



**DEPARTMENT OF PHYSICAL EDUCATION AND KINESIOLOGY**

**COURSE OUTLINE – WINTER 2017**

**PE2060 A3: BIOMECHANICS 3 (3-0-1) UT 60 Hours**

**INSTRUCTOR:** Mr. Chris Nicol

**PHONE:** (780) 539-2838

**OFFICE:** K220

**E-MAIL:** cnicol@gprc.ab.ca

**OFFICE HOURS:** By appointment or drop in.

**CALENDAR DESCRIPTION:** This course presents a method of qualitative analysis of human movement based on knowledge of biomechanical principles.

**PREREQUISITE(S)/COREQUISITE:** NONE

**REQUIRED TEXT/RESOURCE MATERIALS:**

McGinnis, P. 2013. Biomechanics of sport and exercise, (3<sup>rd</sup>ed). Windsor: Human Kinetics.  
Lecture Notes on Moodle.

Additional Readings and Resources as designated by the instructor.

**DELIVERY MODE(S):** A variety of methodologies will be employed including lecture, discussion, lab activities, seminars group/ individual work.

**COURSE OBJECTIVES:**

1. Explain the importance of biomechanics in the analysis of sport and exercise.
2. Describe Newton's laws of motion and how they apply to exercise and sport.
3. Differentiate between kinetic and kinematic quantities for both linear and angular motion.
4. Describe the effects fluid mechanics water and air on motion.
5. Implement the procedures of a Qualitative Biomechanical Analysis to improve performance, reduce injury and improve training
6. Implement the procedures of a Qualitative Biomechanical Analysis to Improve Training.

## LEARNING OUTCOMES:

1. Student will be able to identify and understand mechanical principles governing human motion.
2. Student will be able to analyze and apply mechanical principles governing human motion in the context of sport or human movement skills to improve technique, improve training and prevent injury.
3. Student will be able to construct, design and carry out a biomechanical observation plan.
4. Students will be able to determine faults in observed performance based on mechanical principles.

## TRANSFERABILITY:

- [Athabasca University: APST 2xx \(3\)](#)
- [Burman University: PETH 3xx \(3\)](#)
- [Concordia University of Edmonton: PESS 2xx \(3\)](#)
- [King's University, The: PHED 2xx \(3\)](#)
- [MacEwan University: PEDS 206 \(3\)](#)
- [University of Alberta: KIN 206 \(3\) OR AUPED 232 \(3\)](#)
- [University of Calgary: Jr. KNES \(3\)](#)
- [University of Lethbridge, The: KNES 2650 \(3\)](#)

**\*Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlinesearch.html?SearchMode=S&step=2>

**\*\* Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

## EVALUATIONS:

Coursework, Lab Assignments	20%
Unit Tests	30%
Skill Analysis Project	20%
Final Exam	30%

**GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)** Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

## COURSE TENTATIVE TIMELINE:

Introduction

1. Forces: Maintaining Equilibrium or Changing Motion
2. Linear Kinematics – Describing Objects in Linear Motion
3. Linear Kinetics – Explaining the Causes of Linear Motion
4. Work, Power & Energy: Explaining the causes of Motion without Newton
5. Torques & Moments of Force: Maintaining Equilibrium or Changing Angular Motion
6. Angular Kinematics: Describing Objects in Angular Motion
7. Angular Kinetics: Explaining the Causes of Angular Motion
8. Fluid Mechanics: The Effects of Water and Air
9. Qualitative Biomechanical Analysis to Improve Technique (13)
10. Qualitative Biomechanical Analysis to Improve Training (14)

<b>PE2060 BIOMECHANICS W17 SCHEDULE (Tentative)</b>					
<b>M</b>	<b>TOPIC</b>	<b>W</b>	<b>TOPIC</b>	<b>TH</b>	<b>TOPIC</b>
J2		J4		J5	Introduction & Skill Analysis Tools
J9	Ch1 Forces	J11	Ch 1 Forces	J12	<b>Stability Lab (Gym)</b>
J16	Ch2 Linear Kinematics	J18	Ch2 Linear Kinematics	J19	<b>Ch1,2 Lab (Gym)</b>
J23	Ch 3 Linear Kinetics	J25	Ch 3 Linear Kinetics	J27	<b>Ch 2,3 Lab (Gym)</b>
J30	Quiz & Ch2,3 Seminar	F1	<b>EXAM I (Ch1,2,3)</b>	F2	Ch4 Work, Power, Energy
F6	Ch4 Work, Power, Energy	F8	Ch4 Work, Power, Energy	F9	<b>Ch 4,5 Lab</b>
<b>F13</b>	Ch5 Torques, M of Force	F22	Ch5 Torques, M of Force	F23	Ch6 Angular Kinematics
F20	<b>Winter Break</b>	F22	<b>Winter Break</b>	F23	<b>Winter Break</b>
F27	Quiz & Ch 4,5 Seminar	M1	<b>EXAM II (Ch 4,5)</b>	M24	Ch6 Ang Kinematics
M6	Ch6 Angular Kinematics	M8	Ch7 Angular Kinetics	M9	project work
M13	Ch7 Angular Kinetics	M15	Ch8 Fluid Mech	M16	Ch8 Fluid Mech
M20	Ch8 Fluid Mech	M22	<b>Aquatics Lab (ELink)</b>	M23	Ch13 Qualitative A Tech
M27	Quiz & Ch 6,7,8 Seminar	M29	<b>EXAM III (Ch 6,7,8)</b>	M30	Ch14 Qual Analysis Tr
A3	Ch13 Qualitative A Tech	A5	Ch14 Qual Analysis Tr	A6	<b>Skill Analysis Lab</b>
A10	project work	A12	<b>Project Due</b>	A13	

### STUDENT RESPONSIBILITIES:

Regular attendance and participation is expected at ALL sessions as much of the information provided cannot be obtained in any other way. Students who miss more than 10% of the total number of classes may NOT be granted permission to write the final exam, and/or asked to withdraw from the course. Students who miss class due to medical reasons MUST present medical verification to their instructor. Notify the instructor of any allergies or medical conditions.

Refer to the College Policy on Student Rights and Responsibilities at

[www.gprc.ab.ca/d/STUDENTRIGHTSRESPONSIBILITIES](http://www.gprc.ab.ca/d/STUDENTRIGHTSRESPONSIBILITIES)

### STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <http://www.gprc.ab.ca/about/administration/policies/>

\*\*Note: all Academic and Administrative policies are available on the same page.