

DEPARTMENT OF KINESIOLOGY AND HEALTH SCIENCES

COURSE OUTLINE – WINTER 2023

PE2060(A3): BIOMECHANICS 3 (3-0-1) UT, 60h, 15 weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation, and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land, and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTORS:

- Fabio Minozzo: phone-780-539-2058/email- fminozzo@nwpolytech.ca / office K219
- Alexander Villafranca: phone- 780-539-2971 /email- avillafranca@nwpolytech.ca / office K220

OFFICE HOURS: upon student request

CLASS TIMES:

Lectures: Tuesdays & Thursdays, 16:00 – 17:20

Labs: L2: Tuesdays -13:30-13:50, L1: Friday – 08:30-09:20

CALENDAR DESCRIPTION: The course presents a method of quantitative and qualitative analysis of human movement based on a knowledge of biomechanical principles.

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

This course will be mostly delivered **in class** (or in the lab) with some online components.

- For the remote delivery component: students **should have** a computer with a webcam and reliable internet connection. Technological support is available through helpdesk@nwpolytech.ca.
- For the onsite component: students are also recommended to bring their own laptop or tablet besides book and notebook.

POLICY ON THE RECORDING OF TEACHING ACTIVITIES: Students may not record classroom activities (such as lectures, group activities, 3rd party presentations, etc.) without instructor's consent. This policy is set to protect the privacy and reputation of students, to uphold the copyrights of the instructor and other content creators, and to facilitate free and open discussion of ideas. The classroom is meant to be a psychologically safe environment, where students are free to explore and think through new and controversial ideas without fear of public repercussions. Recording lectures can undermine this goal. If permission to record an activity is granted, the recorded material can only be used for the student's own private use and is not to be posted online or otherwise distributed. Students will be notified in advance by the instructor when someone has been granted permission to record a classroom activity. Students will also be given the option of being excused from actively participating in recorded activities. In the case of student presentations, the recording student must show proof that the presenting student(s) have agreed to be recorded before the instructor will grant permission.

POLICY ON INSTRUCTIONAL RESOURCES AND MATERIALS: Any course resource/material should be properly used: the content created by your instructor is his/her intellectual property and is provided to you based upon your registration for this class; as such, the material is for your private use only. It is not to be distributed, publicly exhibited, or sold without the permission of the instructor. Third party materials (such as assigned readings, videos, et cetera) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

**Note: posting instructional personal notes or slides before or after classes is at discretion of your instructor.*

PREREQUISITE: PE1000

REQUIRED TEXT/RESOURCE MATERIALS:

McGinnis, P. 2013. Biomechanics of sport and exercise, (3rded). Windsor: Human Kinetics.

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

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.

COURSE SCHEDULE TENTATIVE TIMELINE:

PE2060 BIOMECHANICS WINTER 2023 SCHEDULE (Tentative)					
Tuesdays	TOPIC	Thursdays	TOPIC	Tue/ Fri	LABS
3-Jan-23	No classes	5-Jan-23	Intro to the course	Jan 03 or 06	No labs
10-Jan-23	Ch1 Forces	12-Jan-23	Ch1 Forces	Jan 10 or 13	Intro to Labs
17-Jan-23	Ch2 Linear Kinematics	19-Jan-23	Ch2 Linear Kinematics	Jan 17 or 20	L1- Measuring forces with accelerometers
24-Jan-23	Ch 3 Linear Kinetics	26-Jan-23	Ch 3 Linear Kinetics	Jan 24 or 27	L2 -Knoeva tutorial and sports photography
31-Jan-23	Review Seminar	2-Feb-23	TEST I (Ch1,2,3)	Jan 31 or Feb 03	L3- Linear kinematics using photogrammetry
7-Feb-23	Ch4 Work, Power, Energy	9-Feb-23	Ch4 Work, Power, Energy	Feb 07 or 10	L3- Continuation
14-Feb-23	Ch5 Torque	16-Feb-23	Ch5 Torque	Feb 14 or 17	L4 - Linear kinetics using photogrammetry
21-Feb-23	<i>Winter Break</i>	23-Feb-23	<i>Winter Break</i>	Feb 21 or 22	<i>Winter Break</i>
28-Feb-23	Review Seminar	2-Mar-23	TEST II (Ch 4,5)	Feb 28 or Mar 03	L5- Work and power using photogrammetry
7-Mar-23	Ch6 Angular Kinematics	9-Mar-23	Ch6 Angular Kinematics	Mar 07 or 10	L6- Moment Arm and torque using photogrammetry
14-Mar-23	Ch7 Angular Kinetics	16-Mar-23	Ch7 Angular Kinetics	Mar 14 or 17	L7- Tension and Strain using tensiometers
21-Mar-23	Ch8 Fluid Mech	23-Mar-23	Ch8 Fluid Mech	Mar 21 or 24	L8 - Angular kinematics using photogrammetry
28-Mar-23	Review Seminar	30-Mar-23	TEST III (Ch 6,7,8)	Mar 28 or 31	L9 - Qualitative analysis I
4-Apr-23	Qualitative Analysis	6-Apr-23	Review Seminar	Apr 04 or 07	L10- Qualitative analysis II (April 7 no classes)
11-Apr-23	General Review	13-Apr-23	Exam Period	Apr 11 or 14	Exam Period

*Note: Some of these dates may vary to facilitate student learning

EVALUATION:

Test I	15%
Test II	15%
Test III	15%
Labs	20%
Final Exam	35%

100%

GRADING CRITERIA: (The following criteria may be changed to suite the course/instructor)

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4	90-100	C+	2.3	67-69
A	4	85-89	C	2	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3	73-76	D	1	50-54
B-	2.7	70-72	F	0	00-49

STUDENT RESPONSIBILITIES:

Refer to the Polytechnic Policy on Student Rights and Responsibilities on the NWP website.

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 Northwestern Polytechnic Calendar at <https://www.nwpolytech.ca/programs/calendar/> or the Student Rights and Responsibilities policy which can be found at <https://www.nwpolytech.ca/about/administration/policies/index.html>

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

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page <http://www.transferalberta.ca>.

** 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**