Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Trinity Elective Proposal Exemplar

<table>
<tr><td>Module Title</td><td>Hacking Your Health: The Science of Exercise and Fitness</td></tr>
<tr><td>Module status</td><td>Trinity Elective Module</td></tr>
<tr><td>ECTS weighting</td><td>5</td></tr>
<tr><td>Student Workload</td><td>The module will follow a blended format. There will be 2 hours of face-to-face tutorials, with the remainder of the teaching material being delivered online.
<table>
<tr><th>Contact hours</th><th>Hours</th></tr>
<tr><td>Tutorial (face-to-face; students will submit questions for discussion to blackboard in advance to facilitate tutorial preparation).</td><td>2</td></tr>
<tr><td>Engagement with online learning resources</td><td>20</td></tr>
<tr><td>Self-directed study</td><td></td></tr>
<tr><td>Preparation for tutorial:</td><td>4</td></tr>
<tr><td>Reading</td><td>35</td></tr>
<tr><td>Personal reflection:</td><td>5</td></tr>
<tr><td>Assessment preparation:</td><td>25</td></tr>
<tr><td>Participation in discussion boards</td><td>5</td></tr>
<tr><td>Formative assessment (MCQ) including preparation</td><td>4</td></tr>
<tr><td>Total:</td><td>100</td></tr>
</table></td></tr>
<tr><td>Named Academic Coordinator

Secondary Academic Coordinator</td><td>Prof Áine Kelly
Discipline of Physiology, School of Medicine

Prof Y</td></tr>
<tr><td>School that will Host Elective</td><td>School of Medicine</td></tr>
<tr><td>Are other Schools/ Departments/Research Institutes involved in the delivery of the module? If yes, please provide details.</td><td>Discipline of Physiotherapy, School of Medicine.</td></tr>
<tr><td>Teaching staff involved in the delivery of the module</td><td>Prof Mikel Egaña
Prof Fiona Wilson
Prof John Gormley</td></tr>
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Module Learning Aims: (State clearly how they align with Trinity Elective principles (see above under *2. Objectives of a Trinity Elective*).	The personal and societal benefits of regular exercise are beyond dispute. On an individual level, exercise improves physical and mental wellbeing and lowers risk of non-communicable diseases such as cardiovascular disease, cancer and diabetes. On a societal level, a healthier population reduces the burden on health services and improves social capital, while participation in and viewership of sport facilitates social engagement and lifts the spirits of the communities we live in. However, physical inactivity of children and adults is both a global and a national societal challenge. From an Irish perspective, data from Trinity's TILDA and Growing Up in Ireland studies show that an alarming number of Irish children and older adults do not meet the recommended physical activity guidelines for good health, while the latest available data from the World Health Organisation (2013) show that only 31% of Irish adults aged 16 to 65 reach the recommended physical activity levels. Similar trends internationally have proven to lead to increasing incidence of life-limiting diseases. In this module, we will combine the expertise of researchers in the disciplines of physiology and physiotherapy to draw together elements of biology, exercise physiology, sports science, neuroscience and public health to describe the importance of exercise to health and wellbeing. We will use information drawn from large-scale international studies to describe how physical activity guidelines have been developed and how the growing evidence base is allowing these guidelines to become more granular and specific; from general guidelines for maintenance of cardiovascular health to specific exercise prescriptions that will lower the risk of development of hypertension, diabetes, dementia and cancer or act as a treatment for these conditions. We will discuss the relationship between physical activity and mental health and will also describe the fundamental physiological responses of the body to exercise in athletes and non-athletes. Low levels of exercise pose a major societal challenge: in this module, we will task students to consider the societal burden of ill-health due to sedentary behaviour, to critically evaluate the reasons for increasing sedentary behaviour, to evaluate government policy on exercise and activity in adults and children and to consider changes that can be made on a personal, community and national level to increase participation in exercise. We aim to make the module a personal and reflective experience for students; the students will apply their learning in this module to their own lives by monitoring their own physical activity patterns over the course of the module. This may encourage them to make healthier changes to their own lifestyles or to promote the importance of physical activity in their own peer groups and families. Thus, this elective fits the present call in that a) it addresses a key societal challenge b) it draws on and integrates knowledge, techniques and approaches from multiple disciplines c)it requires students to take an active and self-regulated approach to learning

