pm. In accordance with university policy all submissions will go through the Turnitin plagiarism detection software. Feedback on the assignments will be provided on or before **25/5/17**.

Late assessed work will be penalised and the penalty incurred will be 10 marks for work submitted up to 24 hours after a deadline and 10 marks per day after this, including weekends, e.g.:

% mark awarded by tutor Penalty Mark %

Work up to 24 hours late 65 55

Work up to 48 hours late 65 45

Work up to 72 hours late 65 35 and so on, to 0.

Coursework word count policy

The information below is a summary of the word count policy for coursework. Please refer to the notes of guidance for excess word count on the module space for full details.

- Permissible word count excludes the student's name, title of module and assignment, references to sources, bibliography, graphs, tables, maps, diagrams, captions and appendices. These lie outside the stated word limit.
- It is permissible to exceed the stated word limit by up to 10%, without penalty. Thus, a 1000-word assignment is allowed to run to 1100 words, a 2000-word assignment to 2200 words, and so on.
- Assignments which exceed these limits are liable to be penalised by the deduction of 5 marks per 1000 words excess (e.g. if a 1000-word assignment, 5 marks off for 1101-2100 words, 10 marks off for 2101-3100 words, and so on).

Suggested reading

The following is a list of texts which may be useful to your learning on this module. This list should not be considered exhaustive. Key references to papers and other research material will be provided in class and on Moodle

Key texts for the course are:

Begon, M., Harper, J. L. & Townsend, C. R. (2003). Essentials of ecology. Oxford, United Kingdom: Blackwell Scientific.

Case, T. J. (1999). An Illustrated Guide to Theoretical Ecology. New York, NY: Oxford University Press, USA.

Rockwood, L. L. (2009). Introduction to Population Ecology. New York, NY: Wiley.

The following papers will provide case studies of population biology in a conservation context:

Birkhead, T. R. (1977). The effect of habitat and density on breeding success in the common guillemot (Uria aalge). The Journal of Animal Ecology, 751–764.

Crouse, D., Crowder, L. B. ., & Caswell, H. (1987). A stage-based population model for loggerhead sea turtles and implications for conservation. Ecology, 68(5), 1412–1423.

You may find the following journals useful for finding relevant information:

Ecological Modelling, (Journal available on-line from University of Chester library Web site).

Population Ecology, (Journal available on-line from University of Chester library Web site).

Trends in Ecology & Evolution, (Journal available on-line from University of Chester library Web site).