1 INSTRUCTIONAL SUPPORT

1.1 Instructor
Instructor: John Runciman, Ph.D., P. Eng.
Office: THRN 1344, ext. 33072
Email: jruncima@uoguelph.ca
Office hours: TBA

1.2 Lab Technician
TBA

1.3 Teaching Assistants
NA

2 LEARNING RESOURCES

2.1 Course Website
Course material, news, announcements, and grades will be regularly posted on Courselink. You are responsible for checking the site regularly.

2.2 Required Resources
- Instructor Handouts, Check Courselink regularly.
2.3 Recommended Resources

- Instructor notes and handouts
- Journal Articles available through the library and the following texts will be referenced during the course:
  - *Introduction to Sports Biomechanics* - Analysing Human Movement Patterns, Roger Bartlett.

2.4 Additional Resources

Lecture Information: Lecture notes will not be routinely posted on the Course web site.

Lab Information: TBA

Assignments: TBA

Exams: TBA

Miscellaneous Information: NA

2.5 Communication & Email Policy

Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

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### 3 ASSESSMENT

#### 3.1 Dates and Distribution

- Assignment 1, due Week 5, 5%
- Project Proposal, due Week 6, 10%
- Assignment 2, due Week 9, 5%
- Final Seminar Presentation, Weeks 11 & 12, 20%
- Project Report, due Week 12, 40%
- Final Exam, 20%

#### 3.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the graduate calendar for information on regulations and procedures for Academic Consideration:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to
Passing grade: In order to pass the course. Students must obtain a grade of 50% or higher on the exam portion of the course.

Missed midterm tests: NA

Lab Work: You are responsible for completing all assigned laboratory work. If you miss a laboratory due to grounds for granting academic consideration or religious accommodation, arrangements must be made with the instructor to complete a makeup lab.

Late Lab Reports: Late submissions of lab reports will not be accepted.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course has been constructed to expose engineering graduate students to the concepts, tools and experimental methods encountered in sports engineering. The course will consist of weekly lectures and seminars where topics will be presented and assigned readings and other specific topics will be discussed. Lab training will be conducted for the equipment commonly encountered in this type of research, including motion analysis systems, force plate instrumentation, electromyography (EMG) equipment, and materials testing equipment. A term project will be a major focus for the course and a portion of discussions will also be used for discussing the preparation and conducting of this sports engineering research project. Format of this project may take either written paper format or experimental research and written report.

Prerequisite(s): Engineering background in materials, mechanics/biomechanics, dynamics and instrumentation is highly recommended

Co-requisite(s): NA

4.2 Course Aims

Upon completion of the course, students will be able to:

1. Apply advanced mechanics and engineering knowledge in identifying, formulating and solving sports related engineering problems
2. Select and use techniques, skills and modern tools necessary for research or professional practice in the sports engineering field
3. Communicate effectively to present the solution to the given project problem.
4. Demonstrate knowledge of relevant contemporary issues.
5. Understand the impact of the proposed engineering solutions in a global, economic, environmental, and societal context.
4.3 Graduate Attributes

NA

4.4 Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and project.

4.5 Students’ Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures, lab access and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.6 Relationships with other Courses & Labs

Previous Courses: NA
Follow-on Courses: NA

5 Teaching and Learning Activities

5.1 Timetable

Lectures:
3 hour lecture weekly

Laboratory:
Materials Testing, Biomechanics Laboratory and Instrumentation Labs will be scheduled as necessary

5.2 Lecture Schedule/ Course Content*

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<thead>
<tr>
<th>Week</th>
<th>Lecture Topics</th>
<th>Learning Outcomes</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction,</td>
<td>Global Understanding</td>
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<tr>
<td></td>
<td>Introduction to Sports Engineering including: objectives, techniques and future potential. Introduction to general technical aspects including: qualitative versus quantitative data, collection</td>
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and analysis of data, historic sports analysis methods, human / animal ethics and the psychology of performance improvement.

| 2-3 | **Mechanics**, Structural mechanics as it applies to Sports Engineering will be discussed including: deformation, energy storage, resonance, viscoelasticity. Related topics in basic fluid mechanics including laminar, transitional and turbulent flow behaviour, calculation of drag and the basics of flow induced resonance will be introduced. | Critical and Creative Thinking / Literacy |
| 4 | **Human Performance Physiology**, Energy expenditure, metabolic physiology, motor control and reflex neurophysiology, musculoskeletal mechanics and performance optimization. | Critical and Creative Thinking / Literacy |
| 5-6 | **Instrumentation**, Introduction of common sensors used in sports analysis including strain gauge, forceplate, motion analysis and EMG systems. Strengths, weaknesses and common applications will be discussed. | Critical and Creative Thinking / Literacy |
| 7 | **Instrumentation**, Data collection and analysis techniques / issues will be discussed including sampling, filtering, analysis methods, dealing with artefacts, communication and storage. | Critical and Creative Thinking / Literacy |
| 8 | **Physical Experimentation**, Techniques, applications, challenges, advantages / disadvantages, and short case studies will be discussed. | Critical and Creative Thinking / Literacy |
| 9 | **Modelling and Optimization**, Techniques, applications, challenges, advantages / disadvantages and short case studies will be discussed. | Critical and Creative Thinking / Literacy |
| 10 | **Applications, Wheelchair Athletics (time permitting)**, This lecture will examine the concepts involved in the analysis of basic wheelchair mechanics and finish with applications and examples of athletic wheelchair design and performance. | Critical and Creative Thinking / Literacy / Global Understanding |
| 11-12 | **Student Seminar**, | Communicating / Professional and Ethical Behaviour |

*Tentative, length of coverage and order of topics may be changed*
5.3 Lab Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic*</th>
<th>Due</th>
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<td>TBA</td>
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5.4 Other Important Dates

**Drop Date:** The last date to drop one-semester courses, without academic penalty, is the 40th class day for one-semester courses. Two-semester courses must be dropped by the last day of the add period in the second semester. Refer to the Graduate Calendar for the schedule of dates:
[http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml](http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml)

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6 LAB SAFETY

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible. If the laboratory rules are not followed, consequences will include removing student’s access to the lab. If this results in lab work not being completed, the student will receive a grade of 0.

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7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University’s policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources
The Academic Misconduct Policy is detailed in the Graduate Calendar: 
http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1687.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at: 
http://www.academicintegrity.uoguelph.ca/

The Graduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations which apply to graduate programs: 
http://www.uoguelph.ca/registrar/calendars/graduate/current/

Refer to the Graduate Calendar for the schedule of dates: 
http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/

9 RECORDING OF MATERIALS

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

10 RESOURCES

The Academic Calendars are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: http://www.uoguelph.ca/registrar/calendars/index.cfm?index