BIOL114

Evolution and Biodiversity

S1 External 2013

Biological Sciences

Contents

General Information

Unit convenor and teaching staff
Other Staff
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9-5

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Credit points
3

Prerequisites

Corequisites

Co-badged status

Unit description
This unit introduces students to the essential concepts in current biology. The unit forms the first step for students pursuing a career in the biological sciences, and provides a basis for students in other disciplines who wish to maintain an interest in this dynamic field. The theme of this unit is evolution. The first part of the unit is concerned with the origin of life and discusses current theories on how life may have arisen on a previously lifeless planet. We discuss evolutionary theory in detail including some of the genetic principles that underlie evolution. In the second part we introduce the major groups of organisms examining their diversity and how they function. In the final part we discuss the ecological interactions between organisms from the small scale to global patterns. Throughout the unit, these core concepts are illustrated with examples from current research. This unit is designed as a companion unit to BIOL115.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Define the processes of evolution

Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology

Develop falsifiable hypotheses and design experiments to test them

Test a hypothesis by collecting and analysing appropriate data

Effectively communicate biology using written and oral media

Locate and critically assess scientific literature

Use digital microscopy technology to successfully visualise specimen

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly Activities	3%	No	Weekly
Article Search	2%	No	Prac 4
Oral presentation	3%	No	Prac 5
Online Peer review	2%	No	TBA
Midsemester test	15%	No	Intrl: May 2, Extrl: May 18
Scientific journal article	25%	No	Intrl: May 13, Extrl: May 23
Final exam	50%	No	TBA

Weekly Activities

Due: **Weekly**
Weighting: **3%**

A range of activities to prepare for the weekly Practical, assessment tasks and revise concepts

On successful completion you will be able to:

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data

- Effectively communicate biology using written and oral media

Article Search

Due: **Prac 4**
Weighting: **2%**

Assesing the primary scientific literature

On successful completion you will be able to:

- Locate and critically assess scientific literature

Oral presentation

Due: **Prac 5**
Weighting: **3%**

Short presentation to groups students; held during prac 5

On successful completion you will be able to:

- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature

Online Peer review

Due: **TBA**
Weighting: **2%**

You will assess several trial prac reports to gain a deeper understanding of the assessment criteria

On successful completion you will be able to:

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature

Midsemester test

Due: **Intrl: May 2, Extrl: May 18**
Weighting: **15%**

A multiple choice test based on the first half of the unit (Lecture 1-11)

On successful completion you will be able to:

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology

Scientific journal article

Due: **Intrl: May 13, Extrl: May 23**
Weighting: **25%**

Prac report in the form of a scientific paper of the BIOL114 experiment

On successful completion you will be able to:

- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data
- Use digital microscopy technology to successfully visualise specimen

Final exam

Due: **TBA**
Weighting: **50%**

A test on knowledge of lecture and practical material up to and including week 13

On successful completion you will be able to:

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data
- Locate and critically assess scientific literature

Delivery and Resources

CLASSES

Timetable

- Lecture 1 Thursday 9am – 10am E7B Mason Theatre
- Lecture 2 Friday 3pm - 4 pm X5B T1
- Practical 1 Monday 12 - 3pm E8A 120 & E8A 160
- Monday 3pm - 6pm E8A 120 & E8A 160
- Tuesday 9am – 12 E8A 120 & E8A 160
- Tuesday 2 - 5 pm E8A 120 & E8A 160

- Wednesday 9am - 12 E8A 120 & E8A 160
- Wednesday 12 - 3 pm E8A 120 & E8A 160
- Wednesday 3pm - 6 pm E8A 120 & E8A 160

Internal students must attend ONLY ONE practical session a week. You must attend the practical group you were allocated at enrolment, and stay in that group! If there is unexpected enrolment numbers we will offer an additional Monday afternoon practical session. Attendance of practicals is compulsory! **External students must attend ALL on-campus sessions!**

- On-campus session 1 10 March (Sat) 9am - 4pm E8A 120
- On-campus session 2 10-11 April (Tues & Wed) 9am - 4pm E8A 120
- On-campus session 3 12 - 13 May (Sat & Sun) 9am - 4pm E8A 120

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Recommended unit materials

Textbook

The textbook for this unit is by Reece et al.: CAMPBELL BIOLOGY (9th Edition) by Pearson Education.

