

YORK UNIVERSITY
FACULTY OF HEALTH
SCHOOL OF KINESIOLOGY AND HEALTH SCIENCE
HH/KINE 3030 3.0 TERM: Winter 2017
INTRODUCTION TO BIOMECHANICAL ANALYSIS OF HUMAN MOVEMENT

COURSE INSTRUCTORS: Dr. Anne Moore

CLASS TIMES & LOCATION

Section M: M,W,F 12:30-1:30 CLH L

Section N: M,W,F 1:30-2:30 CLH L

LABORATORY LOCATION: CB 162

PREREQUISITE: HH/KINE 2031 3.00 Human Anatomy

COURSE WEBSITE/EMAIL: accessible through Moodle; email biomech@yorku.ca

COURSE DESCRIPTION

Human Movement will be investigated with particular reference to the laws of physics (mechanics) and anatomical concepts applied to joint motion and muscular action.

OBJECTIVES OF THE COURSE:

1. To provide an understanding that all human movement (normal gait, pathological gait, sport, dance, occupational tasks etc.) takes place in a framework of known mechanical principles interacting with human anatomy and muscle physiology.
2. To teach a basic and valid framework of the mechanics of human motion on which students can build.
3. To expose students to the relevance and usefulness of these principles as applied to different aspects of human movement (health, sport, work etc.).

REFERENCE:

Text: Hall, S. Basic Biomechanics, 7th Edition (either print version: selected chapters only, bound by McGraw Hill for HH/KINE 3030 or online smartbook)

Moodle: Introduction to Biomechanical Analysis of Human Movement
Includes: Course Outline, Labs, lecture recordings

EVALUATION

Midterm Exam #1 February 10, 2017 20%

Midterm Exam # 2 March 15, 2017 20%

Laboratories (6 to be submitted, 2 marks each) 12%

On line quizzes 3%

Final Exam (3 hours during final exam session) 45%

GRADING NOTES:

1. The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests* will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.). Details can be found at:

<http://calendars.registrar.yorku.ca/2012-2013/academic/grades/index.htm>

2. **Missed Tests:** Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor's letter) will have the percentage allocated to the missed midterms added to the final exam. If medical documentation is not provided, the student will receive a mark of 0 for that midterm exam. There will be no make-up mid-term exams in this course. **Medical documentation must be provided to the course director for ALL missed midterms and exams.**

3. Any appeal for grade revision must be (a) received within 7 days of the return of the work to the class, (b) in writing, and (c) explicitly state why you believe the mark is in error. Note that any resubmitted material will be re-graded in its entirety. An appealed grade may increase, decrease, or remain unchanged. Note: all returned materials may be subject to photocopying before returning.

4. A make-up exam for a missed final exam will be scheduled (***applicable only with medical documentation and course director approval***)

Labs and Lab Assignments:

- the purpose of these labs is to provide the student with a 'hands-on' application of the major theories discussed during lecture
- assignments for labs 1 (Just Starting), 2 (Instant Calculation), 3 (Projectile Analysis), 5 (Gait Analysis), 6 (Centre of Gravity), and 7 (Analysis of Lifting) **WILL BE MARKED**
- these labs (1, 2, 3, 5, 6, and 7) are due 1 week after the date of the lab. For example, if your lab is on March 18, the completed lab assignment is due March 25.
- you **MUST** hand in your lab assignment to your TA on the day that it is due; when you hand your assignment to the TA, both you and the TA will initial the assignment submission sheet
- if you do not hand in your lab assignment, or if you hand in your assignment to someone other than your TA, your assignment **WILL NOT** be marked and you will receive a mark of zero (0); if you hand in your assignment late, you will lose 50% if it is handed in during the first week that it is late, and 100% after that, i.e., you have one week to hand in late assignments or you will receive a mark of zero (0)
- exceptions to the lateness penalty for valid reasons such as illness, compassionate grounds, etc., may be considered by the Course Instructor but will require supporting documentation (e.g., a doctor's letter)
- each lab assignment is worth 2% of your **FINAL GRADE**; you are strongly encouraged to complete all of the lab assignments and to hand them in on the proper day to the your TA; in total, the lab assignments account for 12% of your final grade
- your TA's name is indicated on Moodle
- All students are required to take the laboratory, there is no exception for people who previously have taken the course.

