

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

BIOMECHANICAL ANALYSIS OF HUMAN LOCOMOTION

KIN 3353A

2017/18

Instructor: Dr. Volker NOLTE

**Lectures: Mon 1:30 - 2:30
Wed 1:30 – 3:30**

Location: WSC 240

Lab Coordinator: tba

TAs: tba

Office: TH 2142

Office Hours: Open door policy

Phone: 519-661-2111 ext. 88385

Email: v nolte@uwo.ca

Laboratory Sessions:

One of: MON 4:30 6:30 a.m.

TUE 2:30 4:30 p.m.

TUE 4:30 6:30 p.m.

THU 8:30 10:30 a.m.

THU 2:30 4:30 p.m.

Biomechanics Lab: Thames Hall 2125

Computer Lab: Thames Hall 2115

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

CONDUCT

Unless you have either the requisites for this course or written special permission from the course department to enroll in it, you may be removed from

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>

GRADING

- 1) Exercise lab assignment due: Sep. 18 2%
- 2) Home Projects or Quizzes (tba) 15%
- 3) Final Examination 33%
Length 3 hrs
- 4) Laboratory assignments (four laboratory assignments including reports each 12.5%) 50%
Due dates(at respective lab session):
Lab #1: Oct. 16 19
Lab #2: Nov. 6 9
Lab #3: Nov. 20 24
Lab #4: Dec. 4 7

REQUIRED EQUIPMENT AND SUPPLIES

IMPORTANT:

Students will need a non-programmable calculator with trigonometric functions. Please, bring your calculator to **ALL** lectures and lab sessions along with binder, ruler, protractor, pencil and eraser!

Each student needs two dedicated memory sticks (500 MB size is enough!) 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!!** This memory stick with all the data and a copy of the assignment report has to be handed in for marking the assignments. Since the memory stick will stay with the assignment, the student may need a second memory stick for their continuous work.

LABORATORY SESSIONS

Laboratories will begin the week of September 11th, 2017. The laboratories include:

Computer Usage: Word Processing, Spread Sheets, Tables, Graphs
Linear Kinematics and Kinetics
Angular Kinematics and Kinetics
Ground Reaction Force
Fluid dynamics
Movement Patterns: Walking, running, cycling, swimming and rowing

LEARNING OBJECTIVES

Upon completion of this course students will be able to:

Identify and delineate theoretical terms, mechanical concepts, and philosophies related to biomechanics of sport motions
Plan and conduct basic biomechanical laboratory tests (i.e. develop a research question; choose, set-up and use the proper video system for a kinematic analysis; then identify appropriate digitizing systems, know how to digitize a sport movement from video, compute and analyze the kinematic data regarding displacement, velocity and acceleration; present the data in tables or graphs, and use the results to answer the research question)
Understand and interpret the effects of forces and torques

PRELIMINARY TIMETABLE:

MON		WED
11 Introduction, Formalities; Usage of Computers, Tables, Graphs; Explain Exercise Lab See Course Website	Exercise Lab: REPORT PREPARATION Word Processing, Spreadsheet, Tables, Graphs	13 Physics and Mathematics Fundamentals; Coordinate System; Projectiles See Course Website; McGinnis, Introduction
18 Lab Organization, Report and Journal Writing See Course Organization, (e110)1		20

2017

KIN 3353 OCT/NOV

MON		WED
9		11
Thanksgiving	FALL READING WEEK	
16 Internal & External Forces; Centre of Gravity & Influences on GRF McGinnis: Chapter 1 & 3	LAB #2: Data collection	18 Linear impulse & Momentum; Calculating Impulse McGinnis: Chapter 3
23 Connecting Kinetics and Kinematics; Calculation of Velocity and Acceleration McGinnis: Chapter 2 & 3	LAB #2: Data reduction	25 Angular Kinematics McGinnis: Chapter 6
30 Angular Kinetics: Torques, Moment of Force; Centre of Gravity; CoG Models McGinnis: Chapter 5 & 7	LAB #2: Write up	1 Moments of Force & Inertia McGinnis: Chapter 5 & 7
	NOTES:	