BIOL247

Systems Physiology

S2 External 2019

Dept of Biological Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

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Credit points
3

Prerequisites
BIOL257 or (6cp from BIOL115 and (BBE100 or BIOL114 or BIOL116 or BIOL108 or BIOL122)) or (HLTH108 and HLTH109) or (PSY104 and PSY105) or (PSYC104 and PSYC105)

Corequisites

Co-badged status

Unit description
This unit considers the maintenance of body homeostasis. We investigate the cardiovascular system including an examination of the electrical and mechanical functions of the heart, its interaction with the blood vessels, and the hormones and the autonomic nervous system that control heart function. Next we study the role of the renal system in the control of the chemical composition of the body, water balance and body fluid volume. An overview of the respiratory and gastrointestinal systems will follow. Practical classes involve measuring physiological parameters such as blood pressure and electrical conduction through the heart (the ECG) in humans.

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:

Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis

Relate specific structural features of organs to essential system functions

Interpret physiological processes using equations of physical, chemical, and electrical properties

Identify situations in which organ systems interact to produce a co-ordinated response

Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols

Analyse data and recognise the implications of experimental results

General Assessment Information

A hurdle requirement is an activity for which a minimum level of performance or participation is a condition of passing a unit. The hurdle requirement in BIOL247 in 2019 is that you must complete and submit the three practical assignments.

Final exam

If you receive special consideration for the final exam, a supplementary exam will be scheduled in December 2019; that is 2 weeks after the exam period. 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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Eight Online Quizzes	20%	No	see below
Mid-semester test	15%	No	Week 7
Practical class assignments	15%	Yes	Week after practical
Final Exam	50%	No	Semester 2 exam period

Eight Online Quizzes

Due: **see below**
Weighting: **20%**

All eight quizzes are in the form of multiple choice questions and will be available from 1pm on the Thursday until Wednesday midnight of the following week. The time limit to complete each quiz will vary with the number of questions and only one attempt at each quiz is allowed. Each quiz contributes an equal proportion of the 20 marks.

The material included in each of the quizzes is

Quiz 1 week 2, lectures 1-4

Quiz 2 week 4 The ECG practical class

Quiz 3 week 5 Blood pressure practical and lectures 8 & 9

Quiz 4 week 6 Cardiovascular system revision and preparation for the mid semester test lectures 1 - 9

Quiz 5 week 8 Renal revision lectures 10 - 14

Quiz 6 week 10 Respiration revision lectures 15-19

Quiz 7 week 11 Digestion practical

Quiz 8 week 12 Nutrition and the gastrointestinal system lectures 20-24

On successful completion you will be able to:

- Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis
- Relate specific structural features of organs to essential system functions

Mid-semester test

Due: **Week 7**
Weighting: **15%**

This test will include 35 multiple choice questions to be completed in 60 minutes. All the cardiovascular section, the first three renal lectures (lectures 1-12) and the material presented in the completed practical classes will be included in the test.

For **internal** students the test will be held in your usual practical session in week 7.

For **external** students, the test will be held at 9.00 am on Monday 16/09/2019, the first day of the second on campus session.

On successful completion you will be able to:

- Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis

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Practical class assignments

Due: **Week after practical**
Weighting: **15%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Internal students

The practical assignments are based on the ECG, cardiovascular system and the permeability practical classes. Details of these assignments are in the practical manual. Students will complete the first two assignments in the week following the practical and submit them to the appropriate turnitin site by Friday midnight of that week. The third assignment will be due by midnight on the 02/10/2019.

External students

Students will complete the first two assignments by 09/09/2019 and submit them to the appropriate turnitin site by midnight . The third assignment will be due by midnight on the 02/10/2019.

On successful completion you will be able to:

- Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis
- Interpret physiological processes using equations of physical, chemical, and electrical properties
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Final Exam

Due: **Semester 2 exam period**
Weighting: **50%**

The exam is a two and a half hour paper with 40 multiple choice questions, and 6 short answer questions (a paragraph or dot points or a diagram). The short answer questions will be in two parts and in each part you will have a choice of 3 out of 6 questions

All the lecture and practical material is examinable. A non-programmable calculator will be

required in the exam but dictionaries are not allowed.

On successful completion you will be able to:

- Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis
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- Interpret physiological processes using equations of physical, chemical, and electrical properties
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Delivery and Resources

Unit Schedule

There will be two lectures each week on Wednesday at 1 pm at 21 WW (Macquarie Theatre) and Thursday 12 noon at 21 WW (Macquarie Theatre). Both lectures are of one hour duration. The lectures will also be available through ECHO on the iLearn site.

Internal practical classes begin in week two and are at 2 pm on Mondays and 10 am and 2 pm on Tuesdays and 10 am and 2 pm on Wednesdays in 4WW (F7B) 102, 105 and 110. Practical classes run for a maximum of 3 hours. You will be assigned to one of these sessions and **it is essential that you attend at your allotted time and place**.

External students will attend practical classes on 24th & 25th of August and the 16th & 17th of September. The classes start promptly at 9.00 am and will be held in 4WW (F7B) 105 and 110.

You will find online lectures in ECHO on an “Introduction to Neurophysiology” and the “Autonomic Nervous System”. The background information contained in these lectures is required for understanding of concepts introduced in BIOL247 so it is essential that all students who have not completed BIOL257 study these lectures in week one. These lectures will also be a helpful revision tool for students who have completed BIOL257.

