

UNSW



THE UNIVERSITY OF NEW SOUTH WALES

Exercise Physiology Program
School of Medical Sciences
Faculty of Medicine

HESC3541

CLINICAL EXERCISE PHYSIOLOGY

Semester 1, 2011
Course Outline

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Staff Contact Details

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Course details

Credit Points: 6 UOC

Course Prerequisites / Assumed Knowledge

PHSL2501 – Human Physiology A

HESC2501 – Exercise Physiology

PHSL2502 - Human Physiology B

PATH2202 – Processes in Disease Health and Exercise Science

or

PATH2201 – Processes in Disease

Course Description

This course will provide you information about the epidemiology and the pathophysiology of ageing, immune, respiratory, metabolic and cardiovascular diseases. You will gain knowledge of how to set up and implement exercise testing and programming in these special populations in order to provide symptomatic relief, as well as to manage the underlying disease. You will also learn how to manage the interaction between exercise and medications in these special populations. By the end of the semester you will be able to successfully use exercise testing and programming in individuals with these diseases to improve their health and quality of life. The teaching and learning approaches used in this course will include problem-based learning as well as more traditional evidence-based information provided during the lectures.

Aims of the Course

1. To provide knowledge on the epidemiology and the pathophysiology of ageing, immune, respiratory, metabolic and cardiovascular disorders
2. Develop an understanding of the specificity of those populations based on their symptoms and treatments and their exercise limitations
3. Develop practical skills necessary for the assessment of the exercise capacity and the prescription of exercise in those populations
4. Develop competencies in exercise testing interpretation

Student Learning Outcomes

This term is used to describe what it is that you should be able to do, explain or understand if you have learned effectively in the course. For each lecture, tutorial, practical and assessment item, the expected learning outcomes will be explicitly stated. The assessment in the course will be matched as closely as possible to the stated learning outcomes. That is, the assessment will test how well you have achieved the learning outcomes of the course. The general learning outcomes for the course are as follows:

At the end of the course you should:

1. Have an understanding of the physiological mechanisms responsible for the development of the chronic conditions addressed in this course
2. Have a strong knowledge of the exercise limitations and contraindications associated with those conditions as well as the main strategies used to prescribe exercise in these populations
3. Have acquired the clinical skills required to monitor the cardio-respiratory functions at rest, during exercise and recovery
4. Develop competencies in using the information collected during the pre screening procedure and the exercise test to individualise exercise prescription

Graduate Attributes

- Understand the relationship between physical activity and health
- Deliver lifestyle change programs that use exercise for the primary prevention of disease and the management of chronic disease
- Apply clinical skills and knowledge relevant to cardiopulmonary, metabolic, musculoskeletal and neuromuscular rehabilitation
- Engage in independent and reflective learning for the betterment of professional clinical practice, following an evidence-based approach
- Communicate effectively with patients, colleagues and other health professionals

Rationale for the inclusion of content and teaching approach

How the course relates to the Exercise Physiology profession – This course provides a strong background on the Pathophysiology, the exercise limitations and the strategies to optimize exercise testing and prescription for major chronic conditions. It also develops critical skills necessary for the safe monitoring of cardio-respiratory function at rest, during exercise and recovery.

How the course relates to other courses in the Exercise Physiology program – This course builds on the knowledge and skills introduced in earlier courses in the program, in particular Human Physiology A and B (PHSL2501/2502), Process in Disease (PATH2202) and Exercise Physiology (HESC2501), to further develop critical skills and knowledge to enable students to interact with patients with chronic conditions. These skills and knowledge will be applied throughout the 4th year clinical practicum. Learning about medications and the impact on exercise responses will be extended in Pharmacology for Health and Exercise Science (PHAR2211).

Teaching strategies

Lectures – The lectures will provide you information on the epidemiology and the pathophysiology of ageing, immune, respiratory, metabolic and cardiovascular diseases. This information will be further used to implement exercise testing and prescription in those populations by taking into account the specificity of each populations and the interaction with the medications used.

