



NUI Galway
OÉ Gaillimh



HANDBOOK 2019-2020

**MSc in Exercise Physiology
and its Application in Therapy**

Discipline of Physiology, NUI Galway

**Academic Coordinator
Dr. Ananya Gupta**

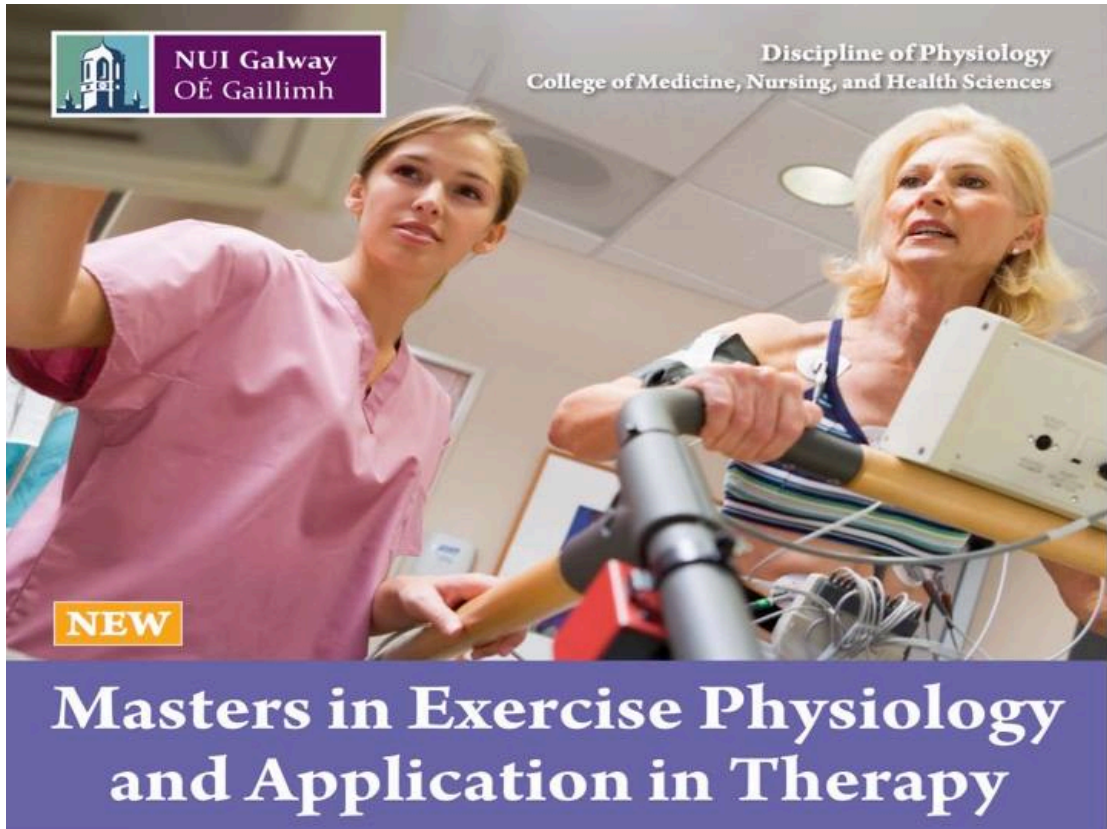


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Welcome

I would like to take this opportunity to welcome you to the MSc in Exercise Physiology Program, in the Discipline of Physiology.

Physiology is primarily affiliated with the College of Medicine Nursing and Health Sciences, but also play a very active role in the Science Faculty. Physiology covers all aspects of human Biology from your heart, your mind, your body as a whole and how this affects your life, it is a multidisciplinary approach to studying human biology. The Discipline has built a reputation for teaching and research excellence and is committed to innovation and the development of a knowledge-based society, both in our region and nationally.

The ethos of the Discipline has always been to combine a thorough grounding in Physiology as an academic subject, with a practical focus in preparation for careers in the field. Students learn about Physiology, and are also trained in the important core competencies. Faculty members in the Discipline are also actively involved in research. Research opportunities range from the molecular level, to the cellular level, to investigation of physiological processes at the level of the whole body.

The exciting new Masters program in **Exercise Physiology and its Application in Therapy** is the first of its kind in the West of Ireland. This course will provide a full and comprehensive understanding of the integrated physiological responses to exercise, evaluation of fitness levels and exercise prescription according to individual needs. Upon completion, graduates will be able to gain accreditation from (Register of Exercise Professionals) REPs Ireland and American College of Sports Medicine (ACSM) and work in the emerging area of exercise physiology and exercise prescription in health and as therapy.

In this course, you will develop an advanced knowledge of exercise physiology including a full and in-depth understanding of physiological processes and changes that occur during routine exercise and during training. You will understand how these changes are beneficial to general health and fitness. You will develop knowledge of the methods of evaluation that can be used to assess these changes, to evaluate fitness levels and risk factors of clients and to plan and prescribe an exercise program or protocol that will be beneficial to the individual in health and in certain chronic disease states. You will also have an opportunity to complete a research project in the area of Exercise Physiology.

I hope that your time here at NUI Galway as an MSc (Exercise Physiology) student will be most productive and enjoyable.

Yours sincerely

Dr. Ananya Gupta,

Academic Coordinator

Key Contact:

Academic Coordinator

Dr. Ananya Gupta

ananya.gupta@nuigalway.ie

Head of Discipline, Physiology

Prof. Antony Wheatley

antony.wheatley@nuigalway.ie

Physiology Administrative Officer

Ms. Claudia Flaus

claudia.flaus@nuigalway.ie

For all queries related to the course please contact your **academic coordinator** for assistance.