This textbook services BIOL114 and BIOL115! The text is available from the Coop bookshop on campus.

UNIT WEBPAGE AND TECHNOLOGY USED AND REQUIRED

Website

Lecture graphics and iLectures will be available on iLearn http://ilearn.mq.edu.au

iLearn™ is a web-based computer mediated communication package and can be accessed by most web browsers from inside or outside the University. iLearn and email will be the principle method of communication in this subject. We expect you to use iLearn for:

- Doing the weekly quizzes;
- Regularly checking subject announcements;
- Discussing lectures and tutorials with lecturers and other students;
- Downloading lecture materials;
- Downloading reference materials;

How do you log in? The URL for the iLearn login page is: http:/i/learn.mq.edu.au/. You will need to log in to iLearn each time you use it. Your user name is your student number.

If you are having trouble accessing your online unit due to a disability or health condition, please go to the Student Services Website at http://students.mq.edu.au/campus_life/wellbeing/ for information on how to get assistance.

If you are having problems logging on after ensuring you have entered your username and password correctly, you should contact Student IT Help, http://informatics.mq.edu.au/help/.

Unit Schedule

Lecture Topics

	Date	Lecturer	Topic
1.	25 / 02 / 13	Kate	BIOL114 and scientific method
2.	28 / 02 / 13	Kate	What is life and where does it occur?
3.	04 / 03 / 13	Kate	Life on Earth: where did we come from?
4.	07 / 03 / 13	Kate	Darwin's theory of evolution
5.	11 / 03 / 13	Kate	Basic genetic principles
6.	14 / 03 / 13	Kate	The concept of species & speciation
7.	18 / 03 / 13	Kate	Genetic variation and evolutionary change
8.	21 / 03 / 13	TBA	TBA
9.	25 / 03 / 13	Kate	Cellular organisation & single-cell life forms
10.	28 / 03 / 13	Kate	Eukaryotes and multicellular life
11.	01 / 04 / 13	Kate	The "Left wall" of life
12.	04 / 04 / 13	Kate	Plants as living multicellular organisms
	06 / 04 / 11 – 23 / 04 / 10	MIDSEMESTER BREAK	
13.	29 / 04 / 13	BA BM &ML	Curious plant biology
	02 / 05 / 13	**MID-SEMESTER TEST**	
14.	06 / 05 / 13	Kate	Animals as living multicellular organisms
15.	09 / 05 / 13	Kate	Energy and growth in multicellular organisms
16.	13 / 05 / 13	Kate	Reproduction of multicellular organisms
17.	16 / 05 / 13	Kate	Life-history stages of plants and animals
18.	20 / 05 / 13	Kate	Behaviour of plants and animals
19.	23 / 05 / 13	Kate	Ecology and the environment
20.	27 / 05 / 13	Kate	Population ecology

21.	30 / 05 / 13	Kate	Community ecology
22.	03 / 06 / 13	Kate	Ecosystems
23.	06 / 06 / 13	Kate	The future of planet Earth

Practical sessions (internals)