Lecture notes will be available in PDF format on **Blackboard**:

<http://lms-blackboard.telt.unsw.edu.au/webapps/portal/frameset.jsp>

Lectures are recorded and available at:

<http://telt.unsw.edu.au/lectopia%5Fdiy/>

Tutorials – During the tutorials, a problem based learning strategy will be used to discuss testing exercise capacity in specific populations. Those tutorials will also help you to learn how to use scientific literature to improve exercise testing and prescription in those populations and how to analyse data collected during exercise tests.

Practicals – During the practicals you will learn clinical skills concerning exercise testing in clinical conditions that will consist of:

- lung function assessment (spirometry)
- cardiac activity monitoring (electrocardiography)
- exploring the metabolic and respiratory adaptations (gas analysis)

Assessments – These tasks have been chosen as tools to enhance and guide your learning as well as a way of measuring performance and are therefore central teaching strategy in this course.

Assessment

Summary of Assessments	Weight	Due Date
ASSESSMENT TASK 1 – QUIZZES	5%	Weeks 3, 5, 7, 11, 13
ASSESSMENT TASK 2 – MID SEMESTER EXAM	25%	Week 8
ASSESSMENT TASK 3 – REPORT ON EXERCISE TESTING	30%	Week 13
ASSESSMENT TASK 4 – FINAL EXAM	40%	Examination period

Assessment Task 1 – ONLINE QUIZZES

Online quizzes offered at the end of each block of lectures on the 5 main topics (aging, respiratory disorders, metabolic disorders, cardiovascular disorders and immune disorders) to test your knowledge on the information delivered on these topics (weeks 3, 5, 7, 11, 13). Answers will need to be submitted through Blackboard.

Assessment Task 2 – MID SEMESTER EXAM

This exam will test your knowledge on the diseases pathophysiology, the effects of exercise of the pathologies or symptoms and the potential interactions with medications during ageing and in respiratory or metabolic conditions.

Assessment Task 3 – REPORT ON EXERCISE TESTING

To be able to prepare this document you will need to submit your group of two students to the course coordinator by Friday 4pm in week 4 (25/03/11). Failure to provide timely information concerning your group will result in a penalty of 25% on your mark for this assignment.

The data used to complete that document will be generated during labs 3 and 4. During those labs your performance in conducting the exercise testing will be assessed against set criteria described on page 5.

The report should be a 4 pages A4 PDF document and should be divided into 4 sections.

Anthropometry:

- description of the pre-testing procedures: risk assessment, regular physical activity evaluation, spirometry, ECG/BP...
- presentation of the anthropometric measurements and tested resting values

Aerobic capacity:

- description of the protocol: workload increments, parameters measured (methods of determination), precautions in the population
- analysis of the results, determination of the maximality of the test, VO₂max, ventilatory threshold, double product break point. One graph per variable should be presented (VO₂max, VO₂VT, DBBP).

Metabolic test:

- description of the protocol: workload increments, parameters measured (methods of determination), precautions in the population
- analysis of the results, determination of Cross over point and Lipoxmax (1 graph per variable) as well as total energy expenditure during the test.

Comparison of the 2 tests:

- determination of the Cross Over Point and Lipoxmax (using data collected during aerobic capacity test) and determination of VO₂max and VO₂VT (using data collected during the metabolic test)
- comparison of the data to determine the validity of each test

Marking Criteria for the Exercise Testing

PASS/FAIL CRITERIA	√ / X
PROTOCOL DESIGN	
Protocol is individualised and workloads have been calculated to support resistance increment during the test.	
PATIENT MANAGEMENT	
Inform patient of purpose of test. Explain emergency and communication procedures. Monitor patients during the test and recovery.	
RESTING LEVELS MONITORING	
Describe resting cardio-respiratory values and use them to assess that test can be performed.	
ECG MONITORING	
Determine the heart vector and identify normal rhythm and abnormalities.	
TERMINATION OF THE TEST	
Define and appropriately use set criteria to terminate the test.	