KEY DATES

Course start: 9th September 2019

Exercise is Medicine Symposium – 28th September 2019
(Compulsory attendance on campus for all students)

Date for returning research project choices: 20th January 2020

Hands on training module: 11th May – 29th May 2020

Project proposal: 8th June 2020

Research Project dates: 15th June – 15th August 2020

Project submission: 28th August 2020

Poster presentations: 19th September 2020

ACSM exam preparation workshops: June-July 2020

(Part-time students registered for the two-year course please contact your course coordinator via email for details of program and dates)

Course Description:

Course Overview

This unique course will enable students to –

- Develop knowledge of EXERCISE PHYSIOLOGY and EVALUATION OF FITNESS
- Learn to plan and provide an EXERCISE PROGRAM to healthy clients and as THERAPY in certain CLINICAL settings
- Obtain PROFESSIONAL RECOGNITION from REPs Ireland/ACSM
- Pursue a career as an EXERCISE SPECIALIST/THERAPIST



In this course, students will develop an advanced knowledge of exercise physiology including a full understanding of physiological processes and changes that occur during different types of exercise. Students will understand how these changes are beneficial to general health and fitness. Students will have a clear understanding of exercise testing and prescription in health and in certain chronic disease settings.

Topics featured in the lecture series include nerve-muscle physiology, cardio-respiratory physiology, kinesiology, integrated physiological responses to exercise and methods of evaluation, metabolism and nutrition in exercise, scientific principles of exercise prescription, methods of physiological assessment during exercise in healthy and clinical populations. Students will gain hands on experience in conducting exercise tests and physiological assessment of fitness.

Semester 1-2 will be taught through lectures and flipped classroom tutorials. All modules (1-5) will be available online via podcasts and will be delivered via the medium of blackboard. Online students will engage with pre-recorded lectures on blackboard. All students will engage with continuous assessments. Students will be assessed during each semester by continuous assessments and end of semester exams. In module 6 in semester 2, students will attend a three week long hands-on training workshop to gain practical experience in exercise testing and physiological methods of evaluating performance and exercise prescription and application of their knowledge. Students will also attend a two-day workshop on professionalism and learn about the roles and responsibilities of an exercise specialist. On successful completion of Semester 1-2 student will be

eligible for a Postgraduate Diploma. Students will also be eligible for accreditation and registration offered by REPs Ireland and American College of Sports Medicine (ACSM).

In semester 3, students will complete a research project on a related topic under the supervision of a member of faculty. A list of projects will be made available to the students towards the end of semester 1. Students can then contact supervisors to obtain more details about the proposed work. At the beginning of semester 2 students will attend a research methods workshop in which they will learn the basic principles of conducting scientific research, data collection, data management and analysis and presentation of scientific data. Students will be made aware of bioethical issues involved in research. At the end of the workshop, the students will prepare and present a plan for their proposed research project. Ethical approval will be obtained in advance from the College of Medicine Research Ethics Committee for each project offered. The students will have 8 weeks to complete their project. During this time they will interact closely with their supervisor. They will also be in contact with the course Academic coordinator for help and guidance whenever necessary. The students will submit a dissertation or thesis report of their project, which will be presented to staff followed by an interview. Student will receive a Masters degree on successful completion of all 3 semesters and successful defense of their project dissertation. At the end of semester 3 there will be a one-day conference organized by the course Academic coordinator where students will have an opportunity to showcase their work.

Course Learning Outcomes

Course learning outcomes (CLO) are grouped into three levels, knowledge-based outcomes, intellectual advancement as well as transferrable and professional skill acquisition. At the completion of the one-year full time program, it is expected that students will be able to:

Knowledge – Based Outcomes

- CLO1. Discuss functional musculoskeletal anatomy and kinesiology its role in movement and exercise
- CLO2. Describe the individual and integrated physiological responses to different types of exercise.
- CLO3. Explain the importance of metabolism and nutrition in maintaining an effective exercise program

Intellectual Outcomes

- CLO4. Assess the physiological responses of an individual during exercise and apply this information to the design of a suitable and relevant exercise program.
- CLO5. Apply knowledge of the adaptations to chronic exercise to provide a rationale for the provision of exercise programs to improve and maintain specific aspects of health and fitness.
- CLO6. Design an exercise program that meets the needs of individuals in consideration of current, best-practice guidelines, risk category and the exercise capacity, tolerance and motivation of the individual.
- CLO7. Evaluate the role of exercise training/rehabilitation in patients with chronic disease and recommend appropriate strategies to implement exercise as a therapeutic tool.

Transferrable Knowledge and Professional Outcomes

- CLO8. Plan and perform a research project based on evaluation of fitness, exercise testing and prescription
- CLO9. Outline occupational roles and responsibilities as an exercise specialist and personal trainer.
- CLO10. Recognize and describe the professional issues associated with the provision of exercise physiology services.

Course Outline

The MSc in “Exercise Physiology and its Application in Therapy” is a full time, 1-Year program of academic study (NFQ level 9). The successful completion of the program requires fulfilling **90 ECTS** including **60 ECTS** of required coursework delivered in 6 compulsory modules, **5 ECTS** of elective course and **25 ECTS** by completing an independent research project and dissertation.

