



Western
UNIVERSITY · CANADA

**SCHOOL OF KINESIOLOGY
FACULTY OF HEALTH SCIENCES
WESTERN UNIVERSITY**

**BIOMECHANICAL ANALYSIS OF DISCRETE SKILLS
KIN 3343B 2016/17**

Instructor: Dr. Volker NOLTE
Lectures: Mon 1:30 – 2:30
tba
Wed 1:30 – 3:30
tba

Office: Thames Hall Room 2142
Office Hours: Open door policy
Phone: 519-661-2111 ext 88385
Email: v nolte@uwo.ca

TA tba

LABORATORY SESSIONS:

Mon 2:30 – 4:30
Tue 4:30 – 6:30
Wed 4:30 – 6:30
Thu 10:30 – 12:30
Thu 2:30 – 4:30

- **Biomechanics Lab: Thames Hall 2125**
- **Computer Lab: Thames Hall 2115**

NOTE: All course information including grades, assignment outlines, deadlines, etc. are available via OWL.

COURSE DESCRIPTION

This laboratory-oriented course is designed to study discrete sport skills from a biomechanical view in theory, as well as through practical tests. Principles of dynamics, first-hand experience in systematic biomechanical analysis, and hands-on experience with instrumentation used in biomechanics will give the students specific understanding in sport techniques.

The course presents a quantitative approach to THE STUDY OF HUMAN ACTIVITIES OF DISCRETE NATURE by which individuals propel them or sport equipment over ground through air and water.

The activity is realized through one single sequence of movements that completes the sport task, for example jumping, throwing, golfing and diving.

COURSE OBJECTIVES

The goal of the course is to present and discuss biomechanics concepts that will be applied to discrete sport skills. By the end of the course students will comprehend kinematical and kinetical concepts in this area of sport and health. They will be able to apply them in practical research projects.

These goals will be reached by:

1. Familiarizing with related research literature.
2. Applying word processing and spreadsheet software programs.
3. Applying theoretical biomechanics concepts to practical research questions.
4. Evaluating and identifying appropriate research methods.
5. Planning and conducting biomechanical research.
6. Analyzing and evaluating the research data.

**REQUIRED
COURSE TEXTS**

- OWL site: <https://owl.uwo.ca/portal>
- McGinnis, P.M. (2013), Biomechanics of Sport and Exercise. Human Kinetics, Champaign IL.

**RECOM-
MENDED
READINGS**

- Some relevant journals and websites:
- International Journal of Sport Biomechanics; now called: Journal of Applied Biomechanics (Best source for Sport).
 - Exercise and Sport Science Reviews (Excellent reviews on selected topics)
 - Journal of Biomechanics (Good general source but quite technical)
 - Math review: <http://www.math.com/>
<http://www.purplemath.com>

**REQUIRED
EQUIPMENT
AND SUPPLIES**

IMPORTANT:

- Students will need a calculator with trigonometric functions. Please, bring your calculator to **ALL** lectures and **ALL** lab sessions along with paper, ruler, protractor, pencil and eraser!
- Each student needs two dedicated memory sticks for this class as electronic storage medium on which to record and backup your computer assignments and lab papers. **The memory stick is needed for all lab sessions. Mark the device clearly with your name and always bring it to the lab sessions!!** One of the memory sticks with all the data and a copy of the assignment report must accompany the binder that is handed in for marking the assignments. Since the memory stick will stay with the assignment, the student may need a second memory stick to continue their work in the lab.
- Each student must have a designated binder to collect all lab data and papers. The binder has to be brought to all lab sessions, so that the student can discuss the progress of the work with the TA.