Comments: _____

Marking Criteria for the Report on Exercise Testing

Anthropometry (22 marks):	Anthropometry Medical history / Lifestyle / Classification Description of the pre-testing procedure and parameters measurement
Aerobic capacity (22 marks):	Description of the testing procedures Method for determination of the different parameters Analysis of the data collected and determination of specific parameters to determine physical capacity (VO ₂ max, ventilatory threshold, double product break point) Inclusion of pertinent graphs to support parameters determination
Metabolic test (22 marks):	Description of the testing procedures Method for determination of the different parameters Analysis of the data collected and determination of specific parameters to determine physical capacity (Cross Over Point, Lipoxmax) Inclusion of pertinent graphs to support parameters determination
Comparison (22 marks):	Determination of Cross Over Point and Lipoxmax using data from the aerobic capacity test Determination of VO ₂ max and VO ₂ VT using data from the metabolic test Comparison of the parameters determined using the 2 tests Inclusion of pertinent graphs to support parameters determination and comparison
Document (12 marks):	Clear, concise and informative Creative, engaging and useful Adapted to AEP audience Individualised testing procedure Use of references that are fully quoted as footnotes APA website for guidelines for referencing: http://www.apastyle.org/

Assessment Task 4 – FINAL EXAM

This exam will test your knowledge about the diseases pathophysiology, the effects of exercise of the pathologies or symptoms and the potential interactions with medications. It will also test your practical skills for testing patients, analysing the data obtained using the test, prescribing exercise using data from the tests and information from scientific literature.

Submission of Assessment Tasks

Written assessment tasks must be handed in via Turn-it-in which can be found on the TELT Blackboard website. Penalties apply for late submissions.

Penalties for late submission of assignments – In cases where an extension has NOT been granted, the following penalties will apply:

1. For assignments submitted after **4.00pm** on the due date, a penalty of 50% of the maximum marks available for that assignment will be incurred.
2. Assignments received two (2) or more days after the due date **will not be allocated a mark**, however, these assignments **must** still be submitted to pass the unit.

Academic honesty and plagiarism

Plagiarism is using the words or ideas of others and presenting them as your own. Plagiarism is a type of intellectual theft and is regarded by the university as academic misconduct. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. The University has adopted an educative approach to plagiarism and has developed a range of resources to support students. The Learning Centre can provide further information via <http://www.lc.unsw.edu/plagiarism>.

Course schedule

Week	Date	Lecture 1 Mathews C	Lecture 2 Biomedical Theatre F	Lecture 3 Biomedical Theatre E	Tutorial	Laboratory
2	07/03-11/03	Introduction – Physiology of Ageing	Physiology of Ageing	Exercise testing and prescription in ageing	Exercise testing in clinical population	Pulmonary function assessment
3	14/03-18/03	Exercise testing and prescription in ageing	Respiratory disorders	Asthma	Exercise testing in metabolic diseases	Introduction to exercise testing
4	21/03-25/03	Chronic obstructive pulmonary diseases	Chronic obstructive pulmonary diseases	Cystic fibrosis	ECG	Introduction to exercise testing
5	28/03-01/04	Rehabilitation in respiratory diseases	Rehabilitation in respiratory diseases	From obesity to the metabolic syndrome		Introduction to exercise testing
6	04/04-08/04	From obesity to the metabolic syndrome	Insulin resistance and type 2 diabetes	Insulin resistance and type 2 diabetes		Testing Aerobic capacity
7	11/04-15/04	Rehabilitation in metabolic diseases	Rehabilitation in metabolic diseases	Endothelial dysfunction		Testing Aerobic capacity
8	18/04-22/04	Hypertension	Mid semester exam	Good Friday		Testing Aerobic capacity
9	02/05-06/05	Atherosclerosis	Coronary artery diseases	Myocardial infarction		Testing metabolic adaptations
10	09/05-13/05	Peripheral arterial diseases	Chronic heart failure	Chronic heart failure		Testing metabolic adaptations
11	16/05-20/05	Immune system and exercise	Immune system and exercise	HIV: pathophysiology and rehabilitation		Testing metabolic adaptations
12	23/05-27/05	Cancer: pathophysiology	Cancer: complications	Rehabilitation in cancer	Report preparation	
13	30/05-03/06	Rehabilitation in cancer survivors	Rehabilitation in paediatric Cancer	Revision		