The following are the requirements for the successful completion of the course: 1) 80% attendance at lectures, laboratories, workshops and tutorials, 2) completion of a dissertation, and 3) obtaining minimum passing grades in all module examinations and continuous assessments.

Students are required to complete 65 ECTS in coursework including 60 compulsory or core module ECTS in pre-determined modules and their choice of elective modules in relevant, related topics totaling 5 ECTS.

The compulsory/core modules are as follows (10 ECTS each):

Semester 1

Module 1

ET1500: Introduction to Exercise Physiology and Biomechanics

Module 2

ET1501: Integrated Physiological responses to Exercise

Module 3

ET1502: Metabolism and Nutrition in Exercise, Endocrinology and Toxicology

Semester 2

Module 4

ET1503: Physiological evaluation of Exercise, Principles of Exercise Testing and Exercise Prescription

Module 5

ET1504: Application of Exercise in Therapy in health and disease

Module 6

ET1505: Exercise Physiology laboratory and workshops

Approved Elective Modules

Semester 3

Module 7

ET1506: Research project and Dissertation

Figure 1: Program Overview and Module Structure

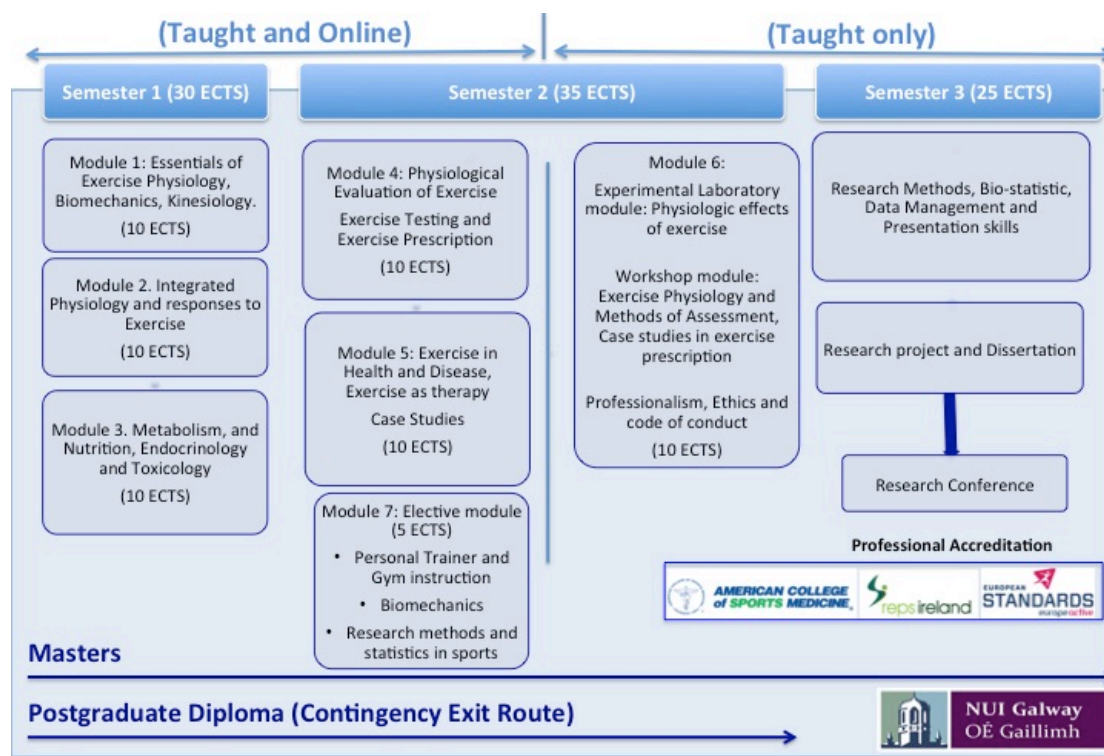


Table 1: Overview of compulsory and elective modules in the proposed MSc program, their weight in ECTS and semester of scheduled activity.

Module Name	ECTS	Semester	Module coordinator
Compulsory modules			
Essentials of Exercise Physiology, Biomechanics and Kinesiology	10	1	Karl McCullagh
Integrated Physiologic responses to Exercise	10	1	Ananya Gupta
Metabolism and Nutrition in Exercise, Endocrinology and Toxicology	10	1	Nicole Burns
Physiological Evaluation of Exercise, Exercise Testing and Prescription	10	2	Ananya Gupta Michael Newell
Exercise in Population Health and application as therapy	10	2	Ananya Gupta
Physiological effects of exercise, exercise testing and prescription, professionalism (Laboratory and Workshop module)	10	2	Ananya Gupta
Research methods, project and Dissertation	25	3	Ananya Gupta and Antony Wheatley

Module Name	ECTS	Semester	Module coordinator
Approved Elective Modules			
1 Personal Trainer and Gym Instruction	5	2	Kathy Hynes
2 Introduction to Research Methods (MD550)	5	2	Michael Newell
3 Statistics for Exercise and Sports (MD551)	5	2	Michael Newell
4 Neurophysiology (SI209) *	5	1	Karen Doyle

(* Registration to this module is available upon request, please contact your course coordinator ananya.gupta@nuigalway.ie for details)

Assessments

Each module is assessed independently via one continuous assessment exam and assignment and one end of semester exam. The lab and workshop module is assessed via preparation of laboratory reports and completion of assignments. The Research project is assessed based on completion of a research project, submission of a written thesis and presentation.

