HBIO 408L Biomechanics
Units: 4
Fall 2020

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Course Description

Prerequisites: MATH 108 and PHYS 135A or higher

Learning Objectives (See Learning Blocks)
1. Discuss the interplay and relative influence of biology and social context on dimensions of human diversity and health.
2. Apply cross-disciplinary scientific principles to explain how humans function, adapt and evolve.
3. Analyze and synthesize discipline-related content specific to real world problems and utilize the scientific method, basic scientific principles and methodologies concepts to clarify what is known, unknown or need further study.
4. Independently and collaboratively apply scientific knowledge as well as analytical and experimental skills to produce integrative original work.
5. Describe the structure/function of muscles, bones, joints and tissues of the human body.
6. Formulate testable hypotheses, design and conduct experiments, present interpretations of results and articulate reasoned conclusions to solve real-world and conceptual problems.
7. Safely and properly use scientific equipment, databases, Newton’s Laws, and other mathematical and computational tools to advance working knowledge of cause-effect relationships governing human movement.
8. Use relevant sources of scientific evidence to construct a well-supported, logical argument, explain it to others using oral, written, and multimedia forms of communication in real world contexts.
Course Notes
The course is organized in 2-week learning blocks. Each learning block incorporates learning modules, self-directed learning, discussion, peer review, thinking, designing, editing, and personal reflection and all content is found in the learning block google drive. Content for each Learning block and executable software required for digitizing will be located here: http://www.usc.edu/dept/LAS/kinesiology/exsc408l/lab/lab.html
Work for peer review will be posted and commented on using Blackboard. Work submitted for evaluation will be uploaded into an assigned personal google drive shared with the professor and teaching assistants.

Technological Proficiency and Hardware/Software Required
You will need access to a personal computer with Microsoft Excel, preferably a PC. Kinovea software runs on a PC. Tracker software runs on a MAC. IF you need access to a PC, please contact Dornsife IT prior to the start of the semester.

Required Readings and Supplementary Materials
1. Web-based lecture notes and videos
2. Selected literature readings available through PubMed@usc through USC Library
3. Electronic Storage Device (back up and store homework, labs, and project content)

Grading Breakdown

<table>
<thead>
<tr>
<th>Learning Assessments</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Motion analysis</td>
<td>10%</td>
</tr>
<tr>
<td>Cause-Effect in Context</td>
<td>10%</td>
</tr>
<tr>
<td>Impulse Regulation</td>
<td>20%</td>
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<tr>
<td>Joint Kinetics</td>
<td>20%</td>
</tr>
<tr>
<td>Refinements</td>
<td>10%</td>
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<tr>
<td>e journal finale</td>
<td>5%</td>
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<tr>
<td>Project</td>
<td>15%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
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</tbody>
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Grading Scale
>90%=A, >80%=B, >70%=C, >65%=D, otherwise =F
Assignment Submission Policy
Meet weekly due dates on Wednesday, Thursday and Friday
otherwise weekly points = 0

Grading Timeline
Feedback provide weekly

Policies
1. Come prepared to live meetings
2. Sincere personal investment in independent discovery and timely peer review
3. USC conduct code (you must do your own work!) - Refer to SCampus Academic Integrity Section.
4. Excused absences require written notification one week in advance.
5. Honor due dates in lab and lecture (anything turned in after due date = zero points).
6. Active weekly participation

Statement on Academic Conduct and Support Systems

Academic Conduct:
Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b.
Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:
Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

**Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298**
usadvocate.simplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

**The Office of Disability Services and Programs - (213) 740-0776**
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

**USC Campus Support and Intervention - (213) 821-4710**
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

**Diversity at USC - (213) 740-2101**
diversity.usc.edu
Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

**USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call**
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

**USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call**
dps.usc.edu Non-emergency assistance or information.
**Description and Assessment of Assignments**

**HBio 408L Biomechanics: Fall 2020**

**Hybrid Model:** In the lab and in the field opportunities scheduled as needed throughout the semester.

**Block by Block:**

<table>
<thead>
<tr>
<th>Block</th>
<th>Personal Quest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Think by questioning with clarity and precision</td>
<td>Quality achieved at a level required to sustain impact of work</td>
</tr>
<tr>
<td>Design by listening with empathy and openness</td>
<td>Understand the challenge in realistic contexts</td>
</tr>
<tr>
<td>Edit by iterating with reflection, trust and interdependency</td>
<td>Expertise develop skills through self-directed learning opportunities</td>
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**Be you:** find your passion-create your pathway

**Strategy:** practice habits of mind and body

**Time:** manage, modify, monitor and reflect

**Reflect**

**Live Discussions**

<table>
<thead>
<tr>
<th>Monday:</th>
<th>Tuesday:</th>
<th>Wednesday:</th>
<th>Thursday:</th>
<th>Friday:</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete by Monday:</td>
<td>Modular Lecture</td>
<td>Discussion Board Participation</td>
<td>Learning Communities</td>
<td>Finalize/Prepare</td>
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### Block 1: Motion Analysis
- **Habits of Mind and Body**
- **Apply to Task of Interest**
- **Content Modules**
- **17-Aug**
- **24-Aug**
- **Self directed learning**
- **Post/Comment**
- **Discuss/Refine**
- **Share**
- **Peer review**
- **Ref: think, design, edit**
- **5**

### Block 2: Cause-Effect in Context
- **Library Investigation**
- **Define Problem and RQs**
- **31-Aug**
- **07-Sep**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **Peer review**
- **Reflect: think, design, edit**
- **2 page Scientific Abstract**
- **5**

### Block 3: Net Impulse = change in momentum
- **Film Strip and force-time curve**
- **14-Sep**
- **21-Sep**
- **Apply to Project**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **Peer review**
- **Finalize project slide**
- **5**

### Block 4: Net Angular Impulse = change in ang mom
- **Events with Force Vector Overlay**
- **28-Sep**
- **5-Oct**
- **Apply to Project**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **Peer review**
- **Finalize project slide**
- **5**

### Block 5: Multijoint Control and Coordination
- **segment and joint angular motion**
- **12-Oct**
- **19-Oct**
- **Apply to Project**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **Peer review**
- **1 min Key Concept Demo**
- **5**

### Block 6: Joint Kinetics
- **Lower Extremity**
- **26-Oct**
- **2-Nov**
- **Apply to Project**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **FBD and Computations**
- **Peer review**
- **Ref: think, design, edit**
- **5**

### Block 7: Joint Kinetics
- **Upper Extremity**
- **9-Nov**
- **16-Nov**
- **Apply to Project**
- **Self directed learning**
- **Post Slide Draft/Comment**
- **Share**
- **Peer review**
- **Finalize project slide**
- **5**

### Finale
- **Present project:** 10 minutes, 5 minutes Q&A
- **Recorded Zoom Format:**
- **e-journal Finale**
- **5**
- **Final Grade:**
- **100**

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Refinements