KINESIOLOGY 4C03: INTEGRATIVE PHYSIOLOGY OF HUMAN PERFORMANCE

Term: Winter 2017
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DESCRIPTION

A detailed analysis of the physiological factors that regulate human physical performance. Emphasis is placed on the body’s integrative response to exercise and the influence of physical training and altered environmental or metabolic conditions.

OBJECTIVES

The main objective of the course is to provide students with a detailed appreciation for the physiological processes that regulate energy supply and demand during exercise in humans, with a focus on skeletal muscle metabolism and cardiorespiratory function.

The course places a heavy emphasis on reading and interpreting scientific literature, including original journal articles and reviews. It is hoped that students will develop science communication skills by orally presenting findings from an original research study and writing a paper that concisely summarizes information on a topic of interest.

REQUIRED TEXT / READINGS

There is no textbook or printed courseware pack for the course. Required readings and other material will be posted to the course website on Avenue to Learn. It is expected that students will enter the course with a solid, fundamental understanding of exercise physiology, i.e., to a level developed after the introductory core course KINESIOLOGY 2CC3. Students may find it useful to review lecture notes and readings from the 2CC3 course related to specific topics that will be addressed in greater detail in 4C03.

TOPICS TO BE COVERED

1. Regulation of oxygen delivery and utilization during exercise
   *Key question: What limits maximal oxygen uptake during exercise?*

2. Fundamentals: Regulation of exercise metabolism and adaptation to training
   *Key question: What limits the lipid oxidation during exercise?*

3. Interval exercise training: Physiological, performance and health adaptations
   *Key question: How does interval training compare to traditional aerobic exercise?*

4. Altitude/hypoxia: Physiology, performance and the effect of training
   *Key question: Is altitude training beneficial for performance?*

5. Manipulation of the acute exercise response and chronic adaptation to training
   *Key question: Theory versus practice: What strategies work in the real world?*

EVALUATION

The following scheme will be used to determine the student's final grade. No changes to the grading scheme will be permitted under any circumstances.

1. Term test #1: 25%
2. Term test #2: 25%
3. Research presentation: 25%
4. Research paper: 25%

The term tests are cumulative will consist mainly of short answer questions and will be written during regularly scheduled class time (TBD). Details regarding the research presentation and research paper are outlined in Appendices A and B, respectively.

WEEKLY LABS/TUTORIALS: LABORATORIES AND STUDENT PRESENTATIONS

These sessions will usually involve a laboratory demonstration or student presentations. There will also be the opportunity for “hands on” experience as both a subject and investigator. The student presentation schedule depends upon the number of students enrolled in the course and will be finalized during the first two weeks of classes. Students are strongly encouraged to attend all sessions except in those instances where they are prevented due to illness or other legitimate reason, and to actively participate in discussions to enrich the overall learning environment.

DROP BOXES

Course drop boxes are located on the second floor of the IWC near IWC 224. Please do not place assignments in the administrative drop box located outside IWC 219C.
POLICY REGARDING DEFERRED TESTS AND EXAMS

Students who miss a term test for legitimate reasons such as illness may be allowed to write a deferred or "make-up" test. The format of any deferred test is similar to the regularly scheduled term test. The make up date for any missed date is the last day of classes for the term. In all instances, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science.

Students who miss a Registrar-scheduled final exam can apply to the Associate Dean’s office for permission to write in the deferred final exam schedule. In all cases, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science, for consideration of deferred examination permission. Under no circumstances will the instructor re-schedule a final exam for individual students.

MCMASTER STUDENT ABSENCE FORM

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons (e.g., religious, personal) must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to gibalam@mcmaster.ca. Then contact the instructor immediately (normally within 2 working days) by email/telephone/in person to learn what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam.

Note that the MSAF is typically not applicable owing to the evaluation system employed in the course, i.e., all components are worth 25% of the final grade. Absences lasting ≥3 days or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. The make up date for any missed test is the last day of classes of the term.