	d)it exposes students to a range of teaching, learning and assessment methods, some of which are innovative.
Which Graduate Attributes are being developed in the module and how?	This module is designed to develop all four Graduate Attributes. **To think independently**: Students will be tasked to research and critically evaluate different methods of physical activity measurement, including recently-developed wearable technologies. They will learn to appreciate knowledge outside of their own fields of study, including physiological responses to exercise. This aligns with the attributes of thinking creatively, thinking critically, analysing and synthesising evidence and appreciating knowledge beyond their chosen field. **To communicate effectively**: Two of the summative assessments are designed specifically to develop different aspects of effective communication. a) Students will measure their own physical activity, thus will collect data that they must analyse and present in graphical form within a short report written in scientific style. This will introduce students who may not be studying a scientific discipline to some fundamentals of science report-writing and communication. b) Students will design a one-page infographic targeted at college students that will use the evidence-based physical activity guidelines to explain the benefits of exercise and to promote physical activity among the student population. This aligns with the attributes of presenting work through different media, connecting with people and having digital skills. **To act responsibly**: In this module, students will be challenged to consider their own exercise behaviour and the potential impact on their own health, as well as the societal dangers of modern sedentary lifestyles. In-depth knowledge of physical activity guidelines may alter students' own behaviour and may lead to communication of these guidelines among their families and peer groups. This aligns with the attributes of acting on the basis of knowledge and understanding, self-motivation and ability to take responsibility. **To develop continuously**: Students will be introduced to concepts in physiology, neuroscience, exercise science and public health that are likely to be new to them. This module also has an element of personal development through reflection. This aligns with the attributes of capability of adapting to change and committing to personal development through reflection.
Module Learning Outcomes (LOs): (State clearly how they align with Trinity Elective principles (see above under *2. Objectives of a Trinity Elective*).	On successful completion of this module, students should be able to: 1. Describe the key physiological responses to regular exercise and discuss fundamental biological differences between sedentary people, recreational exercisers and trained athletes. *Trinity Elective Principles*: foster reflection, inquisitiveness, skills of analysis and critical thinking; expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider implications/ consequences of the challenge/topic.

	Students will be introduced to concepts of physiological homeostasis and responses of physiological systems to exercise. They will consider the cardiorespiratory responses to different types and intensities of exercise and how they differ in unfit and fit people, including elite athletes – e.g. how does an elite sprinter differ from an elite marathon runner? 2. State the recommended physical activity guidelines, give an account of present government initiatives on activity and describe the historical development of guidelines based on scientific evidence derived from different international populations. *Trinity Elective Principle:* foster reflection, inquisitiveness, skills of analysis and critical thinking; expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider implications/consequences of the challenge/topic. Students will consider the global challenge and societal burden of inactivity and its implications and consequences. They will assess the evidence base underpinning physical activity guidelines including the evolution from recommendations of bedrest for cardiac patients in the 1950s (the worst health advice that could possibly have been given!), to today's advanced hospital and community-based cardiac rehabilitation exercise programmes. 3. Evaluate and justify the benefits of exercise to health and in the prevention of disease. *Trinity Elective Principle:* examine current and/or past critical issues using techniques and approaches from multiple disciplines. Students will assess the critical issue of sedentary behaviour as a risk factor for development of disease. They will also consider the impact of exercise on patients with chronic cardiorespiratory and metabolic conditions. The disciplines covered include physiology, public health, quantitative and qualitative research methods. 4. Propose and outline appropriate methods of assessing physical activity, exercise, strength and aerobic fitness on an individual and community level. *Trinity Elective Principle:* foster reflection, inquisitiveness, skills of analysis and critical thinking; expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider implications/consequences of the challenge/topic. A variety of methods are available to allow measurement of physical activity, including questionnaires and wearable technologies. Students will critique the validity, accuracy and utility of each. They will also assess how such data can inform public policy. 5. Assess their own physical activity using validated physical activity questionnaires and/or wearable devices and/or smartphone apps and produce a scientific report detailing this activity. *Trinity Elective Principle:* expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider

	implications/consequences of the challenge/topic; foster reflection, inquisitiveness, skills of analysis and critical thinking. Students will be challenged to produce a short scientific report based on original data, which is likely to be a new skill for many and will develop analytical skills and critical thinking. 6. Use their knowledge of evidence-based physical activity recommendations to produce a one-page infographic describing the benefits of regular exercise to college students. *Trinity Elective Principle:* expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider implications/consequences of the challenge/topic; foster reflection, inquisitiveness, skills of analysis and critical thinking. Students will be challenged to distil and condense their learning to produce an impactful visual tool that is accurate and informative
Proposed Mode/s of Delivery (fully online, blended, face-to-face – please refer to the above *Guide to Blended Delivery*)	Blended/Hybrid
Module Content	The module syllabus will cover the following content: •The fundamental physiology of exercise. •The physiological differences between sedentary people, recreation athletes and elite athletes. •The physical activity guidelines for health, the history of their development and present government initiatives to increase participation in sports and exercise •Methods of measuring physical activity, their advantages and disadvantages. •Biological mechanisms by which exercise decreases health risks. The module will run over one semester. Each week, the students will be provided with reading material at the appropriate level, without assuming any prior knowledge of the topic, that will prepare them to understand the material covered in the weekly online lecture. The material relating to the physiology of exercise will be integrated with an explanation of the development of physical activity guidelines and the efficacy of exercise in the prevention and treatment of disease. Students will be given a discussion topic and invited to contribute to the associated discussion on the online discussion board. Supporting tutorials will be held twice during the module. This syllabus aligns to the principles underpinning the Trinity Electives as follows:

