BIOL229

Comparative Physiology

S2 Day 2018

Dept of Biological Sciences

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General Information

Unit convenor and teaching staff
Unit convenor
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Credit points
3

Prerequisites
(12cp at 100 level or above) including BIOL116 and (BIOL114 or BIOL115)

Corequisites

Co-badged status

Unit description
This unit will compare and contrast a range of physiological processes in microbes, plants and animals. It will highlight common features and their evolutionary origins, with particular reference to prokaryotic genes which have been conserved in multicellular organisms. Topics to be explored include metabolism (e.g. respiration, photosynthesis and transport), environmental responses (e.g. abiotic stress response, immune reactions, behaviour), morphogenesis (e.g. cell division, homeotic genes, embryogenesis and symmetry) and phenology (e.g. sexual maturation, fertilisation, life cycles). The unit will draw the common threads of evolution together in complex multicellular organisms, as well as contrasting those processes unique to each Kingdom, such as photosynthesis and locomotion.

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:

1. Describe how organisms gain energy, grow, and develop
2. Describe the co-ordination of physiological processes in organisms, including

transport systems and responses to stimuli

3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved

4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion

5. Analyse collected experimental data and relate results to established physiological phenomena

6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature

7. Relate your knowledge of physiology to applications in biotechnology and medicine

General Assessment Information

General Assessment Information

Assessment for this unit consists of a mixture of quizzes, a written assignment, a short test, a team-project report and a final exam. Submission of all assessments and completion of all tests is essential for adequate progress, since all assessment tasks are required to master the content of this unit. Most importantly, it will be essential to keep pace with the quizzes, as marks accrue weekly throughout the semester.

HURDLE: The final exam is a hurdle for this unit. Students must achieve a mark of at least 40% in the final exam to pass the unit. Students who fail to achieve this hurdle on the first attempt, but demonstrate a 'serious attempt' by achieving a mark of at least 30%, will be given a second attempt to cross the 40% hurdle in a supplementary final exam. Students that achieve or surpass the hurdle on the second attempt will obtain a mark of 40%. The final mark will then be calculated from the in-semester grade (out of 65 marks) and the final exam (out of 35 marks). An overall mark of 50% is the minimum required to pass the unit.

All assessments will be graded and we aim to have marks available within three weeks of the assessment due date. Marks will be available on Gradebook in iLearn. Feedback on the written assignment will be provided through Turnitin when the marks are released.

Weekly ‘lecture’ quizzes:

Questions will be inserted into the lecture slides each week, based on the lecture material. Quizzes will be open on iLearn each week from Tuesday (the day of your lecture) and close the following Sunday at midnight. Once you start the quiz you have 15 minutes to complete it and you are only allowed one attempt. These questions are designed to ensure that you have **some familiarity** with the lecture material and should be completed ideally before the practicals so you have the best opportunity to learn from the practical exercises. They do not require a deep understanding of the lecture material. There are a total of 12 weekly quizzes, starting in Week 2. The quizzes will be automatically marked and the marks and correct answers will be released once submissions have been completed.

Weekly 'practical' quizzes:

These quiz questions will be based on the material covered in the practicals. Questions will be available on iLearn **at some time during the practical sessions**; have your internet access ready. Answers must be submitted online during the practical session and you are only allowed one attempt. These questions are designed to test your understanding of the practical exercises but are very simple and do not require *interpretation* of the data. There are a total of 9 practical quizzes (each with multiple questions). Multiple-choice answers will be entered online and quizzes will be automatically marked and the marks will be available immediately.

Written assignment:

Students will choose from a list of topics provided in Week 4. The topics are designed to cover a wide range and for each topic, two recent publications will be provided. These papers are the source for your assignment work but more references should be used to support your arguments. Write (up to) a 1000-word report which will be submitted through Turnitin. The write-up will be divided into three distinct questions to direct you: (a) what did the papers report? (b) are they a sound piece of research? (c) what would you do as a follow-up experiment? A rubric which outlines the assessment criteria will be made available on iLearn.

This report is due by 11:59 pm Monday 8 Oct 2018 (end of Week 8) and must be submitted through the Turnitin link in iLearn (no hardcopy is required). Students are reminded that Turnitin is plagiarism-checking software and all assignments must comply with the Academic Honesty Policy of the university, which you can read at: http://www.mq.edu.au/policy/docs/academic_honesty/policy.html.

Apart from plagiarising other external sources of material, be aware that your work will be electronically cross-checked against other students' work. We encourage you to discuss ideas with your fellow students but you must write original work for submission. Assignments can only be submitted to Turnitin once, so make sure your assignment is finalised before you submit.