Academic Calendar

Semester 1

Module 1: September 9th – October 2nd

ET1500: Introduction to Exercise Physiology and Biomechanics

Module 2: October 7th– November 4th

ET1501: Integrated Physiological responses to Exercise

Module 3: November 4th – November 29th

ET1502: Metabolism and Nutrition in Exercise, Endocrinology and Toxicology

Semester study week: December 5th – December 10th 2019

Semester 1 exams will be held between December 12th – 16th 2019

Semester 2

Module 4 January 13th – 25th February

ET1503: Physiological evaluation of Exercise, Principles of Exercise Testing and Exercise Prescription

Module 5: 25th February – 10th April

ET1504: Application of Exercise in Therapy in health and disease

Semester study week: April 10th – April 22nd 2020

Semester 2 exams will be held between April 24th – April 30th 2020

Module 6: May 2020

ET1505: Exercise Physiology laboratory and workshops – This is a hands-on module and is compulsory to attend on campus. The dates and timetable for this module will be available in January 2020.

Approved Elective Modules (Semester 2 modules only)

Semester 3

Module 7: June-August 2019

ET1507: Research project and Dissertation

Module Description

Semester 1 (30 ECTS)

Module 1: Introduction to Exercise Physiology and Biomechanics (10 ECTS)

In this module the student will obtain a clear and comprehensive understanding of applied / functional anatomy, including relevant important surface anatomy and normal / abnormal patterns of range of movement of joints. Student will learn about the structure function relationship of nerves, muscles, joints and connective tissue and its relevance to movement and exercise. The student will also gain an understanding of the basic principles of biomechanics pertinent to movement and exercise, injury and rehabilitation.

Module Coordinator:

Dr Karl McCullagh

Contributors:

Prof. Gary Duffy

Dr. Ananya Gupta

Dr. Brian McDonagh

Module Learning Objectives (MLO):

Upon completion of this module students should be able to discuss the following concepts -

1. Discuss the general anatomy of the human body
2. Outline musculo-skeletal anatomy - structure of bones, muscles and ligaments
3. Explain the biomechanical principles of movement
4. Discuss the function of 3 types of muscle in the human body (skeletal, smooth, cardiac)
5. Explain the principles of kinesiology: the joint actions as a result of muscular action.
6. Outline functional contributions of different types of muscles to movement and exercise.
7. Discuss the short and long term effects of exercise on bone and muscles.

Teaching and Learning activities: This module will be taught through lectures and tutorials supported by online self-learning exercises.

Assessment: One MCQ based continuous assessment at the end of module and one end of semester paper exam

Recommended Textbooks:

MAIN TEXTBOOK

1. **Exercise Physiology: Nutrition, Energy, and Human Performance, Eighth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-451-19155**
2. Anatomy & Physiology: Foundations for the Health Professions, Roiger, 1st Edition.
3. Essentials of Exercise Physiology, Fifth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-4963-0209-0
4. Biomechanical Basis of Human Movement. Fourth Edition. Hamil, Knutzen, Derrick.
5. Biomechanics of Sport and Exercise 3rd Edition (eBook With Web Resource, PDF Version) Product
6. Kinetic Anatomy, 3rd Edition, Robert Behnke
7. ACSM's Introduction to Exercise Science, Third Edition, Jeffrey Potteiger
8. ACSM's Resources for the Exercise Physiologist: A Practical Guide for the Health Fitness Professional, American College of Sports Medicine
9. Vander's Human Physiology, Widmaier, 14th3. Vander's Human Physiology
10. Human Anatomy and Physiology Revealed. MHEducation. Online Learning tool. <http://anatomy.mheducation.com/html/human/paris.html>

Module 2: Integrated Physiological responses to Exercise (Cardio-Respiratory and Nervous system and role in exercise) (10 ECTS) In this module the student will learn about the normal functions of the various physiological systems, the individual and integrated responses that occur during exercise and adaptation to exercise, training and detraining.

Module Coordinator:

Dr. Ananya Gupta

Contributors:

Prof. Antony Wheatley

Dr. Brendan Higgins

Dr. Karen Doyle

Prof. Gary Duffy

Module Learning Objectives (MLO):

1. Explain the Gross anatomy of the heart
2. Outline the cardiac cycle and and flow of blood through the heart, regulation of stroke volume, heart rate and cardiac output, regulation of blood pressure.
3. Discuss the effect of physical activity on the cardiovascular system
4. Describe the struvture and function of the respiratory system
5. Explain the relationship between the cardiovascular system and respiratory system and how regular physical activity impacts them
6. Discuss short and long term effects of exercise on the cardio-respiratory system
7. Outline the main role and responsibilities of the nervous system
8. Explain the effect of exercise and training on the nervous system, improving motor fitness

Teaching and Learning activities: This module will be taught through lectures and tutorials supported by online self-learning exercises.

Assessment: MCQ based continuous assessment at the end of module, Case study reports and end of semester paper exam.