Unit material and Textbooks

The textbook for this unit is “Principals of Human Physiology” by Cindy L Stanfield, published by Pearson. You can subscribe to the new digital version (6th addition) at

http://www.pearson.com.au/9781292156491

and you do not need MasteringA&P.

An alternative is “Physiology” by Jake Mann and David Marples published by JP medical publishers. This book is one of the Eureka series and is more concise than Stanfield but still covers the content of BIOL247. Other physiological texts of a similar standard may also be suitable.

iLearn

Your iLearn site will contain the unit outline, lecture audio and graphics, the text of the lectures, a link to ECHO 360 practical notes, announcements and discussion areas, and other information to help you complete the unit. Later, quizzes and assignment marks will be added. **Please check this site regularly. You should also check your university email regularly for important announcements.**

Unit Schedule

Lecture Timetable 2019

Week	Lecture
1	1. Overview of the cardiovascular system
	2. Electrical activity of the heart
2	3. Generation of the heartbeat
	4. Regulation of contraction of cardiac muscle
3	5. Physics of the circulation
	6. Components of the circulation and their specific functions
4	7. Function of the microcirculation/Control of blood flow
	8. Regulation of cardiac output
5	9. Short term regulation of the arterial blood pressure
	10. Structure and function of the renal system
6	11. Production of urine by the nephron
	12. Excretion as the outcome of filtration, reabsorption and secretion
7	13. Water balance: The control of ECF osmolarity
	14. Sodium balance : The control of the ECF volume and blood pressure

Study break: 15/9/19– 29/09/19

8	15. Structure and function of the respiratory system
	16. The process of breathing

9	17. Alveolar ventilation and perfusion
	18. Gas exchange and the carriage of O_2 and CO_2 in the blood
10	19. Control of respiration
	20. Nutrition
11	21. Function and organisation of the gastrointestinal system
	22. Motility of the gastrointestinal system
12	23. Secretion in the gastrointestinal system
	24. Digestion and absorption of food
13	25. Catch up lecture and description of the final exam
	no lecture

Internal Practical Timetable 2019

Week	Practical Group A 4WW (F7B) 102	Practical Group B & C 4WW (F7B) 105, 110
1	**No practical but students who have not completed BIOL257** should go to two tutorials (Introduction to Neurophysiology and the Autonomic Nervous System) at Echo in the iLearn site for important background information which will be essential for their understanding of topics covered in BIOL247	
2	The electrocardiogram (ECG) and human cardiovascular function	Introductory tutorial and the Langendorff perfused heart video and questions
3	Introductory tutorial and the Langendorff perfused heart video and questions	The electrocardiogram (ECG) and human cardiovascular function
4	Cardiovascular system and the effect of posture on heart rate and blood pressure (BP prac)	
5	Analysis of blood pressure control during postural changes	
6	Permeability, osmolarity and tonicity **(lab coats)**	
7	**Mid-semester test; MCQ test on cardiovascular and renal systems (L1-12)**	

Study break: 15/9/19– 29/09/19

8	Digestion prac **(lab coats)**
9	No practical as Monday is a public holiday
10	Discussion of the results of the digestion practical and body compartments tutorial questions
11	Review of test and tutorial questions on renal function
12	Revision tutorial based on a previous exam paper (Externals welcome)
13	No Practical

External practical timetable 2019

Saturday 24/8	**Monday 16/9**
Introduction	**Mid-semester test**
Langendorff heart DVD	Body compartments tutorial questions
Cardiovascular system and the effect of posture on heart rate and blood pressure	Renal function tutorial questions
Tutorial on the effect of posture on the cardiovascular system	Digestion practical **(lab coats)**
Sunday 25/8	**Tuesday 17/9**
The electrocardiogram (ECG)	Discussion of the results of the Digestion practical
Permeability, osmolarity and tonicity **(lab coats)**	Review of mid-semester test

For external students, the mid-semester test on the cardiovascular and renal systems is on Monday, 16th September. It will cover Lectures 1-12 and the practical classes completed in the first on campus session.

Learning and Teaching Activities

Graduate Capabilities

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 • Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis • Relate specific structural features of organs to essential system functions • Interpret physiological processes using equations of physical, chemical, and electrical properties • Identify situations in which organ systems interact to produce a co-ordinated response Assessment tasks • Eight Online Quizzes • Mid-semester test • Practical class assignments • 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 • Relate specific structural features of organs to essential system functions • Interpret physiological processes using equations of physical, chemical, and electrical properties • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols • Analyse data and recognise the implications of experimental results Assessment tasks • Eight Online Quizzes • Mid-semester test • Practical class assignments • 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 outcome • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols Assessment task • Practical class assignments

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 outcome • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols Assessment task • Practical class assignments

Critical, Analytical and Integrative Thinking

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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 • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols • Analyse data and recognise the implications of experimental results Assessment task • Practical class assignments

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 outcome • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols Assessment task • Practical class assignments

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 outcome • Perform experiments safely with human subjects and accurately collect data, following Macquarie University Human Research Ethics Committee sanctioned protocols Assessment task • Practical class assignments

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 outcome • Explain how the cardiovascular, renal and respiratory systems contribute to the maintenance of homeostasis Assessment tasks • Eight Online Quizzes • Mid-semester test • Practical class assignments • Final Exam

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Assessment tasks

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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 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 or if you are a Global MBA student contact 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) 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

If you are a Global MBA student contact globalmba.support@mq.edu.au

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.

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Changes from Previous Offering

No changes from last year.