



BIOL376

Advanced Human Physiology

S2 Day 2017

Dept of Biological Sciences

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General Information

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Credit points

3

Prerequisites

(BIOL247 and BIOL257) or (admission to BHumanSc and 6cp at 200 level including BIOL247)

Corequisites

HLTH306 or HLTH310 or HLTH316 or HLTH317 or BIOL345 or BIOL367 or CBMS306 or CBMS335 or CBMS337 or PSY354 or STAT395

Co-badged status

Unit description

This unit follows on from BIO257 and BIOL247. We will investigate the interaction of the renal and respiratory systems in the control of body pH. The next topic is the control of blood pressure leading to a discussion of hypertension and exercise. We continue with endocrinology discussing signal transduction and messenger pathways, and the role of hormones in the regulation of plasma potassium, calcium and glucose concentrations. A discussion of neuroendocrine systems and function of thyroid, sex, growth, mineralocorticoid and glucocorticoid hormones leads into a discussion of stress and the stress hormones. As obesity is currently a major threat to human health we will consider energy balance and the neurological basis for homeostatic and hedonic control of appetite before investigating other factors involved in weight control including genetics, foetal programming, protein leverage and the gut microbiota. The final two lectures will be on the neurobiology of the reward systems involved in hedonic eating and drug addiction. Practical classes make use of computer-assisted learning, as well as laboratory experiments. We will measure physiological parameters such as blood pressure during exercise, acid and base in the urine and stress hormones in the saliva. In these classes students will act both as investigators and experimental subjects.

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 homeostasis
- Identify the components of the neural and endocrine systems that maintain energy balance in the human body
- Perform experiments safely with human subjects, following protocols sanctioned by the Macquarie University Human Research Ethics Committee and Institutional Biosafety Committee
- Practice measurements of physiological responses in human subjects
- Analyze experimental data using statistics and graphing and interpret physiological significance
- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats
- Critically evaluate information and form logical arguments supported by experimental evidence

General Assessment Information

Students are expected to attend all the practical classes and there will be questions on the material covered in the practical classes in the mid-semester test and the final examination.

A hurdle requirement is an activity for which a minimum level of performance or participation is a condition of passing a unit.

In BIOL376 the final exam is the hurdle assessment and the university has stipulated that if you have made a serious attempt but failed to pass a hurdle requirement you will be given a second chance to attain a passing grade. The pass mark for the final exam is 45%. Students who have a mark of 35 to 44% will be able to sit the exam again. The exam papers for the first and second attempts will be the same in style (i.e. multiple choice and short answer questions) but the actual questions will be different.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Mid semester test</u>	10%	No	practical sessions in week 7
<u>Acid /base balance assignment</u>	10%	No	04/09/2017
<u>Essay</u>	10%	No	03/10/2017
<u>Seminar</u>	10%	No	Weeks 9 and 10
<u>Formal exam</u>	60%	Yes	End of semester exam period

Mid semester test

Due: **practical sessions in week 7**

Weighting: **10%**

This test will include 35 multiple choice questions to be completed in 60 minutes. All the material in lectures 1-11 and the material presented in the practical classes will be included in the test.

On successful completion you will be able to:

- Explain how the cardiovascular, renal, and respiratory systems contribute to homeostasis
- Identify the components of the neural and endocrine systems that maintain energy balance in the human body

Acid /base balance assignment

Due: **04/09/2017**

Weighting: **10%**

In this assignment, excretion rates of the control and treatment groups will be compared. To do this the time courses of the urine excretion rates, total acid excretion rates, urine pH, and the rates of bicarbonate excretion will be plotted. To complete the assignment students will answer a series of questions that are designed to probe the physiological mechanisms that produce the experimental results. The details of this assignment are in the practical manual

The assignment must be written in your own words and submitted through Turnitin.

On successful completion you will be able to:

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- Practice measurements of physiological responses in human subjects
- Analyze experimental data using statistics and graphing and interpret physiological significance
- Critically evaluate information and form logical arguments supported by experimental evidence

Essay

Due: **03/10/2017**

Weighting: **10%**

The essay will be of 1,500 words and the topic will be chosen from the list on the iLearn site. The essay must be written in your own words. The main criterion for marking will be the physiological content but writing style will also be considered. The rubric used to mark the essay is on the iLearn site.

The source of all statements and diagrams obtained from the literature must be cited. The reference list only contains the articles that you have actually cited in the essay. Citations and the reference list should be in Harvard Style. For more information go to

[www.bio.mq.edu.au/files/Harvard%20Referencing%20System%202012\(5\).pdf](http://www.bio.mq.edu.au/files/Harvard%20Referencing%20System%202012(5).pdf)

On successful completion you will be able to:

- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats
- Critically evaluate information and form logical arguments supported by experimental evidence

Seminar

Due: **Weeks 9 and 10**

Weighting: **10%**

The seminar topics will be the same as your essay topic. You will present your seminar as part of a team of three students. Each seminar is of 15 minutes duration with an extra 5 minutes of question time. There will be time during the practical sessions for you to decide on the distribution of tasks between team members. All three students must present part of the seminar and answer questions at the end..

The main criterion for marking will be the quality of presentation although the physiological content will also be considered and the rubric used to mark the seminar is included on the ilearn site

On successful completion you will be able to:

- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats
- Critically evaluate information and form logical arguments supported by experimental evidence

Formal exam

Due: **End of semester exam period**

Weighting: **60%**

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

The exam is a three hour paper. One third of the marks will be for multiple choice questions, and the rest from short answer questions (a paragraph or dot points or a diagram). There will be some choice for the short answer questions.