**LABORATORY
SESSIONS**

- Laboratories will begin the week of September 12th, 2016. The laboratories include:
- Computer Usage: Word Processing, Spread Sheet, Tables, Graphs
 - Linear Kinematics and Kinetics
 - Angular Kinematics and Kinetics
 - Ground Reaction Force
 - Aerodynamics
 - Movement Patterns: vertical jumps, drop jumps, counter movement jumps, striking and throwing

GRADING

- | | |
|--|------|
| 1) Exercise Laboratory Project | 2 % |
| 2) Home Projects or Quizzes | 15 % |
| 3) Final Examination (short answers) | 33 % |
| 4) Laboratory assignments (four labs each 12.5%) | 50 % |
- (Lab reports are due at the start of the student's respective lab; Due dates see schedule; 20% mark reduction per day after due date starting with the student's respective lab)

PRELIMINARY TIME TABLE:

2016

SEP/OCT

KIN 3343

MON		WED
		
12 Introduction, Formalities; Usage of Computers, Tables, Graphs; Explain Exercise Lab ⇒ See Course Website	Exercise Lab: REPORT PREPARATION Word Processing, Spreadsheet, Tables, Graphs	14 Physics and Mathematics Fundamentals; Coordinate System; Projectiles ⇒ See Course Website
19 Trial Lab Due!!! Lab Organization, Report and Journal Writing ⇒ See Course Organization	LAB #1: Data collection	21 Biomechanics, Kinematics & Kinetics Position, Displacement, Velocity, Acceleration ⇒ McGinnis: Introduction, Chapter 2
26 Position, Displacement, Velocity, Acceleration ⇒ McGinnis: Chapter 2	LAB #1: Data reduction	28 Projectile Motion ⇒ McGinnis: Chapter 2
3 Projectile Motion ⇒ McGinnis: Chapter 2	LAB #1: Write-up	5 Introduction Kinetics: Newton's Laws; Ground Reaction Force; Equation of Motion ⇒ McGinnis: Chapter 1
NOTES: - Class presentations will always be published on OWL ahead of time - Print out presentation and mark possible questions - Take notes during class		

2016

OCT/NOV

KIN 3343

MON		WED
10 Thanksgiving	Lab Report #1 Due!!! LAB #2: Data collection	12 Equation of Motion ⇒ McGinnis: Chapter 3
17 Free Body Diagram; Internal & External Forces; Centre of Gravity & Influences on GRF → McGinnis: Chapter 1 & 5 24 Connecting Kinetics and Kinematics; Calculation of Velocity and Acceleration ⇒ McGinnis: Chapter 3	LAB #2: Data collection LAB #2: Write up	19 Linear impulse & Momentum; Calculating Impulse → McGinnis: Chapter 3 25 Angular Kinematics ⇒ McGinnis: Chapter 6
31 Angular Kinetics: Torques, Moment of Force; Centre of Gravity; CoG Models → McGinnis: Chapter 5 & 7	Lab Report #2 Due !!! LAB #3: Data collection	2 Moments of Force & Inertia ⇒ McGinnis: Chapter 5 & 7
	NOTES:	

2016

NOV/DEC

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MON		WED
7 Work, Power & Energy ⇒ McGinnis: Chapter 4	LAB #3: Data reduction	9 Fluid Dynamics Pressure, Drag & Lift ⇒ McGinnis: Chapter 8
14 Fluid Dynamics Pressure, Drag & Lift ⇒ McGinnis: Chapter 8	LAB #3: Write up	16 Influences of Drag & Lift ⇒ McGinnis: Chapter 8
21 Mechanics of Biological Materials ⇒ McGinnis: Chapter 9	Lab Report #3 Due!!! LAB #4: Data collection	23 Mechanics of Biological Materials & Loads on the Body ⇒ McGinnis: Chapter 9, 10 & 11
28 Loads on the body and its Adaptations ⇒ McGinnis: Chapter 9, 10 & 11	LAB #4: Data reduction	30 Technology in Biomechanics ⇒ McGinnis: Chapter 16
5 Selected topics of Biomechanics in Sport – Summary Students' Interest in Sport- Biomechanics	Lab Report #4 Due!!!	7 Conclusions and Questions Last day of classes
EXAM PERIOD Dec. 10 - 21, 2016	NOTES:	 Kinesiology 3343 Biomechanical Analysis of Discrete Skills

Course/University Policies

1. **Lateness/Absences:** Assignments are due at the beginning of class on the assigned due date and will not be accepted late, except under medical or other compassionate circumstances. Electronic submission of assignments will not be accepted (unless otherwise specified) under any circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. Appropriate documentation for assignments worth less than 10% should be submitted to the Undergraduate office. A missed mid-term examination without appropriate documentation will result in a zero (0) grade. The course policy is not to allow make-ups for scheduled midterms, presentations or final exams, nor to assign a grade of Incomplete without acceptable and verifiable medical (or equivalent compassionate) reasons. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents or illness, death) or similar circumstances.

