Department of Clinical Sciences and Nutrition

Master of Science

in

Exercise & Nutrition Science

Full-Time and Part-Time Taught Modular Masters Programme

Module Descriptor Outlines
Short Module Descriptors
Exercise & Nutrition Science

XN7515 Exercise & Health

The science of exercise and health is a rapidly expanding field. The module aims to develop a thorough knowledge and understanding of the evidence investigating the links between physical activity and health, skills for the measurement and evaluation of health-related fitness and examine strategies the promotion of exercise in a variety of school, community and workplace contexts. Module content includes: Exercise & Health: an overview; risk or benefit? Exercise, fitness and health; physiology of exercise; exercise in prevention and treatment. Exercise in cardiovascular health and disease. Exercise and weight control. Assessment of health-related fitness: aerobic capacity; body fat; blood pressure; strength; flexibility; screening procedures in community and workplace settings. Assessment of physical activity and energy expenditure (e.g. cardiopulmonary parameters – e.g. VO2, METS, BP, HR, etc), accelerometry, pedometers, etc. Exercise in health promotion – school, community and workplace. Critical review of recommendations of frequency, intensity, type and time of exercise for optimal health benefits (e.g. ACSM, DoH, etc). Occupational health and fitness.

XN7512 Research Methods & Data Analysis

This module aims to expose students to the essential elements in the process of conducting sound scientific research and develop skills in the key aspects of data handling and statistical analysis in preparation for the planning and completion of the Research Project.
Module content includes: Scientific parlance (hypothesis, concepts, operational definitions, dependent/independent variables), sampling procedures and measurement issues (reliability and validity). Research and data collection methods: experimental research (developing hypotheses, independent/dependent variables, controls, sample selection, study designs, and experimental validity); descriptive research (questionnaires and interviews, case studies); qualitative research (characteristics, procedures, methods of data collection, data analysis, and internal/external validity). The nature of research; scientific methods of enquiry, pure versus applied ways of problem solving. Developing the research problem; identifying a topic area, devising specific questions, discovering what is already known (reviewing the literature), determining feasible ways to answer the questions. Ethics in research. Introduction to data analysis software (SPSS for Windows). Establishing an SPSS database. Defining and transforming variables; data storage and retrieval. Data analysis for descriptive and experimental research; descriptive statistics. Describing data; measures of variability, correlation and multiple correlation, scatter plots and prediction analysis (regression). inferential statistics. Selecting appropriate tests (parametric or non-parametric), and types of statistical tests (chi-square; t-tests; one-way ANOVA & post-hoc tests; Wilcoxon, Mann-Whitney U). Repeated Measures ANOVA & Intraclass correlation; Factorial ANOVA. Limits of agreement analysis for method comparison and test retest reliability. Worked examples in SPSS.
XN7502  Physiology & Biochemistry of Metabolism

This module critically examines the major physiological and biochemical systems pertinent to human metabolism, with particular reference to exercise and to individual health.

Module content includes: metabolic requirements of tissues (e.g. liver, muscle, heart and brain); bioenergetics and energy transduction in cells; role of creatine phosphate; energy sources and pathways. Carbohydrate metabolism (glycolysis, glycogenolysis and gluconeogenesis); TCA cycle; substrate and oxidative phosphorylation. Dietary lipids (saturated, unsaturated and polyunsaturated fats; essential fatty acids; cholesterol); lipid metabolism – triglyceride and ketone body metabolism; phospholipid and cholesterol; adipose tissue metabolism; lipoproteins - role and turnover; lipids and health. Protein metabolism – amino acid catabolism and waste nitrogen; nutrition and protein metabolism; regulation systems. Metabolic control of lipids and carbohydrates - glucagon and insulin; metabolism in exercise and starvation.

XN7509  Nutrition in Health & Disease

The module explores the scientific principles that underpin nutritional requirements for health, the scientific basis for current nutrition guidelines and the nature of diet and its relationship to the health of different groups within the population. It also reviews policies which affect nutrition, food choice and related matters and aims to develop practical analytical skills in nutritional assessment.


XN7514  Sports Nutrition

This module aims to develop critical knowledge and understanding of sports nutrition by reviewing theoretical, research and practice-based work; to develop skills in critical analysis, particularly in relation to published research in this area; and to enhance students' perception of professional and ethical issues related to research and practice in sports nutrition.