Switching Labs:

- your lab sections have been assigned by the Registrar’s Office, but under special circumstances, we can allow students to switch lab sections
- there is a process for switching lab sections, which maintains a level of organization, as follows:
 - if you want to switch lab sections, you must identify someone else who is willing to switch with you
 - you must download and complete the “Lab Section Switch” form, which will be signed by you and the person who is switching sections with you, and both associated TAs
 - you must meet with each TA in person to obtain their signature; during that meeting, the TA will adjust the class-list of students for that section by removing your name and adding the other student’s name; of course, you must repeat this process with the TA of the section you are switching in to
 - in some circumstances, you may be switching out of a lab that is TA’ed by the same person as the lab you are wanting to switch in to
 - if you have any questions about this process, contact your TA immediately
 - it is important to follow these steps because the TA will mark only the lab assignments for the students who are in his or her lab sections, according to the class-list for each section; if your name is not on the class-list, your assignment will not be marked and you will receive a mark of zero (0), as described above
 - there well over 700 students in KINE 3030, and in my experience these procedures are very important for maintaining the organization of the course and students’ marks

Lecture Schedule:

Day	Lecture	Date	Topic	Readings	Lab
Fri.	1	January 6	Introduction: What is biomechanics?	Ch1	
Mon.	2	January 9	Kinematics Overview (part 1)	Ch 2	Just Starting** (Due week of January 16)
Wed.	3	January 11	Kinematics Overview (part 2)		
Fri.	4	January 13	Kinetics Overview	Ch 3 (not 68-72)	
Mon.	5	January 16	Linear Kinematics (part 1)	Ch 10	Instant Calculation* * (Due week of January 23)
Wed.	6	January 18	Linear Kinematics (part 2)		
Fri.	7	January 20	Tutorial		
Mon.	8	January 23	Linear Kinematics of a Projectile	Ch 10 (321-336)	Projectile Analysis** (Due week of Jan 30)
Wed.	9	January 25	Angular Kinematics I	Ch 11	
Fri.	10	January 27	Tutorial		
Mon.	11	January 30	Angular Kinematics II		Kinematic Quiz (self test)
Wed.	12	February 1	Relationship Between Angular and Linear	Ch 11 (359-365)	

			Motion		
Fri.	13	February 3	Human Skeletal Muscle (part 1)	Ch 6	
Mon.	14	February 6	Human Skeletal Muscle (part 2)		
Wed.	15	February 8	Midterm Review and Tutorial		
Fri.	16	February 10	Midterm #1		
Mon.	17	February 13	Newton's Laws	Ch 12 (374-378)	Gait Analysis** (Due week of February 22) Note this lab in SC 101A
Wed.	18	February 15	Free Body Diagrams		
Fri.	19	February 17	Tutorial		
Reading Week Feb 20-24					
Mon.	20	February 27	Ground Reaction Forces and Friction	Ch 12 (379-384)	
Wed.	21	March 1	Torque and Mechanical Action of Muscles	Ch 13	
Fri.	22	March 3	Tutorial		
Mon.	23	March 6	Gravity and Centre of Gravity	Ch 13 (425-430)	Centre of Gravity** (Due week of March 9)
Wed.	24	March 8	Static Equilibrium: Whole Body Motion	Ch 13	
Fri.	25	March 10	Static Equilibrium: Joint Level		
Mon.	26	March 13	Midterm Review and Tutorial		Lift** (Due week of March 16)
Wed.	27	March 15	Midterm #2		
Fri.	28	March 17	Muscle implications: Joint Kinetics+Kinematics		
Mon.	29	March 20	Stability and Balance	Ch 13 (431-433)	
Wed.	30	March 22	Moment of Inertia	Ch 14	Kinetic Quiz (self test)
Fri.	31	March 24	Tutorial		
Mon.	32	March	Linear and Angular	Ch 12 (384-	

		27	Momentum	389) Ch 14 (448-457)	Momentum (will not be marked)
Wed.	33	March 29	Centripetal Acceleration		
Fri.	34	March 31	Tutorial		
Mon.	35	April 3	Power and Energy	Ch 12 (392- 398)	
Wed.	36	April 5	Exam Review		

IMPORTANT COURSE INFORMATION FOR STUDENTS

All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (see Reports, Initiatives, Documents) -

<http://secretariat.info.yorku.ca/files/CourseInformationForStudentsAugust2012.pdf>

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation

Academic Honesty and Integrity

York students are required to maintain high standards of academic integrity and are subject to the Senate Policy on Academic Honesty. This policy can be found on the York University Secretariat website (<http://www.yorku.ca/secretariat/policies/>).

There is also an academic integrity website with complete information about academic honesty. Students are expected to review the materials on the Academic Integrity website (<http://www.yorku.ca/academicintegrity>).

Access/Disability

York provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. It is the student's responsibility to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations. Additional information is available at <http://www.yorku.ca/cds/> or from disability service providers:

- **Physical, Sensory & Medical Disability Services:** N108 Ross, 416-736-5140
- **Counselling & Disability Services:** N110 Bennett Centre for Student Services, 416-736-5297
- **Glendon students - Glendon Counselling & Career Centre:** Glendon Hall 111, 416-487-6709

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an Application for Ethical Approval of Research Involving Human Participants at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class.

Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately.

Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services

Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf

Student Conduct

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship.

Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. A statement of the policy and procedures involving disruptive and/or harassing behaviour by students in academic situations is available on the York website <http://www.yorku.ca/secretariat/policies/> (Senate Policy on Disruptive and/or Harassing Behaviour in Academic Situations)

Please note that this information is subject to periodic update.