ACADEMIC INTEGRITY

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences (e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript reading "Grade of F assigned for academic dishonesty", and/or suspension or expulsion from the university). It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at: http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf

The following illustrates only three forms of academic dishonesty:

• Plagiarism (e.g. the submission of work that is not one's own or for which other credit has been obtained),

KIN 4C03 Winter 2017
• Improper collaboration in group work.
• Copying or using unauthorized aids in tests and examinations.

ONLINE LEARNING RESOURCES

In this course, we will be using Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone (905) 525-9140 ext. 28652 or email sas@mcmaster.ca. For further information, consult McMaster University’s Policy of Academic Accommodation of Students with Disabilities. http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf

MODIFICATIONS TO COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

USE OF COURSE MATERIALS

Course materials provided by the instructor are for use by students registered in this class only. Under no circumstances are these materials to be shared, posted, sold or disseminated in any manner. Recording of lectures is also prohibited without explicit written permission from the instructor.

EMAIL COMMUNICATION POLICY

For any correspondence related to this course, please use your @mcmaster.ca account and include “4C03” in the subject line, along with an appropriate salutation and signature. Messages that include attachments only without proper explanation in the text will not be opened and deleted.
APPENDIX A: STUDENT PRESENTATION GUIDELINES

The goal of this assignment is to provide students with experience presenting in front of a group. Depending on class size, four to eight student presentations pertaining to a specific topic will be arranged during a single tutorial session. Each tutorial session will have a single theme, however students are free to choose any research article that relates to the topic area. There is no specific “date range” in terms of publication year. Students may select a “classic” paper in the field, or a relatively recent publication, but the goal should be to present research that is significant and/or timely. The paper should address physiological mechanisms and not simply exercise performance.

At least one week prior to their scheduled presentation, each student must advise the course TA of the article they wish to present by delivering a pdf copy of the article by e-mail. Please note that it is not the responsibility of the TA to “vet” the article or gauge whether the article would make for a “good” presentation. Students are encouraged to contact their TA well in advance of their scheduled date as duplicate presentations will not be permitted. A copy of the PowerPoint presentation MUST be delivered to the TA by e-mail at least 24 hours (i.e., one week day, not including weekend days) prior to the scheduled presentation time. This will allow time for revision in case there are any problems associated with the presentation file, and also avoid unnecessary delays during the tutorial sessions. All presentations will be loaded in advance onto a single laptop computer that will be arranged and facilitated by the TA.

Each 10-min presentation should summarize the findings from one scientific study that has been published as an original journal article. Presentations will be evaluated with equal weight given to presentation style and the quality of the article critique.

Evaluation criteria and tips for an effective oral presentation:

Format (Overall style) = 50% of assignment mark, based on:
- keep on time
- speak in a strong clear voice
- show enthusiasm for topic area
- address audience rather than screen
- minimize word whispers (“ums” and “uhs”)
- use large, bold lettering on screen (i.e., at least 24 pt font)
- minimize use of text (e.g., use bullet points rather than full sentences or paragraphs)

Content (Evaluation of article) = 50% of assignment mark, based on:
- include brief introduction and relevant background information
- include clear statement of study purpose and hypothesis
- include an overview of research design and essential methodology
- focus on the key results and major findings
- use figures and simple tables to highlight key findings
- include succinct summary/conclusion or “Take Home Points” ©
- attempt to place findings in context with respect to the field of research
APPENDIX B: RESEARCH PAPER GUIDELINES

The topic of the research paper should broadly relate to the content of the course, however considerable latitude will be permitted in this regard. The paper could be an expansion of a topic discussed in class, or a topic not specifically addressed during lectures but one that is of interest to the student. Students are encouraged to consult with the instructor and start thinking about potential topics early in the term.

Key dates and submission procedures: Students must submit a one-page topic proposal (saved in pdf format) via e-mail to the course instructor by noon on the Friday before the mid-term break. Submissions prior to this date are encouraged. In addition to the student's name and student number listed at the top of the page, the proposal should consist of a tentative title, a ~100-word summary and five relevant references. Within one week of submission (not including the break week), the course instructor will either formally approve the topic proposal or suggest revisions by e-mail.