Week	Date	Activity	Assessment
1		No Practicals	*Weekly Activity 1*
2	04 - 06/ 03/13	Prac 1: Welcome, Introduction to some major Phyla, introduction to Practicals; safety induction; library challenge; Induction to digital microscopy	*Weekly Activity 2*
3	11 - 13/ 03/13	Prac 2: Scientific method; the BIOL1114 experiment & set up & instructions for *Article Search*	*Weekly Activity 3*
4	18 - 20/ 03/13	Prac 3: Early life on earth; the BIOL114 experiment; information about *Oral Presentation*	*Weekly Activity 4* *Article Search*
5	25 - 27/ 03/13	Prac 4: Natural selection; induction to scientific illustration; BIOL114 experiment	Weekly Activity 5
6	01 - 03/ 04/13	Prac 5: Cells – Animal, plant & Protozoa; BIOL114 experiment; Students give *Oral Presentation*	*Weekly Activity 6* *Oral presentation*
Mid-semester break 06/04/13 – 28/04/13			
7	29/04/13 – 01/05/ 13	Prac 6: Putting the *Scientific Journal Article* together Discussion of *Peer Review*	*Weekly Activity 7*
8	06 – 08/ 05/13	Prac 7: Plant diversity	*Weekly Activity 8* *Peer Review*
9	13 - 15/ 05/13	Prac 8: Microbial and fungal diversity	*Weekly Activity 9* *Scientific Journal Article* due internals

10	20 - 22/ 05/13	Prac 9: Animal diversity	*Weekly Activity 10* *Scientific Journal Article* due externals
11	27 - 29/ 05/13	Prac 10: Animal and plant reproduction; Meet & greet researchers in department; Tutors return Prac-report to students	*Weekly Activity 11*
12	03 - 05/ 06/13	Prac 11: BIOL114 Synthesis, revision & discussion of final exam	*Weekly Activity 12*
13		No Practicals	All *Weekly Activities* will be available for revision

External Schedule	Dates	Practicals	Assessment
On Campus Session 1	9 March (Sat)	Pracs 1 & 2	Ensure you have completed *Weekly Activities 1 & 2*
On Campus Session 2	15-16 April (Mon & Tues)	Pracs 3 - 6	Ensure you have completed *Weekly Activities 3, 4, 5 & 6* *Article Search* *Oral Presentation*
On Campus Session 3	18 &19 May (Sat & Sun)	Pracs 7 - 11	*Mid-semester Test* May 18 at 9am Ensure you have completed: · *Weekly Activities 7, 8, 9, 10 & 11* · *Peer Review* REMINDER*: Scientific Journal Article* due 23/05/13 at midday via email

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://www.mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://www.mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://www.mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Special Consideration Policy http://www.mq.edu.au/policy/docs/special_consideration/policy.html

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Support

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: http://students.mq.edu.au/support/

UniWISE provides:

- Online learning resources and academic skills workshops http://www.students.mq.edu.au/support/learning_skills/
- Personal assistance with your learning & study related questions.
- The Learning Help Desk is located in the Library foyer (level 2).
- Online and on-campus orientation events run by Mentors@Macquarie.

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

Details of these services can be accessed at http://www.student.mq.edu.au/ses/.

IT Help

If you wish to receive IT help, we would be glad to assist you at http://informatics.mq.edu.au/help/.

When using the university's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students and it outlines what can be done.

Graduate Capabilities

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Test a hypothesis by collecting and analysing appropriate data
- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature
- Use digital microscopy technology to successfully visualise specimen

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Develop falsifiable hypotheses and design experiments to test them
- Locate and critically assess scientific literature

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data
- Use digital microscopy technology to successfully visualise specimen

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Define the processes of evolution
- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data
- Locate and critically assess scientific literature

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Define the processes of evolution
- Describe the major morphological characteristics of the main groups of organisms and compare and contrast their biology
- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data
- Locate and critically assess scientific literature

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Develop falsifiable hypotheses and design experiments to test them
- Test a hypothesis by collecting and analysing appropriate data

- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcome

- Effectively communicate biology using written and oral media

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Define the processes of evolution
- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Define the processes of evolution
- Develop falsifiable hypotheses and design experiments to test them
- Effectively communicate biology using written and oral media
- Locate and critically assess scientific literature