Recommended Textbooks:

1. **Exercise Physiology: Nutrition, Energy, and Human Performance, Eighth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-451-19155 (MAIN TEXTBOOK)**
2. Anatomy & Physiology: Foundations for the Health Professions, Roiger, 1st Edition.
3. Essentials of Exercise Physiology, Fifth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-4963-0209-0

4. ACSM's Introduction to Exercise Science, Third Edition, Jeffrey Potteiger
5. ACSM's Resources for the Exercise Physiologist: A Practical Guide for the Health Fitness Professional, American College of Sports Medicine
6. Vander's Human Physiology, Widmaier, 14th3. Vander's Human Physiology
7. Human Anatomy and Physiology Revealed. MHEducation. Online Learning tool. <http://anatomy.mheducation.com/html/human/paris.html>

Module 3: Energy Systems, Metabolism and Nutrition, Steroids, Endocrinology and Toxicology (10 ECTS)

In this module the student will obtain an understanding of the physiological principles related to metabolism and nutrition. The student will have knowledge of the energy and dietary requirements for different types of exercise. The student will know about the role of the endocrine system and hormonal regulation of performance. The student will have a basic understanding of the long-term effects of steroids and sports drugs.

Module Coordinator:

Dr. Nicole Burns

Contributors:

Dr. Amir Shafat

Dr. Eva Szegezdi

Dr. Ananya Gupta

Module Learning Objectives (MLO):

1. Explain the application of the energy systems in correlation to exercise goal
2. Outline the dietary role and common dietary sources for each of the six main nutrients (carbohydrate, fat, protein, vitamins, minerals, water).
Examples of food items in each of the four basic food groups, vitamins and minerals
3. Discuss the components of energy balance and basal metabolic rate
4. Apply various methods to estimate calorie requirements
5. Explain how to develop a healthy, balanced way of eating and healthy eating patterns
6. Discuss the energy needs for different activities/sports/fitness plans. The role of carbohydrate, fat and protein as fuels for aerobic and anaerobic exercise
7. Give description of hormonal response to exercise and their catabolic and anabolic role. Role of cortisol and side effects

Teaching and Learning activities: This module will be taught through lectures and tutorials supported by online self-learning exercises.

Assessment: MCQ based continuous assessment at the end of module, written assignment and one end of semester paper exam

Recommended Text Books:

1. **Exercise Physiology: Nutrition, Energy, and Human Performance, Eighth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-451-19155 (MAIN TEXTBOOK)**
2. Essentials of Exercise Physiology, Fifth Edition. William D. McArdle; Frank I. Katch; Victor L. Katch. ISBN: 978-1-4963-0209-0
3. Sports and Exercise Nutrition, Fourth Edition, William D. McArdle; Frank I. Katch; Victor L. Katch
4. Nutrition for Sport, Exercise, and Health, Book by D. Travis Thomas, Laura J. Kruskall, and Marie A. Spano

Semester 2 (35 ECTS)

Module 4: Physiologic Evaluation of Exercise and Fitness (10 ECTS)

In this module the student will learn about the physiological basis for assessment of fitness and responses to exercise and training. The candidate will be expected to understand the physiological principles underlying different types of training and to be familiar with current trends in training techniques and practically useful fitness assessment.

Module Coordinator:

Dr. Ananya Gupta

Contributors:

Dr. Michael Newell

Dr. Nicole Burns

Guest lecturers

Module Learning Objectives (MLO):

1. Apply correct methods for assessing health and fitness
2. Demonstrate clear understanding of risk categories and methods of risk assessment.
3. Outline the current ACSM or other recognized International guidelines for developing the different components of fitness
4. Outline various physiological methods of assessment of fitness and effects of exercise and exercise programming.
5. Explain the basic principles of training.
6. Demonstrate understanding of safe and effective use of various equipment

Teaching and Learning activities: This module will be taught through lectures, flipped classroom discussions and tutorials supported by online self-learning exercises.

Assessment: One MCQ based continuous assessment, one written assignment and one end of semester paper exam

Recommended Text books:

1. Physiological Assessment of Human Fitness (ISBN 978-0736046336). By Peter Maud, Carl Foster. 2nd Edition, Human Kinetics, 2006.
2. ACSM's Guidelines for Exercise Testing and Prescription (ISBN 978-1609139551) By American College of Sports Medicine, Lippincott Williams & Wilkins Publisher/Wolters Kluwer, Ninth Edition, 2014
3. Exercise Testing and Interpretation: a Practical Approach. Cooper and Storer. Cambridge University Press. (ISBN 9780521648424), 1st Edition, 2001.

Module 5: Exercise in population Health and exercise as therapy (10 ECTS)

The candidate will be expected to be familiar with the case for and against exercise in relation to disease prevention and treatment of disease and disability. In addition the candidate should understand the mechanisms of benefit, the guidelines and safety considerations for exercise prescription. The candidate will be expected to understand the physical and physiological differences between males and females and client specific differences in relation to exercise performance and injury / illness profiles.

Module Coordinator:

Dr. Ananya Gupta

Contributors:

Dr. Michael Newell

Guest Lecturers

Module Learning Objectives (MLO):

1. Explain the physiological principles associated with chronic conditions and physical inactivity.
2. Evaluate precautions needed and safety issues prior to beginning a program of exercise
3. Apply risk assessment criteria for each disease setting as laid out by the ACSM
4. Evaluate the physiological, psychological and sociological factors associated with participation and compliance for exercise intervention.
5. Demonstrate application of exercise as therapy in various chronic disease settings
6. Exercise prescription- a case based approach.
 - i. Cardiovascular disorders
 - ii. Respiratory disorders, COPD
 - iii. Diabetes
 - iv. Obesity
 - v. Arthritis
 - vi. Neurological disorders
 - vii. Cancer Rehabilitation
 - viii. Injury Rehabilitation

Teaching and Learning activities: This module will be taught through lectures and Flipped classroom discussions. There will be a series of seminars available on the application of exercise in therapy in different disease settings: Cardiovascular disorders, COPD, Diabetes, Neurodegenerative disorders, cancer rehabilitation and injury rehabilitation. The flipped classrooms will involve discussion and resolution of a set of predefined case studies in exercise testing and prescription as recommended by the American College of Sports Medicine (ACSM), which will expose the students to different disease settings, pre-existing conditions and how to assess risk factors and fitness. Students will then be able to prescribe appropriate levels of exercise or exercise programs in those settings.