2. **Written documentation:** Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, examinations, etc. stating specific reasons and dates. Students must follow up with their professors and their Academic Counselling office in a timely manner. Documentation for any request for accommodation shall be submitted directly, as soon as possible, to the appropriate *Academic Counselling Office* of the student's Faculty/School of registration not to the instructor, with a request for relief specifying the nature of the accommodation being requested. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. These documents will be retained in the student's file, and will be held in confidence in accordance with the University's Official Student Record Information Privacy Policy. See <https://studentservices.uwo.ca/secure/index.cfm> for specific policy and forms relating to accommodation.

3. **Grades:** Where possible assignment objectives and rubrics will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you must wait 24 hours from the receipt of the assignment to approach the instructor or TA. In doing so, please make an appointment and prepare in writing, with evidence, why you feel your grade is inappropriate. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same. Note that calculations errors (which do occur!) should be brought to my attention immediately.

4. **Scholastic offences:** They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf.
 - A) Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required papers might be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com (<http://www.turnitin.com>)

 - B) Computer marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5. **Formatting** (*as recommended by the course instructor*): example- APA style is the approved style of writing for all assignments produced for this course. Please refer to Western University Library webpage for information on citation style and format or consult the APA publication manual: Publication manual of the American Psychological Association (6th ed.). (2009). Washington, DC: American Psychological Association.

6. According to the **Examination Conflict policy**, “A student who is scheduled to write more than two examinations in any 24-hour period may request alternative arrangements through the office of their Academic Counsellor.” **This policy does NOT apply to mid-term examinations.* There will be no make-up for the mid-term exam. Students who miss this exam with a valid reason will have the final re-weighted accordingly.

7. **Classroom Behaviour:** Class will begin promptly at the time specified at the top of page one of this syllabus. In the event that you must arrive late, please enter the classroom with a minimal disturbance to the class. I reserve the right to lock the classroom door and deny entrance if lateness becomes a common occurrence. Excessive talking during class time is disruptive, disrespectful, and will not be tolerated. Students engaging in such behaviour may be asked to leave the room. Cellular phones, pagers, and text-messaging devices are disruptive when they ring in class. If you must bring these with you, please place them on silent mode or turn them off during class. Failure to do so may result in your being asked to leave.

8. Laptops for the **purpose of typing lecture notes** are permitted in class, but please be respectful to your fellow students and turn the sound off. If I receive complaints from other students regarding noise or other disruptive behaviour (e.g., watching videos on YouTube.com, updating your Facebook status, playing Solitaire), your classroom laptop privileges will be revoked.

9. Audio and/or videotaping of lectures is not permitted unless approval has been sought from the instructor in advance.

STUDENT CODE OF CONDUCT

The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed, and set out the disciplinary procedures that the University will follow. For more information, visit

<http://www.uwo.ca/univsec/board/code.pdf>

ENGLISH PROFICIENCY FOR THE ASSIGNMENT OF GRADES

Visit the website <http://www.uwo.ca/univsec/handbook/exam/english.pdf>

SUPPORT SERVICES

There are various support services around campus and these include, but are not limited to:

1. Student Development Centre -- <http://www.sdc.uwo.ca/ssd/>
2. Student Health -- <http://www.shs.uwo.ca/student/studenthealthservices.html>
3. Registrar's Office -- <http://www.registrar.uwo.ca/>
4. Ombuds Office -- <http://www.uwo.ca/ombuds/>