Course Syllabus

IE_Technical Elective – Fundamentals and Laboratory of Human Physical Activities
Sichuan University-Pittsburgh Institute
Fall 2022
Thursday 8:15 am – 11:00 am, Zone 4, 4-201

COURSE DESCRIPTION: (3 semester hours)

This technical elective course is aimed to provide students an introduction to concepts and principles related to biomechanics. Understanding human physical activity from a biomechanical perspective prepares the student to address major issues which include reducing the risk of injury, optimizing exercise prescription, and understanding clinical evaluations. An interdisciplinary approach will be employed and will include elements from functional anatomy, work physiology, physics, and engineering.

PREREQUISTIES:

None

COURSE OBJECTIVES:

Upon completion of the course, it is expected that students should be able to:

(1) Understand the fundamentals mechanical principles involved in human physical activities

(2) Be familiar with various equipment, instruments, and software involved in human movement data collection and analysis

(3) Obtain hands-on experience of collecting and analyzing human physical activities in different biomechanical contexts and computing basic quantities such as displacements, velocities, forces etc.

(4) Summarize and interpret findings from articles published in biomechanics journals

INSTRUCTOR: Ruoliang (Rio) Tang, PhD, 4-221 Zone 4, 19136151636 (mobile), rio.tang@scupi.cn

TAs: Sixuan Wang, 3-314, Zone 3, 2019141520186@stu.scu.edu.cn

TEXT or REFERENCE BOOKS:

(1) **Biomechanics and Motor Control of Human Movement**, 4th Edition., edited by David A. Winter, John Wiley and Sons Inc., 2009

(2) **Fundamentals of Biomechanics**, 2nd Edition., Duane Knudson, Springer, 2007

OFFICE HOURS: Dr. Tang: T/W/TR 11am-12pm; Sixuan: TBD and by appointment

ATTENDANCE:

It is your decision whether or not to attend class. However, you are responsible for all materials covered in class. Please refer to student handbook for information on absence excuses. If you are absent for any non-excused reason, please obtain the handouts from Blackboard and contact your classmates for any pertinent material. DO NOT see the instructor for notes or handouts or a "review" of unexcused absences.

EVALUATION:

Evaluation:	
HOMEWORK (4 @ 50 each)	200
LAB REPORT (8 @ 100 each)	800
EXAM 1 (Mid-term)	400
Project (Report and Presentation)	600
TOTAL	2,000

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The final letter grade is determined from the following table.

Grade Ranges (Class may be "curved", but below grades are assured)

A: 90 – 100	A−: 85 – 90	B+: 80 – 84	B: 76 – 80	B−: 73 – 76
C+: 70 – 73	C: 66 – 70	C−: 63 – 66	D: 60 – 63	F*: < 60

***academic misconduct can result in an "F" regardless of %**

Homework and computer assignments will be given in the lectures. Due dates for each assignment will also be post to Blackboard. Homework assignments and reports must be typed and presented in a professional manner. Unless otherwise stated, homework assignments are to be completed on an individual basis. Homework assignments may require presentation to the class (a subset will be selected for class discussion – you should be prepared to present your work). Semester project reports require a written report and a final presentation to the class (or video presentation). Late work will receive a penalty of up to 10% per day. Work (presentations/exams) from unexcused absences cannot normally be made up. However, *at the instructor's discretion,* some work may be made up with penalty. You are responsible for ALL materials posted to Blackboard (assignments and lecture notes). These materials may include: papers, videos, lectures, HW problems/explanations, classmate presentations, and reference materials. Some optional/supplemental materials may also be posted to Blackboard. These optional materials will NOT be directly tested, but may represent extra credit questions on the exams. These materials are intended to supplement and enhance the materials presented in class and discussed in the text.

The lecture schedule shows the text material to be covered each class period. It is recommended that students read the text prior to the class lecture. Due dates, holidays, and exam dates are also listed. The schedule will be adhered to as closely as possible; however, some changes will undoubtedly be required (particularly to schedule any guest lecturers). Changes to the schedule (due dates, additional information provided, etc.) will be announced during the lecture period. You are responsible for noting these changes.