To achieve this the students will be further supported by the following additional learning activities:

- i. Attend a series of seminars on the application of exercise in therapy in different disease settings: Cardiovascular disorders, COPD, Diabetes, Neurodegenerative disorders, cancer rehabilitation and injury rehabilitation.
- ii. Participate in flipped classroom discussions on the application of exercise therapy in health and disease.
- iii. Complete a written assignment on the application of exercise therapy in one of the key areas.

Assessment: One written assignment and quiz for continuous assessment, one case study report at the end of module and assessment via end of semester paper exam

Recommended Text books:

- ACSM's Exercise in Medicine: A Clinician's Guide to Exercise Prescription. Jonas and Phillips. Lippincott, William &Wilkins, Publisher (ISBN 978-1582557397), 1st Edition 2009.
- ACSM's Guidelines for Exercise Testing and Prescription (ISBN 978-1609139551) By American College of Sports Medicine, Lippincott Williams & Wilkins Publisher/Wolters Kluwer, Ninth Edition, 2014
- Exercise Testing and Interpretation: a Practical Approach. Cooper and Storer. Cambridge University Press. (ISBN 9780521648424), 1st Edition, 2001.
- Clinical Exercise: A Case-based Approach. By Melainie Cameron, Steve Selig, Dennis Hemphill. (ISBN 978-072953941), 1st Edition, 2011, Elsevier.
- Exercise Prescription - A Case Study Approach to the ACSM Guidelines. By David Swain, Brian Leutholtz. (ISBN 978-073606680). 2nd Edition.

Module 6: Laboratory methods in Exercise Physiology (10 ECTS) The aim of this module is to introduce the student to a variety of laboratory techniques used in exercise physiology, exercise testing and physiology research laboratories. The module focuses on the generic topics of ethics and safety, and on the reliability and validity of laboratory techniques used for the assessment of the physiological responses to exercise. The student will be able to obtain hands-on experience in use and application of various exercise testing techniques and gain knowledge and understanding of their practical applications. Students will learn about the roles and responsibilities of a personal trainer, ethics and code of conduct. Students will also learn about the Psycho-Social aspects of exercise and fitness. Students will also learn about the current ACSM guidelines for exercise prescription.

Module Coordinator:

Dr. Ananya Gupta

Contributors:

Dr. Michael Newell
Prof. Antony Wheatley
Ms. Catherine Loughrey
Ms. Barbara Coen
Dr. Louise Campbell
Dr. Nicole Burns

Module Learning Objectives (MLO): Upon completion of this module students should be able to-

1. Demonstrate knowledge and skills necessary for measuring various physiological responses during rest and during exercise.
2. Perform various experimental procedures involved in the assessment of body composition, fitness and exercise performance
3. Know the use, application and safety measures involved in the use of various exercise and exercise testing equipment.
4. Identify appropriate exercise testing procedures specific for various populations encountered in the field (Case Based study).
5. Obtain experience in aerobic and anaerobic exercise testing protocols.
6. Perform fluently all metabolic and power calculations involved in aerobic and anaerobic exercise testing.
7. Work independently in an exercise testing laboratory
8. Be aware of the roles and responsibilities of an exercise professional
9. Be aware of the *Code of Ethics and Conduct* as prescribed by REPs Ireland and ACSM.

Assessment: This module will be assessed through submission of laboratory reports at the end of each laboratory session and a final portfolio assignment involving development of a personalised exercise programme for a client.

Recommended Text books:

- Exercise Testing and Interpretation: a Practical Approach. Cooper and Storer. Cambridge University Press. (ISBN 9780521648424), 1st Edition, 2001.
- Physiological Assessment of Human Fitness (ISBN 978-0736046336). By Peter Maud, Carl Foster. 2nd Edition, Human Kinetics, 2006.
- Exercise Physiology Laboratory Manual. By William Beam and Gene Adams, McGrawhill publisher (ISBN 978-007802265), 7th Edition.

Module 7: Electives (5 ECTS) The complete list of approved elective modules available, are listed in Table 1.

Semester 3 (25 ECTS)

Module 8: Research methods, Research Project and Dissertation (25 ECTS)

This module serves as an introduction to scientific research and research methodologies that are commonly used in exercise physiology research. In this module learners are introduced to the key components of research and the steps needed to formulate a research question. The students then undertake an

independent research project under the supervision of a mentor. Particular emphasis is given on project design and execution, specifically on the application of exercise physiology laboratory techniques, selection and recruitment of participants to the study, research ethics and obtaining ethical approval from the research ethics committee, data collection and subsequent analysis and interpretation of data.

The topic of the research project will be decided upon by the student in collaboration with a primary supervisor and approved by the Academic Coordinator. Potential projects will be offered to the students at the end of Semester 1. Students will be required to submit their choices at the beginning of Semester 2. The chosen research project will be planned and proposed by the student at a workshop prior to the commencement of research work. The student will work closely with and under the supervision of his or her mentor to carry out the study. The student will have 8 weeks for collecting and analyzing data and 2 weeks for writing his/her thesis. The thesis will consist of an introduction comprising of up-to-date literature review on the topic, methodology used, process of selecting and enlisting study volunteers and inclusion criteria, rationale, planned activities, data collection, analysis and conclusion. The student will also be required to present his or her work to members of staff.

