



# BIOL606

## Comparative Physiology

S2 External 2019

*Dept of Biological Sciences*

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#### Disclaimer

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## General Information

Unit convenor and teaching staff

Unit convenor

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Tuesdays (10 am to noon)

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Credit points

4

Prerequisites

Admission to MBiotech or MConsBiol or GradDipConsBiol or GradCertConsBiol or MSc or MScInnovation

Corequisites

Co-badged status

BIOL606

Unit description

All living things share a series of basic cell processes that are vital to life as we know it: these include membrane integrity, transport and energy transduction, enabling microorganisms, fungi, plants and animals to grow, develop and reproduce. However, these processes have evolved from their prokaryotic origins in eukaryotes, now varying qualitatively across taxa. For example, at the cell level, signal amplification, hormonal regulation, sensory responses, photosynthesis, locomotion and immune responses are examples of adaptations that are genetically distinct in either plants or animals. Within the life cycle of a single organism, expression of these gene combinations determines the way that organisms develop and acclimate to their immediate environment. This unit will explore the full range of adaptations across Kingdoms and how specific gene combinations are expressed to enable life to flourish. Such events will be viewed primarily through the prism of physiology but with reference to morphology, gene expression and metabolism.

## 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:

Describe how organisms gain energy, grow, and develop

Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli

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

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

Analyse collected experimental data and relate results to established physiological phenomena

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

Relate your knowledge of physiology to applications in biotechnology and medicine

Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## 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 who 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.

### **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 8 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 7 Oct 2019 (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](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 held in the afternoon of Wednesday 18 Sep 2019 (first day of the second on-campus session). The test will consist of short-answer questions and will cover all lecture content up to and including Week 6 and practical content presented before the test (i.e. lectures 1-12 and practicals 1-5). Calculators without text retrieval capacity will be allowed into the exam room. This test will be different from the test completed by the internal students.

### **Prac Project (in the final days of the external 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 5 but in brief, the practical execution happens in the second OCS. The steps are: (1) a discussion from your team of four (depending on the size of the external cohort) 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.

**Discussions & seminar (BIOL606 only):** This is an additional assessment task that you must complete in order to earn your BIOL606 (postgraduate) status in this unit. It is not onerous and no marks are awarded but it is a hurdle - i.e. you **MUST** complete it to pass the unit. The format is to meet three weeks in a row late in the semester and discuss topics that each person might develop (first week). In the second meeting, we will go over each topic in more detail and check that it is feasible and in Week 3, you will present a three-minute Powerpoint seminar on the topic to the group. The common theme in all your talks will be a physiological process or analysis. For example, you might decide to explore how anteaters manage to derive nutrition from ants, and what processes occur in their guts and what organisms are involved. You must each choose a topic that is different from any of your fellow students. There are many possibilities. Some will like an ecosystem-level topic while other might choose something right down at the molecular level. Details to follow later in the semester

### **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. The short-answer questions will be drawn from the sample short answer questions made available each week on iLearn. 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](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 2019. 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
<u>Weekly quizzes</u>	20%	No	Weekly by 11.59 pm Sunday
<u>Practical quizzes</u>	20%	No	During on-Campus Session 2
<u>Online preparatory skills</u>	0%	No	11.59 pm on 14 August
<u>Mid-semester test</u>	10%	No	During on-campus session 2
<u>Written assignment</u>	10%	No	11:59 pm Monday 7 Oct
<u>Group Project</u>	5%	No	During on-Campus Session 2
<u>Discussions &amp; seminar</u>	0%	Yes	tbd (final week)
<u>Final exam</u>	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:

- Describe how organisms gain energy, grow, and develop
- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

### Practical quizzes

Due: **During on-Campus Session 2**

Weighting: **20%**

Online quizzes to be completed during practical sessions

On successful completion you will be able to:

- Describe how organisms gain energy, grow, and develop

- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- Analyse collected experimental data and relate results to established physiological phenomena
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## Online preparatory skills

Due: **11.59 pm on 14 August**

Weighting: **0%**

This is intended to prepare you for the basic science skills you will require in second year. It is not meant to be complicated but rather, to revise the content of first year science and get you ready to think about how basic cell metabolism works. The intention is to test three disciplines: 1) biology; 2) chemistry and 3) numeracy. There will be You Tube video to watch or short passages out of books then a series of simple online questions.

On successful completion you will be able to:

- Describe how organisms gain energy, grow, and develop

## Mid-semester test

Due: **During on-campus session 2**

Weighting: **10%**

Short-answer questions

On successful completion you will be able to:

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

## Written assignment

Due: **11:59 pm Monday 7 Oct**

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:

- Describe how organisms gain energy, grow, and develop
- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- Relate your knowledge of physiology to applications in biotechnology and medicine

## Group Project

Due: **During on-Campus Session 2**

Weighting: **5%**

Introductory talks, execution of project & summary of findings

On successful completion you will be able to:

- Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion.
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## Discussions & seminar

Due: **tbd (final week)**

Weighting: **0%**

**This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)**

This is a group discussion followed by a seminar, spanning three weekly meetings late in the semester. You will discuss topics (Week 1) then in the second meeting, we will go over each topic in more detail and check that it is feasible and in Week 3, you will present a three-minute Powerpoint seminar on the topic to the group.