The final version of the research paper, based on an approved topic proposal, is due at noon on the last day of classes for the term. Late papers will be accepted for up to five days following the due date, subject to a grade reduction of 5% per day. This means that a paper submitted five days late would be subject to a late penalty equivalent to a 25% deduction. No extensions will be granted after the late submission deadline under any circumstances. Students must submit one electronic copy of the their research paper (in Microsoft Word and/or PDF format) by e-mail to the course instructor and one identical hard copy of their paper to the 4C03 drop box on IWC Level 2.

The research paper should introduce the topic, summarize important relevant literature, integrate the findings from various studies and highlight key issues that remain to be resolved. It is not sufficient to simply describe the results from a number of studies. Rather, a major objective for the student is to present his/her own view of the literature, and frame their ideas and opinions into a coherent message. The majority of information contained in the paper should come from primary research articles published in scientific journals. Secondary sources, such as review articles and textbooks, should be used sparingly but these can be effective to cite well-established or classic findings.

The entire document should be double-spaced with 1-inch margins around. Use Arial, Times or Times New Roman font in 12-pt size throughout. The main body of the research paper, excluding the abstract and references, should be six double-spaced pages in length or ~1500-2000 words depending on the inclusion of any figures or tables. Adhere strictly to the following page guidelines:

Page 1 (Abstract): This should be a 250 word concise summary of the research paper. Note: the abstract is not simply an introduction, but rather it should succinctly convey the key messages contained in the main text.
Pages 2-7 (Main text): Include a clearly defined introduction; a pertinent literature review using appropriate subheadings that attempt to integrate and interpret study findings; and a summary/concluding section that reinforces key points and highlights topics to be resolved and specific suggestions for future research initiatives. Cite references numerically in the text. Students are encouraged to make use of figures and/or tables, which are effective to highlight key findings and/or concisely summarize information (or simply aid the reader by breaking up the monotony of rows of text). These should be inserted directly into the main document and accompanied by an appropriate legend that concisely explains the material presented and acknowledges the source. If figures or tables are inserted in the main text, the word count should be reduced appropriately in order to meet the 6-page guideline. As a general rule, figures or tables should not take up more than ~20% of the total space allocated to the main text. Note there is no “one sized fits all” approach, and it is up to the student to determine what is the most appropriate manner in which to format their paper and convey their information.

Pages 8+ (References): Cite a minimum of 15 and a maximum of 30 references, which can include reviews as well as original articles. Cite references numerically in the text and in alphabetical order in the reference list, using the style recommended for American Physiological Society journals: http://www.the-aps.org/mm/Publications/Info-For-Authors/Composition#references

Tips for getting started and general evaluation criteria:

Begin by trying to find one or two review papers that are dedicated to your general topic area. Your instructor can be of assistance in this regard, or perform a PubMed search and include the word “review” as one of the search criteria (this will narrow the search results to review articles only). Review papers help direct you to the relevant body of scientific literature which has been published on various aspects of the topic, and should help you narrow or broaden the focus of your own research paper. Review articles are also a good source of references (i.e., primary journal articles which describe the results of original research studies). Following this initial search, try to sketch an outline of your intended research paper. What are the major sub-categories of the main topic that you plan to cover? Identify several potential key references for each area. Perform your own search for additional original articles. Finally, begin to develop the various sections of the paper in greater detail and be prepared to further expand or condense the topic depending on available information. Have a classmate or friend read an initial draft and offer suggestions for revision.

Similar to the evaluation of the research presentation, the research paper will judged on both “style” and “content” in equal measure, using the following general criteria:

**Style (50% of overall mark):** Based on literary presentation and writing style, including grammar, sentence structure and overall format.

**Content (50% of overall mark):** Based on scope and quality of scientific analyses, in terms of integration and interpretation of literature cited and insight into the topic.