Extra credit may be earned (up to 2.5%). You can earn up to 1% by providing classroom demonstrations, props/models, or case studies. Participating and sharing ideas in Blackboard online forums can earn up to 1 % and demonstrating an Ergonomic solution to a problem for someone else (at work, home, or play) can earn up to 1%.

ACCOMMODATIONS:

Students who need accommodations are asked to arrange a meeting during the first week of classes.

COURSE SCHEDULE

WK1	**Introduction to Human Physical Activities and Functional Anatomy**
WK2	**Functional Anatomy, *Part A: General Descriptions, Upper Extremities***
WK3	**Functional Anatomy, *Part B: Hip and Lower Extremities***
WK4	**Functional Anatomy, *Part C: Human Spine***
WK5	**Lab: Measurements of Strength and Force**
WK6	**Lab: Static and Dynamic Balance**
WK7	**Work Physiology**
WK8	**Mid-term Exam**
WK9	**Topics in Occupational Ergonomics**
WK10	**Lab: Hands-on Experience with EMG system**
WK11	**Clinical Aspects of Human Movements**
WK12	**Lab: Gait Analysis**
WK13	**Lab: Hands-on Experience with Motion Capture System**
WK14	**Lab: Demo of Comprehensive Modeling of Human Movements**
WK15-17	**Final Project Reports and Presentations**

Important! Please Note: The **schedule is subject to change** based on availability of guest lecturers and the classroom driven, interactive nature of this course. All topics will be covered, but order may vary. Plan on attending all scheduled class sessions!

Meetings: Class meets Thursday from 8:15 am to 11:00 am in 4-201 Zone 4. **Class will meet on all dates** listed **on** this **schedule**. If presentation order alters significantly from this schedule, a revised schedule will be provided (posted online). Grading, however, will be as described on this syllabus.

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Expect that **all material** from the text and all topics on this schedule **will be covered**. **You will be responsible for all material** presented in class, in the text, in homework assignments, and in handouts.

ACADEMIC HONESTY:

Students are responsible for all material covered as part of this class (including both graded and ungraded assignments posted on Blackboard). The work (homeworks, lab reports, design projects, reports, and tests) submitted for grading should represent your individual effort. However, studying and working with your peers (on outside class assignments) is not only acceptable, but greatly encouraged. Study groups can provide an extremely valuable resource to students, and you are encouraged to form one.

In general, submitting work copied from others is considered academic misconduct. Plagiarism of ideas or work as well as giving or receiving unauthorized information on examinations is considered academic misconduct. **All academic misconduct will be dealt with severely** and may result in a course grade of "F." Refer to school policy and the student handbook for complete information on your rights and responsibilities as a student.

Violations include, but are not limited to:

Cheating on an examination, such as copying from another's paper, using unauthorized notes, calculators, etc., or giving or receiving unauthorized aid, such as trading examinations, whispering answers, passing notes, or using electronic devices to transmit or receive information (**such as copying the word, powerpoint, or excel spreadsheet assignment of another student**).

Violation of proctor guidelines and/or otherwise thwarting the "chain of custody" (such as copying or sharing exam questions before *or* after an exam) for an exam **is considered cheating** and grounds for failure in this course.

Plagiarism. This is using someone else's work without giving credit. It is, for example, using ideas, phrases, papers, laboratory reports, computer programs, data - copied directly or paraphrased - that you did not arrive at on your own. Sources include published works such as book, movies, Websites, and unpublished works such as other students' papers or material from a research service. In brief, representing someone else's work as your own is academically dishonest. *The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.*

Unauthorized collaboration. This is working with or receiving help from others on graded assignments without the specific approval of the instructor. *If in doubt, seek permission from the instructor before working with others.* Students are encouraged to learn from one another: form study groups, discuss assignments, BUT each assignment must be individual work unless specifically stated and turned in as a group assignment.

- Copying another student's assignment and putting your name on it is plagiarism.
- You are encouraged to talk to one another about your assignments, however, all assignments must be done by the student whose name is on it unless you are specifically assigned to a "team" assignment.

Multiple submission. This means using the same work to fulfill the academic requirements in more than one course. *Prior permission of the instructors is essential.*