Mid-semester test:

The mid-semester test will be closed book, will take 50 minutes and will be held in the Tuesday lecture timeslot in Week 7 (3 pm Tuesday 11 September 2018) in the Macquarie Theatre. The test will consist of short-answer questions and cover all lecture and practical content up to and including Week 6 (i.e. lectures 1-12 and practicals 1-5). Calculators without text retrieval capacity will be allowed into the exam room.

Prac Project (in the final weeks of the pracs):

The project is an innovation which you will be testing for the first time. It attracts only 5% towards your final mark in recognition of this. The aim is that you select an experimental topic from a list provided and execute a small experiment of your own to test a hypothesis. Further details will be released in Week 6 but in brief, there are several steps from Weeks 7 - 13. These are: (1) a discussion to form your team of four (not more and not less!) and choose your topic; (2) after the break, you will give introductory talks on your topic and how you will tackle it in the lab; (3) in Weeks 11 and 12 you will execute your experiment and (4) in the final week you will present your data to the class. A lot of equipment will be made available and the aim is to plan what you need

and we will have it set out for you when you start your experiments.

Final examination:

The final exam will be closed book and three hours duration and held in the official university examination period at the end of the session. The exam will consist of short- and extended-answer questions. Some short-answer questions will be drawn from the sample short answer questions made available each week in lectures. Calculators without text retrieval capacity will be allowed into the exam room. For further information please see the university examination policy at: https://www.mq.edu.au/policy/docs/assessment/schedule_4.html

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the week of 17 - 21 December 2018. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

If you are given a second opportunity to sit the final examination as a result of failing to meet the minimum mark required, you will be offered that chance during the same supplementary examination period and will be notified of the exact day and time after the publication of final results for the unit.

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly quizzes	20%	No	Weekly by 11.59 pm Sunday
Practical quizzes	20%	No	Weeks 2-10 in practicals
Mid-semester test	10%	No	Tuesday lecture in Week 7
Written assignment	10%	No	11:59 pm Monday 8 Oct 2018
Group project	5%	No	Weeks 7 to 13
Final exam	35%	Yes	Exam period

Weekly quizzes

Due: **Weekly by 11.59 pm Sunday**
Weighting: **20%**

Online quizzes & problem solving covering lecture material

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

Practical quizzes

Due: **Weeks 2-10 in practicals**
Weighting: **20%**

Online quizzes to be completed during practical sessions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 5. Analyse collected experimental data and relate results to established physiological phenomena

Mid-semester test

Due: **Tuesday lecture in Week 7**
Weighting: **10%**

Short-answer questions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 5. Analyse collected experimental data and relate results to established physiological phenomena

Written assignment

Due: **11:59 pm Monday 8 Oct 2018**
Weighting: **10%**

1000-word report explaining a physiological process, its control points, impact on overall cell function and response to the environment - details to be advised.

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Group project

Due: **Weeks 7 to 13**
Weighting: **5%**

Introductory talks, execution of project & summary of findings

On successful completion you will be able to:

- 4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion

Final exam

Due: **Exam period**
Weighting: **35%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Short answer & higher order questions

On successful completion you will be able to:

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 5. Analyse collected experimental data and relate results to established physiological phenomena
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Delivery and Resources

Lectures

There are two lectures each week: Tuesday 11 am - noon in the **T1 Theatre (23 Wally's Walk)**

and Tuesday 3 - 4 pm in the **Macquarie Theatre (21 Wally's Walk)**. These lectures are recorded and made available through the iLearn page soon after the lecture is presented. Audio and screen capture of lectures are available for you. Since some topics in this unit are not dealt with in the textbook, it is important to listen to/watch all lectures, especially as assessed quizzes are embedded in each lecture. Students who do not listen to/watch all lectures often find it difficult to manage the quiz regime and therefore to pass the unit.

Practical sessions

Practical sessions are held in either **14 Eastern Road room 120 (the RED lab) OR 5 Wally's Walk room 428 (the glasshouse lab)** each week, commencing in Week 2. Practical sessions are compulsory and a roll will be taken. You are required to attend the practical timeslot in which you are enrolled unless prior arrangements are made with the Unit Convenor or you risk missing that week's practical session and the associated assessment marks. The laboratories have a capped student load. There are three practical timeslots of which you must attend one:

1. Thursday 10 am - 1 pm
2. Thursday 2 pm - 5 pm
3. Friday 10 am - 1 pm

You need to bring a lab notebook, pencils and pens with you to the practical sessions for making notes and drawings of what you observe. A calculator would also be an advantage. Textbooks will be referred to during lab classes so having it on hand will help.

You need to bring a lab notebook, pencils and pens with you to the practical sessions for making notes and drawings of what you observe. A calculator would also be an advantage. Your textbook will be referred to during lab classes so having it on hand will help.

Safety

Students are required to bring a lab coat to all practical sessions. Lab coats can be purchased from the campus shop (there are no lab coats available for loan in practical sessions). Closed in shoes are required for practical classes. If you do not have closed in shoes you will not be allowed into the lab and will therefore miss out on that week's practical material and associated assessment marks.