All the lecture and practical material is examinable. A non-programmable scientific 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 homeostasis

- Identify the components of the neural and endocrine systems that maintain energy balance in the human body
- Critically evaluate information and form logical arguments supported by experimental evidence

Delivery and Resources

Timetable

There will be two lectures each week and these will be on Tuesdays at 12 pm in E7B T3 and on Thursday at 5 pm in E7B T4. All lectures will be recorded and available on iLearn.

Each week students are expected attend one practical class at either on Thursday from 1 pm to 5 pm or Friday from 10 am until 1 pm. All practical classes will be in F7B 102, 105 or 110.

Practical sessions for external students will be held on Saturday 2nd and Sunday 3rd September and on Thursday and Friday the 21st and & 22nd September.

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>

However, much of the material in this unit is not covered in this book and when this is the case references to the journal articles used in the writing of the lectures are included in the lecture graphics

iLearn

Your iLearn site will contain the unit outline, lecture graphics, lecture notes, practical manual, a link to Echo 360, announcements and discussion areas. Later, marks for in semester assessments tasks will be available in Grade Book. **Please check this site and your student email regularly.**

Unit Schedule

Lecture Timetable 2017

Week	Beginning on	Lecture
1	31/7	1. Acid base regulation in the body
		2. Disturbances acid/base balance
2	7/8	3. Short term control of BP
		4. Long term control of BP

3	14/8	5. Hypertension
		6. Exercise I
4	21/8	7. Exercise II
		8. Hormones, signal transduction and cell messengers
5	28/8	9. Regulation of plasma K ⁺ concentration
		10. Regulation of plasma Ca ²⁺ concentration
6	4/9	11. Neuroendocrinology
		12. Regulation of plasma glucose concentration
7	11/9	Catch up lecture
		Mid-semester test in practical session

Study break: 18/9/17 – 3/10/17

8	2/10	13. Stress hormones
		14. The obesity epidemic and energy balance
9	9/10	15. Homeostatic control of appetite
		16. Reward systems and hedonic eating
10	16/10	17. Genetics of obesity
		18. Foetal effects and epigenetics(Dr Jess Buxton; NS talks)
11	23/10	19. Protein and energy balance
		20. The microbiota
12	30/10	21. TBA
		22. TBA
13	6/11	no lecture
		no lecture

Internal Practical Timetable 2017

Wk	Practical
1	no practical
2	Introduction to BIOL76 and acid-base balance computer tutorial (calculator with logs needed for this prac) Organise seminar groups Discuss ethics and protocol for the acid base prac, organise subjects and sign consent forms
3	The effect of net acid or base ingestion on the pH and the hydrogen ion and bicarbonate excretion in the urine (lab coats)
4	Analysis of acid base practical results
5	The effect of exercise on the cardiovascular system-planning and experimental
6	The effect of exercise on the cardiovascular system- experimental, data analysis and presentation
7	Mid-semester test at 1 pm Thursday and 10 am Friday in prac

Study break: 19/9/16 – 3/10/16

8	Revision of the mid-semester test and case study ; seminar preparation
9	Student Seminars
10	Student seminars
11	Salivary cortisol (lab coats), lactose/fructose intolerance and case studies
12	Salivary cortisol results and revision session based on the 2013 exam paper
13	No practical

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://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/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

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

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

- Perform experiments safely with human subjects, following protocols sanctioned by the Macquarie University Human Research Ethics Committee and Institutional Biosafety Committee
- Practice measurements of physiological responses in human subjects
- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats

Assessment task

- Formal 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 outcome

- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats

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 homeostasis
- Identify the components of the neural and endocrine systems that maintain energy balance in the human body
- Practice measurements of physiological responses in human subjects
- Analyze experimental data using statistics and graphing and interpret physiological significance
- Critically evaluate information and form logical arguments supported by experimental evidence

Assessment tasks

- Mid semester test
- Acid /base balance assignment
- Essay
- Seminar
- Formal 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

- Explain how the cardiovascular, renal, and respiratory systems contribute to homeostasis
- Identify the components of the neural and endocrine systems that maintain energy balance in the human body
- Analyze experimental data using statistics and graphing and interpret physiological significance
- Synthesize information from the scientific literature and present it [to a professional

standard] in written and oral formats

- Critically evaluate information and form logical arguments supported by experimental evidence

Assessment tasks

- Mid semester test
- Acid /base balance assignment
- Essay
- Seminar
- Formal 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

- Identify the components of the neural and endocrine systems that maintain energy balance in the human body
- Analyze experimental data using statistics and graphing and interpret physiological significance
- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats
- Critically evaluate information and form logical arguments supported by experimental evidence

Assessment task

- Acid /base balance assignment

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

- Practice measurements of physiological responses in human subjects
- Synthesize information from the scientific literature and present it [to a professional standard] in written and oral formats
- Critically evaluate information and form logical arguments supported by experimental evidence

Assessment tasks

- Acid /base balance assignment
- Essay
- Seminar
- Formal 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 outcome

- Perform experiments safely with human subjects, following protocols sanctioned by the Macquarie University Human Research Ethics Committee and Institutional Biosafety Committee

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

- Practice measurements of physiological responses in human subjects

Changes since First Published

Date	Description
28/07/2017	Tutors added