Resources for students

UNSW Library

The University Library provides a range of services to assist students in understanding how to identify what information is required for assignments and projects; how to find the right information to support academic activities; and how to use the right information most effectively.

<http://www.library.unsw.edu.au>

Reference Services

For basic reference enquiries come to the Level 2 Service desk, call 9385 2650, or email libraryinfo@unsw.edu.au. If your enquiry is more detailed you will be referred to a subject specialist who can provide a more in-depth response.

Online Tutorials

The ELISE tutorial <http://elise.library.unsw.edu.au/> is a beginners tutorial to help give you the basic knowledge about dealing with information appropriately.

The new Library Online Information Skills Tutorial

<http://info.library.unsw.edu.au/skills/tutorials/InfoSkills/sitemap.htm> is a task-based approach to information literacy and the skills you need to be effective. It contains modules on searching databases (which include videos and screen captures), evaluating different types of resources like peer-reviewed journals and websites and citing references.

The ELISE postgraduate tutorial <http://pgelise.library.unsw.edu.au/> will help you develop your information skills to advanced undergraduate level. The five modules will step you through the fundamental processes of research and information seeking, they cover; selecting and searching, finding and using and critically evaluating all sources of information

Subject Guides

The Subject Guides <http://info.library.unsw.edu.au/web/guides/guides.html> are designed to be your starting place for research, or for when you have a topic and not much else. These bring together the core web and print resources in one place and provide a one click portal into the online resources.

How to use Guides

The How to use Guides <http://info.library.unsw.edu.au/skills/howto/howto.html> are excellent step-by-step guides on how to use the main library tools, the databases and catalogue. Guides have screen captures, FAQs and video footage of actual searches.

Database Help sheets

The Database Help sheets <http://info.library.unsw.edu.au/skills/helpsheets.html> include cheat sheets for specific databases. They help you learn the tips and tricks of individual databases.

Textbooks (Recommended)

Textbook 1: Brooks G.A., Fahey T.D. and Baldwin K.M. (2004). Exercise Physiology, human bioenergetics and its application. McGraw-Hill. 4th Ed.

Textbook 2: Hampton R.J. (2008). The ECG made easy. Churchill Livingstone Elsevier. 7th Ed.

Textbook 3: LeMura L.M. and von Duvillard S.P. (2004). Clinical Exercise Physiology: Application and Physiological Principles. Lippincott Williams and Wilkins. (Purchase at the bookshop, Also in special reserve)

Textbook 4: Ehrman J.K., Gordon P.M., Visich P.S. and Keteyian S.J. (2003). Clinical Exercise Physiology. Human Kinetics. (Purchase at the bookshop, Also in special reserve)

Textbook 5: American College of Sports Medicine (2006). ACSM's Guidelines for Exercise Testing and Prescription. Lippincott Williams and Wilkins. 7th Ed

Course evaluation and development

Every year, feedback from the student is collected through the Course and Teaching Evaluation and Improvement (CATEI) organised online by UNSW. This evaluation and feedback are used to constantly improve the course content and make it more relevant to the students. Significant changes are then communicated to the following cohort of students.

This year additional groups' size for the labs have been reduced to provide a more hands-on experience to the students. More material is provided to support the learning experience during the labs and allow more focus on the clinical skills that needs to be developed during the labs. Selected specialists have been invited to participate to this course by providing lectures on specific populations.