Technology

A computer with internet access is required to access iLearn which contains the unit materials and assessments. If you do not have a computer at home then computers with internet access are available in the Library for all students to use. We expect you to log on to iLearn several times each week so you can:

- Check for announcements
- Download lecture notes (available as pdf files)
- Complete weekly online quizzes and submit assessments
- Post questions and replies on the discussion board
- Check your grades

Remember that we can check your individual log-ins in iLearn so best that you make this a habit.

There are 16 desktops in the practical labs but probably 32 students. The lab-based quizzes will require internet access. You can easily complete the quizzes using a smartphone or tablet connected to the university Wi-Fi. However, if you do not have a convenient way of doing these quizzes with your own device, then locate yourself at a desktop computer.

Practical notes will be available online but are kept deliberately short in order to make printing off these notes practicable. You may use a tablet in the practical sessions but paper notes are often more convenient in the reality of wet surfaces, lots of equipment and risk of things toppling overboard.

Textbook and readings

The recommended textbooks for this unit are:

- *Plant Physiology* by Taiz and Zeiger – published by Sinauer;
- *Animal Physiology* by Hill, Wyse and Anderson – published by Sinauer; and
- *Biology of Plants* by Evert and Eichhorn – published by Freeman.

These will be available for purchase from the Co-op Bookshop on-campus. Limited copies will be available in the Reserve Section of the library. We recommend textbooks but do not insist on them. However, these are classical texts which are in at least their fourth edition and there will often be good second-hand copies to be found. An older edition is far better than not having a text.

Unit Schedule

Week	Start date	Topic	Notes	Weekly quiz (due Sunday 11:59pm)	Practical quiz
1	30 Jul	Introduction to molecules, cells and evolution		No	No practical
2	6 Aug	Gaining the substrates for metabolism		Yes	Yes
3	13 Aug	Primary energy metabolism		Yes	Yes
4	20 Aug	Using energy (carbon)		Yes	Yes
5	27 Aug	Symbiosis		Yes	Yes
6	3 Sept	Cell division		Yes	Yes
7	10 Sept	Growth	**Mid-semester test in Tuesday lecture**	Yes	Yes
Break 17 - 28 Sept					

8	1 Oct	Development & cell types - plants		Yes	Yes
9	8 Oct	Development & cell types - animals	**Written assignment due 11:59 pm Monday 8 Oct**	Yes	Yes
10	15 Oct	Hormones		Yes	Yes
11	22 Oct	Response to external stimuli		Yes	No
12	29 Oct	Movement/ intracellular signalling		Yes	No
13	5 Nov	Defence		Yes	No
Exam period	**12 to 30 November**	**Final exam**			

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

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

For all student enquiries, visit Student Connect at ask.mq.edu.au

Absences from lectures and practicals that lead to missed assessments must be covered by a medical certificate (this needs to be lodged through Ask.mq.edu.au) unless otherwise discussed with the unit convenor. Any assignments submitted after the due date will incur penalties for late submission. Extensions will only be granted in extenuating circumstances with supporting documentation. Matters of a personal nature can be raised in strict confidence with the unit convenor.

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

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

- 4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion
- 5. Analyse collected experimental data and relate results to established physiological phenomena
- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Group project
- Final exam

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

- 5. Analyse collected experimental data and relate results to established physiological phenomena
- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature

Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Final exam

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

- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Written assignment
- Final exam

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

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Final exam

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

- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion
- 5. Analyse collected experimental data and relate results to established physiological phenomena
- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Group project
- Final exam

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

- 4. Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion
- 5. Analyse collected experimental data and relate results to established physiological phenomena
- 6. Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- 7. Relate your knowledge of physiology to applications in biotechnology and medicine

Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Group project

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 outcomes

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

Assessment tasks

- Weekly quizzes
- Practical quizzes

- Mid-semester test
- Written assignment
- Group project
- Final exam

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

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment

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

- 1. Describe how organisms gain energy, grow, and develop
- 2. Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- 3. Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved

Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment

Changes from Previous Offering

First offered in 2017. In 2018, the principal changes are: (1) you have five days to complete 'Lecture Quizzes'; (2) the final practical slots are used for you to design and run a team-based experimental project and (3) the final exam is a hurdle.

Late submissions

Absences from lectures and practicals that lead to missed assessments **must be covered by a medical certificate** (this needs to be lodged through Ask.mq.edu.au unless otherwise discussed with the unit convenor. Any assignments submitted after the due date will incur penalties (10%/day) for late submission. Extensions will only be granted in extenuating circumstances with supporting documentation. Matters of a personal nature can be raised in strict confidence with the unit convenor.

Changes since First Published

Date	Description
02/08/2018	Prac quizzes start in Week 2