	➢ examine current and/or past critical issues using techniques and approaches from multiple disciplines; Students will examine the relationship between exercise and health by integrating information from human biology, sports science, clinical practice, evidence-based medicine and public health. They will assess the evolution of physical activity guidelines from a historical perspective and consider the evidence base that led to their development. ➢ expose students to new domains of knowledge, methods of enquiry and epistemologies, and the wider implications/consequences of the challenge/topic; It is likely that many of the students will have a limited background, if any, in biological science or health sciences. By definition they will be exposed to new domains of knowledge methods of enquiry and epistemology. By considering exercise behaviour on a personal and a societal level they will be exposed to the wider implications and consequences of the topic. ➢ foster reflection, inquisitiveness, skills of analysis and critical thinking; Reflection will be fostered through assessment of the students' own physical activity; inquisitiveness, skills of analysis and critical thinking will be fostered by critical analysis of the reading material and integration of information from multiple disciplines and developed further by completion of the formative and summative assessments, which require data analysis and interpretation. ➢ engage students in learning opportunities in diverse/heterogeneous groups; While the content will be delivered mostly online, students will have two opportunities to engage in group learning; first, through participation in weekly online discussions and second, through small group discussions during face-to-face tutorials. Students will work in groups to prepare their practical report, further fostering groups and collaborative working skills. ➢ provide students with opportunities to develop the Trinity Graduate Attributes [think independently, communicate effectively, develop continuously, act responsibly]. See section above on page 5: all Graduate Attributes will be developed during this module
Teaching and Learning Methods	The teaching and learning methods will include online lectures and supporting materials, face-to-face tutorials, self-directed reading and participation in discussion boards. The mostly online nature of this module affords flexibility to students whereby they can choose when and where to engage with the learning

material. It also encourages, and indeed requires, an active and self-directed approach to learning. With this flexibility however comes challenges. To encourage continued effective engagement with the module, we will hold two face-to-face tutorials with students. The discussion boards form part of the formative assessment. They will be moderated by teaching staff and will provide another forum for engagement between teachers and learners, and within the learning group. Student to student communication will therefore be encouraged through the discussion boards.

Module Assessment Components

Assessment component	Learning Outcome	State Formative/ Summative	State Group/ individual	% weighting
Students will complete online quizzes each week that relate to the lecture material for that week.	1,2,3,4	formative	Individual	0%
Students will be asked to contribute to an online discussion board, where a new topic for discussion will be posted each week. Topic example: *Dr Robert H Butler once said "If exercise could be purchased in a pill, it would be the single most widely prescribed and beneficial medicine in the nation." Discuss this statement and its applicability to society today*.	1,2,3,4	formative	Individual	0%
Online examination: The main assessment of knowledge and understanding of course material will be through an online examination that will incorporate short answer questions, MCQs and EMQs.	1,2,3,4	Summative	individual	60%
Group Practical Report: Students will monitor their own daily physical activity using smartphone apps or wearable technologies over the course of the module. They will also complete a validated self-reported physical activity questionnaire. They will collate their data and then	4,5	Summative	Group	20%, including a peer mark of 5%

	work in small groups to produce a short scientific report of their analysis of their individual and mean data in the usual format (aims, introduction, methods, results, figures, discussion and conclusion).				
	Infographic (20%): Students will produce a one-page infographic in poster format to advertise the recommended physical activity guidelines and outline the evidence base of the benefits of physical activity to health and wellbeing. In the first year, this will be targeted to their peer group (third-level students); this may change in different years to target other groups e.g. children, parents, older adults etc. We plan to select the highest-quality infographic submissions and approach College Health and College Sports to use them as a health promotion tool.	2,3,6	Summative	Individual	20%
Re-assessment Process	The individual components will remain the same. The student will be asked to complete an essay in lieu of the group component.				
Indicative reading list (if available) 4-5 titles max.	Indicative journal articles listed below. Ekelund, U. et al. (2016) Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women Lancet 38 (10051): 1302-1310 Jakicic JM et al. (2015) Objective Versus Self-Reported Physical Activity in Overweight and Obese Young Adults. J Phys Act Health O'Donovan et al. (2010) "The ABC of Physical Activity for Health: a consensus statement from the British Association of Sport and Exercise Sciences." J Sports Sci. 28(6):573-91 Powell et. al. (2011) "Physical activity for health: What kind? How much? How intense? On top of what?" Annu Rev Public Health 32:349-65. Wilson, M.G. et al (2015) Basic science behind the cardiovascular benefits of exercise Heart 101:758-765 National Physical Activity Plan, Ireland (2016)				

Maximum Capacity (please provide details of particular physical capacity constraints, e.g., fieldwork requirement; requirement to access particular facilities in College with space constraints) Please also indicate the minimum numbers to run the module.	Max capacity (if applicable): 150 Min nos: 20
Please indicate the semester for delivery: Sem 1 or Sem 2 or both.	Semester 1
Are there any cohorts or programmes in SF or JS years that should be excluded from taking the Elective being proposed (because of overlap with core or optional modules that are part of a programme)?	No cohorts excluded
If approved, please confirm that this Trinity Elective will run for a minimum of four consecutive academic years.	I confirm this TE will run for a minimum of four consecutive years

If you have any queries in relation to this form please contact: conlonc2@tcd.ie