Occupational Health and Safety

Class activities must comply with the NSW Occupational Health & Safety Act 2000 and the Occupational Health & Safety (OHS) Regulations 2001. It is expected that students will conduct themselves in an appropriate and responsible manner in order not to breach OHS regulations. Further information on relevant OHS policies and expectations is outlined at: http://www.hr.unsw.edu.au/ohswc/ohs/ohs_policies.html All students must come prepared for active participation in laboratories. No open footwear is permitted. No consumption of food is permitted in class.

Examination procedures and attendance requirements

Attendance is expected at all lectures, practicals and tutorials for this course. Attendance at all practicals, tutorials and clinicals will be recorded. Students who do not participate in these sessions for any reason other than medical or misadventure, will be marked absent and will be awarded a grade of FAIL for the entire course. If absent for medical reasons, a medical certificate must be lodged with the lecturer within 7 days of the time period of the certificate's expiry. No consideration will be given after this time. Although lectures will be available on ilecture, student participation is encouraged in both the lectures and the tutorials and these are important to attend.

Deferred Exams

If you miss an exam for medical reasons you must supply adequate documentation (including a medical certificate). Your request for consideration will then be assessed and a deferred exam may be granted. You cannot assume you will be granted supplementary assessment. The deferred exam may include a significant oral element. ***It is intended that supplementary exams for School of Medical Sciences courses in Semester 1, 2011 will be held in the week commencing Monday 11th July, 2011.***

Special consideration in the event of illness or misadventure

Please note the following Statement regarding Special Consideration.

If you believe that your performance in a course, either during session or in an examination, has been adversely affected by sickness, misadventure, or other circumstances beyond your control, you should notify the Registrar and ask for special consideration in the determination of your results. Such requests should be made as soon as practicable after the problem occurs. **Applications made more than three working days after the relevant assessment will not be accepted except in TRULY exceptional circumstances.**

The decision to allow a student to sit for a supplementary assessment is made by the Course Authority or the Assessment Review Group. You will know if you are offered a supplementary exam if you have a WC grade for a course. You are required to contact the course convenor within 3 days because it might be necessary to arrange details of the further assessment. If a student fails to contact the course convenor within the specified time, a failure in the course may be recorded.

The form of the supplementary assessment will be determined by the Course Authority or the Assessment Review Group and may not necessarily be the same as the original assessment.

You must make yourself available for the supplementary assessment. In most cases, supplementary assessments are held outside of University sessions. Travel arrangements that have been made in anticipation of passing an examination will not be an acceptable excuse for failing to attend a supplementary assessment. If you fail to attend the supplementary assessment, a failure in the course will be recorded.

When submitting a request for special consideration you should provide all possible supporting evidence (eg medical certificates) together with your student number and enrolment details. Consideration request forms are available from Student Central in the Chancellery or can be downloaded from the web page linked below. Note that normally, if you miss an exam (without medical reasons) you will be given an absent fail. If you arrive late for an exam no time extension will be granted. It is your responsibility to check timetables and ensure that you arrive on time.

Students who apply for consideration to Student Central must also contact the Course Convenor immediately. All applications for Special Consideration will be processed in accordance with UNSW policy (see: <http://my.unsw.edu.au/student/atoz/SpecialConsideration.html>). If you miss an assessment and have applied for Special Consideration, this will be taken into account when your final grade is determined. You should note that marks derived from completed assessment tasks may be used as the primary basis for determining an overall mark. Where appropriate, supplementary examination may be offered, but only when warranted by the circumstances.

Student equity and diversity issues

Students requiring assistance are encouraged to discuss their needs with the course convenor prior to, or at the commencement of the course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (EADU) (9385 4734). Further information for students with disabilities is available at <http://www.studentequity.unsw.edu.au/disabil.html>