Module Learning Objectives (MLO):

- Apply appropriate research procedures to the acquisition of knowledge and solution of problems in exercise physiology
- Demonstrate the use of appropriate methodologies in the analysis and interpretation of data obtained in laboratory.
- Demonstrate clear understanding of the moral, ethical and legal issues that underpin best practice in dealing with human participants in research studies.
- Perform research to assess evidence related to concepts and hypotheses in exercise physiology
- Design and conduct experiments to investigate aspects of human physiological responses to exercise both in the laboratory and in the field.
- Understand and utilise a range of formal procedures applied to the acquisition of knowledge in exercise physiology
- Undertake safe and effective laboratory and field-work.
- Assess the functional fitness of sedentary and active people.
- Plan, design and execute a research project and communicate the results verbally and in written form.

Week 1: Research methods, Bioinformatics and Research proposal – this will be delivered via a workshop where students will be introduced to the research methods commonly used in a exercise physiology. Further the students will be reminded of the importance of ethical considerations in study design, data collection, storage and management, confidentiality and informed consent. Students will also learn about the methodologies used in data analysis and interpretation. Students will then be asked to present an outline proposal of the

project including hypothesis, recruitment of volunteers, inclusion criteria, planned activities, data collection and analysis.

Week 2: Selection and recruitment of study volunteers

Week 3-8: Data collection and Analysis

Week 9-10: Thesis preparation and submission

Assessment:

The module will be assessed on the Project proposal as outlined in planning and presentation, Project work completion, Supervisors Report, Thesis submitted, Thesis presentation and interview.

Recommended Text books:

- Research methods in physical activity. By Thomas and Nelson.
- ESSAs Student Manual for Health, Exercise and Sport Assessment. By Jeff Coombes & Tina Skinner.
- Student handbook for the course
- Relevant research papers as prescribed by the research supervisor.

Course Online Resources

The course is supported via a learning management system (LMS) or software application called **Blackboard**. This platform will be used to provide educational material and instructions to students to plan, implement, and assess a specific learning process. Blackboard will be used by the instructors of this course to deliver course content, provide assessment and quizzes, monitor student participation, and assess student performance.

Please familiarise yourself with blackboard and make sure you can access all the course material provided. Please make sure you check blackboard regularly for updates on new material added, announcements and instructions.

- **Announcements** : This is where course announcements are added
- **Information**: This is where the timetable, handbook etc are available
- **Learning Materials**: This section contains your lectures and notes provided by your instructors
- **Assessment**: This is where you will find your online exams
- **Online Study Portal**: This is your online study section.
- **Virtual classroom**: This is where you go for attending an online tutorial
- **Discussion Forum**: A class chat page
- **My Grades**: This is where you will be able to see your marks

Accreditation and Professional Recognition

The course is designed to fulfill all the requirements for the American College of Sports Medicine (ACSM), REPs Ireland and EHFA accreditation.

REPs Ireland is a **Register of Exercise Professionals in Ireland**.

REPs Ireland accepts exercise professionals onto the professional register when they fulfill the following criteria: Achieve qualifications and awards that meet industry standards & have been independently Quality Assured (This is the role of the approved educational institution).

Students graduating from an REPs approved course receive eligibility to register with REPS Ireland and are entitled to membership for one year from the date of course completion.

The industry standards used by REPs Ireland are based upon the European standards developed by the European Health & Fitness Association (EHFA).

<http://www.ehfa-standards.eu/?q=node/12>

Professional Accreditation



Graduates from this course will be able to register as an exercise professional and work as exercise specialists/therapist with full accreditation from REPS Ireland and ACSM.

Figure 2: Professional Qualification and Certification

Upon completion of the course students will receive a certificate of completion and will be eligible for registration with REPs Ireland. Students will be supported and guided in the application process for registration and professional exams for exercise physiologist and clinical exercise physiologist exams from American College of Sports Medicine.