XN7508  Performance Enhancement

This module explores contemporary methods of performance enhancement, giving insights and critical appreciation into the effectiveness of selected practises and substances. The module is designed for any student with a professional or personal interest in enhancing human performance irrespective of gender, age, ability or culture.
Module content includes: Biotechnology of performance enhancement. Role of performance enhancement within current and future sport and exercise contexts. Exercise issues: sports science of training; energy power systems; peak performance; paediatric training; exercise and immune function. Nutrition issues: macro nutrient intake for exercise; carbohydrate feeding; ergogenic properties of medium chain triglycerides; amino acid supplementation; micro-nutrient intake for exercise; creatine supplementation; anti-oxidants and vitamin supplements; mineral supplements; alkalising agents; hydration and electrolyte balance. Performance enhancement modalities and health implications.

XN7501  Physiology & Physical Performance

The module critically reviews the responses and adaptations of the physiological systems to physical activity. It also takes an evidence-based approach to discussion of current theories regarding the limits to human performance.
Module content includes: Homeostasis: rest, exercise and recovery integrative responses and control mechanisms. Physiology of anaerobic and aerobic metabolism: energy substrate utilisation; neurohormonal control mechanisms, thermoregulation mechanisms; fluid balance. Physiology of the cardiovascular, respiratory and neuromuscular systems during exercise; maximum oxygen uptake: measurement and evaluation; physiological limits to maximal aerobic physical performance; inter-relationships between workload and HR/BP/VO$_2$/VCO$_2$/VE. Resting and exercise ECG assessment and interpretation.

XN7506  Science of Weight Control

The module critically reviews contemporary issues in weight control and provides underpinning knowledge of the biochemical and physiological basis of metabolism. Methods of dietary and body composition analysis are critically reviewed in theory and practice together with an evidence-based approach to successful weight control through exercise and dietary regimes.
XN7521  Independent Study (Exercise Science)

Exercise science is a wide-ranging and interdisciplinary subject that may be considered from a variety of perspectives. The module enables students to take the lead on the subject content to be studied and to focus the 4,000-word written assignment on a specific self-selected topic. The topic and structure of the assignment must be agreed with the module tutor in advance. This may be, for example, a case study, a critical review of literature, a mini-project, etc. On completion of this module the student will have: (i) demonstrated critical application of in depth knowledge and understanding of an agreed exercise-related topic; (ii) utilised relevant research skills (e.g. literature review, data collection, analysis and communication) in the preparation of a written report; (iii) demonstrated the project planning and management skills required to complete a negotiated task to agreed deadlines and specifications.

The module requires tutorial attendance by arrangement with the module tutor.

XN7522  Independent Study (Nutrition Science)

Nutrition science is a wide-ranging and interdisciplinary subject that may be considered from a variety of perspectives. The module enables students to take the lead on the subject content to be studied and to focus the 4,000-word written assignment on a specific self-selected topic. The topic and structure of the assignment must be agreed with the module tutor in advance. This may be, for example, a case study, a critical review of literature, a mini-project, etc. On completion of this module the student will have: (i) demonstrated critical application of in depth knowledge and understanding of an agreed nutrition-related topic; (ii) utilised relevant research skills (e.g. literature review, data collection, analysis and communication) in the preparation of a written report; (iii) demonstrated the project planning and management skills required to complete a negotiated task to agreed deadlines and specifications.

The module requires tutorial attendance by arrangement with the module tutor.

XN7523  Research Project

Successful completion of all taught/compulsory modules; preparation of an approved research proposal, ethical approval
Following completion of six taught modules, MSc students are required to undertake a programme of personal research on a topic of relevance to exercise and nutrition science.
Projects may be laboratory-based in the university or workplace-based and may utilise a range of methodological approaches and traditions; whilst some projects will be experimental others will adopt more qualitative methods. It is envisaged that many of those students who are in employment will undertake projects in collaboration with their employer.
Throughout the research stage of their studies all students are under the guidance and direction of the Research Co-ordinator and an individually allocated supervisor. It is a responsibility of the Research Co-ordinator to maintain an overview of all students at the research stage to ensure that research projects are consistent with the aims and objectives of the programme. The module will consist of the submission of a project report and literature review.

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