On successful completion you will be able to:

- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule



## 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:

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

## Delivery and Resources

### Lectures:

There are two live lectures each week: Monday 9 - 10 am in the **Macquarie Theatre** and Tuesday 9 - 10 am in the **Lotus Theatre**. These lectures are recorded and made available through the iLearn page soon after the lecture is presented but you are always welcome to attend. 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 **14 Eastern Road room 120 (the RED lab on the ground floor)**. There are two (9 am - 5 pm) on-campus sessions, the first at the end of Week 5 (31 Aug - 1 Sept) and the second in the mid-semester break (18 - 20 Sept). You are required to attend **for the full duration** of both on-campus sessions but we will try to wind up early on the last day once you have the material covered and have used the opportunity to raise any questions about the exam etc. Please be aware that parking is not free on-campus and there are security guards patrolling and issuing fines for vehicles without permits. You can park on nearby roadsides for longer periods.

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.

**Online preparatory skills:** This is a set of online exercises in Week 2. See details under

'Assessment Tasks' above.

### **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 on 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. I 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. We are confident that the principles described in these texts are enduring and they will be decades (at least) before they are no longer relevant to the living world.

# Unit Schedule

## Lectures and assessments

Week	Start date	Topic	Lecture topic	Weekly quiz (due 11.59 pm Sunday)
1	29 Jul	Introduction to molecules, cells and evolution		No
2	5 Aug	Gaining the substrates for metabolism		Yes
3	12 Aug	Primary energy metabolism		Yes
4	19 Aug	Using energy (carbon)		Yes
5	26 Aug	Symbiosis	<b>On-campus session 1:</b> <b>31 Aug - 1 Sept (this is a weekend)</b>	Yes
6	2 Sept	Cell division		Yes
7	9 Sept	Growth		Yes
Break	16 - 27 Sept		<b>On-campus session 2</b> <b>18 - 20 Sept (Wednesday to Friday) incl. mid-semester test</b>	
Break	24 Sept			
8	30 Sep	Development & cell types - plants		Yes
9	7 Oct	Development & cell types - animals	<b>Written assignment due 11:59 pm Monday 7 Oct</b>	Yes
10	14 Oct	Hormones		Yes
11	21 Oct	Movement		Yes
12	28 Oct	Response to external stimuli		Yes
13	4 Nov	Defence		Yes
<b>Exam period</b>	<b>11 to 29 November</b>	<b>Final exam</b>		

## On-campus sessions

Session	Week	Dates	Practicals + quizzes	Notes
1	5	Sat 31 Aug & Sun 1 Sept	1 - 4	Organising project groups
2	First week of break	Wed 18 to Fri 20 Sept	5 - 13 (quizzes on Pracs 5 - 9)	Mid-semester test Work on group projects

## 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) (<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) (<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) (<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 published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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](http://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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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](http://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 17 - 21 December 2019. 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/](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

- Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion.
- Analyse collected experimental data and relate results to established physiological phenomena
- Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- Relate your knowledge of physiology to applications in biotechnology and medicine
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

#### Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Group Project
- Discussions & seminar
- 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

- Analyse collected experimental data and relate results to established physiological phenomena

- 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**

- Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- Relate your knowledge of physiology to applications in biotechnology and medicine
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## **Assessment tasks**

- 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**

- Describe how organisms gain energy, grow, and develop



- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- 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
- Online preparatory skills
- Mid-semester test
- Written assignment
- Group Project
- Discussions & seminar
- 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**

- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion.
- Analyse collected experimental data and relate results to established physiological phenomena
- Address a major physiological process in the form of a scientific report based on reference to the scientific literature
- Relate your knowledge of physiology to applications in biotechnology and medicine
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Group Project
- Discussions & seminar
- 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

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

## Assessment tasks

- Practical quizzes
- Mid-semester test
- Written assignment
- Group Project
- Discussions & seminar
- Final exam

## 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**

- Describe how organisms gain energy, grow, and develop
- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Undertake a team-based experiment chosen from a topic provided after presenting a plan, and summarise the findings on completion.
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## **Assessment tasks**

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Group Project
- Discussions & seminar
- 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**

- Describe how organisms gain energy, grow, and develop
- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussions & seminar
- Final exam

## 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

- Describe how organisms gain energy, grow, and develop
- Describe the co-ordination of physiological processes in organisms, including transport systems and responses to stimuli
- Compare and contrast physiological processes in microbes, plants, and animals, considering how these processes have evolved
- Use your knowledge of physiology to analyse a biological system at one level of organisation, ranging potentially from a community/ecosystem to a cell or molecule

## Assessment tasks

- Weekly quizzes
- Practical quizzes
- Mid-semester test
- Written assignment
- Discussions & seminar
- Final exam

## Changes from Previous Offering

First offered in 2017. In 2019, the principal changes to the unit are the introduction of: (1) a hurdle and (2) a refresher module in Week 2. The unit name has changed to '*Life Processes*' from '*Comparative Physiology*'

## Late submissions and penalties

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](http://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
23/09/2019	To accommodate guest lecturer
03/08/2019	See comments for BIOL606 (internal). Brian