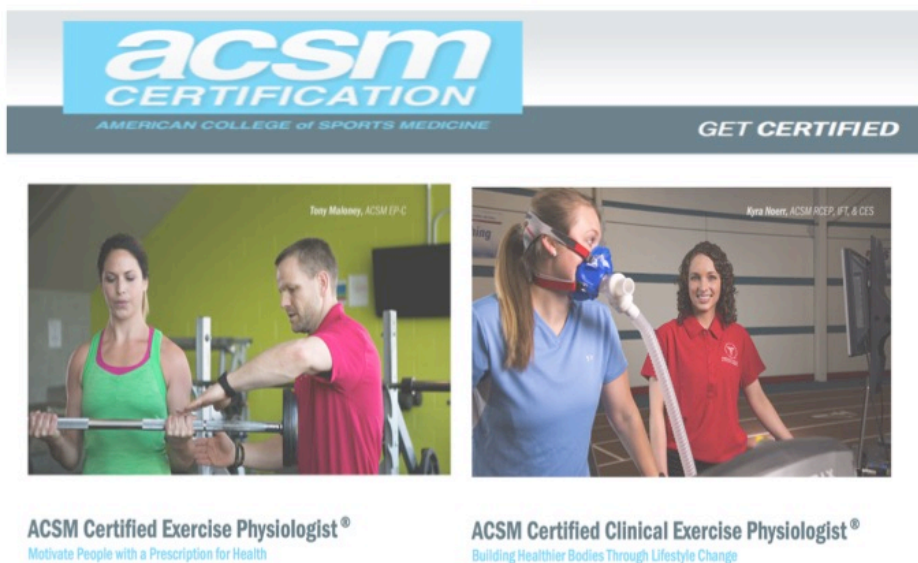


Figure 3: ACSM Certified Exercise Physiologist

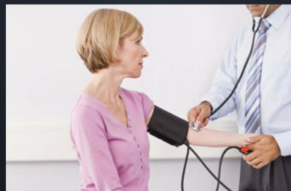
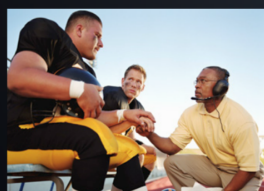
- **Course is designed in alignment with the ACSM recommendations and syllabus**
- **Graduates will be eligible for ACSM certification**
- **Students will be guided in their ACSM application process and exam preparation.**

Career path and Employment

With the increasing number of people living with chronic illnesses the demand for exercise physiologists capable of giving personal exercise advice that can improve the living standards of an individual is constantly growing.

Demand Now and in the Future


Employment of exercise physiologists is projected to grow 9 percent from 2015 to 2022



Duties of an Exercise Physiologist



Exercise Physiologists develop:

1. Fitness programs
2. Exercise programs



These programs help:

1. Patients recover from chronic diseases
2. Improve patient cardiovascular and respiratory function
3. Recover from injury or damage to muscles

Location

Exercise physiologists work in:

1. Hospitals
2. Leisure centres
3. Outpatient clinics
4. University laboratories
5. Nursing homes
6. Residential care facilities
7. Private practices
8. Physical education










Figure 4: Duties of an Exercise Physiologist

Upon successful completion of this course students will be able to work in areas such as:

- Health clubs, leisure centers and related organizations
- Public sports and recreation facilities
- Local public health Authorities and organizations
- Schools, further education and higher education institutions
- Independently as personal trainers and exercise specialist.

Graduates will also be eligible to pursue a career in research through structured PhD programs in Sport and Exercise Science and related areas in the Discipline of Physiology, NUI Galway.

Academic Integrity and Code of Conduct

The primary objectives of the University are the dissemination and advancement of knowledge and understanding through teaching, research, study and rational discussion.

Any student who enrolls for any course in the University in doing so accepts the objectives of the University and is giving a commitment, as a responsible individual and as a member of the University community, to behave in an appropriate manner.

The Student Code of Conduct offers guidelines as to the norms of behaviour that accord with the obligations of students, but where more specific requirements are in place, they are available on the University's web site. It should be noted that Students of the University cannot claim any privileged position in regard to the general law of the land.

Breaches of this Code and of any University regulations make students liable to the imposition of sanctions.

Broad Principles

In the broadest terms the University expects students to behave in a manner which ensures that the University can meet its legal, statutory and contractual obligations, that all students and staff are treated with dignity and respect, that all University property and facilities are used appropriately and that students uphold the good name of the University in their actions both on and off campus. The University will have due regard to a student's right to freedom of speech within the law and to the relevant University policies.

Rights and obligations of staff, students and others

- Every student and staff member has the right to be treated with dignity and respect.
- Students are expected to acknowledge the authority of the staff of the University, both academic and support staff, in the performance of their duties.

Academic Conduct

- Every student is expected to approach his/her academic endeavours with honesty and integrity.
- Each student shall comply with his/her academic programme requirements in terms of lectures, practicals, assignments and assessments and with all University registration, fee, library, use of computer facilities and examination regulations associated therewith.
- No student shall provide false or misleading information to or withhold relevant information from any party regarding his/her academic achievements.

General

Every student is required to behave in a manner which enables and encourages participation in the educational activities of the University and does not disrupt the functioning of the University.

The maintenance of the good name of the University is in the interests of all of the University community and, as the standing of the University depends largely on those who represent it, it is the duty of its students at all times to behave, both inside and outside of the University, in a way which does not bring discredit to the University.

This Student Code of Conduct does not purport to contain all of the regulations of the University. Where such regulations are made, information as to their content will be publicised and made available to the student body by posting them on the University website. It is incumbent on students to ensure they are familiar with the regulations applicable at any given time. Regulations are currently in place covering among other things such matters as:

- Enrolment and re-enrolment
- Admission to Courses and Examinations
- Procedures for the checking and appeal of examination results
- Plagiarism
- Use of various University facilities

Establishment and Financial Management of Clubs and Societies by Students

The observance of the Code, so far as it applies to the individual student, is his/her personal responsibility and, so far as it applies to recognised groups, is the responsibility of their duly appointed officers.

Breach of any of the regulations of the University will be dealt with either under the appropriate approved University procedure or the Disciplinary Procedure. Every student is required to cooperate with the disciplinary procedures outlined below. Failure to cooperate or failure to pay a fine or comply with a disciplinary sanction imposed for a breach of discipline (subject to any right of appeal applicable) is considered a breach of this Student Code of Conduct.

Use of Buildings, Facilities and Equipment

- Every student is expected to treat with respect the property, equipment and facilities of the University.

The detailed code of conduct and disciplinary procedure is found at <http://www.nuigalway.ie/codeofconduct/>