BIOS 4200 Syllabus

**Kinesiological Basis of Human Movement**

**Section BIOS-4200-A, 3 credits (cross-listed as BIOS 4803-CHA)**

**Mondays, Wednesdays, Fridays; 10:10am – 11:00am**

**Room 1253, 575 Fourteenth St.**

**Instructor Information**

|  |  |  |
| --- | --- | --- |
| Instructor | Email | Office Hours & Location |
| Dr. Young-Hui Chang, Ph.D.  Professor of Biological Sciences | yh.chang@ap.gatech.edu | Room 1309B, 555 14th St.  Wed’s 11am-12pm or by appt |

**General Information**

**Description**

Even though the study of human movement dates back thousands of years, the complexities of understanding the control of even simple movements remain as major challenges in several areas of science and medicine ranging from rehabilitation to sports performance. This course teaches principles related to the biomechanics, energetics and motor control of movement as it applies to human and animal movement, rehabilitation, and sports performance. It gives an overview of (1) the biophysical subdisciplines that make up the knowledge base for kinesiology and (2) the professions that depend on kinesiological knowledge for their practice. Key biological themes related to physiological and neural adaptation and maturation will be used to exemplify the contributions that the anatomical, mechanical, physiological, and neural studies of human physical activity can make to human health and performance. The class periods will be organized into topical sections that will be introduced with standard lectures and concluded with active learning tasks within the classroom.

## Pre- &/or Co-Requisites

This course will allow students the opportunity to integrate concepts from previous courses such as anatomy, physiology, introductory biology, math and physics. This course also fulfills a breadth elective requirement for the Physiology minor in Biological Sciences and is also provided for pre-health professional students to gain additional knowledge-base for potential graduate studies in different allied health programs (e.g., medical, dental, physical therapy, prosthetics & orthotics, etc.). It is assumed that students in this course will have taken and performed adequately in at least one course from among each of the two following lists (or have permission from the instructor):

* Pre-requisite course 1 (one from this list):

BIOL 1510, BIOL 1511, BIOL 1520, BIOL 1521, BIOL 3751, BIOL 3753, APPH 3751, APPH 3753

AND,

* Pre-requisite course 2 (one from this list):

MATH 1113, MATH 1501, MATH 1511, MATH 1502, MATH 15X2, MATH 1504, MATH 1555, MATH 1552

## Course Goals and Learning Outcomes

To introduce students to the disciplinary and professional bases for the field of kinesiology and to establish an organizational framework for any future study in human movement science. On completion of this course, students will be able to demonstrate understanding of the following topics:

* The goals, scope, significance and methods of the field of kinesiology
* The various subdisciplines of kinesiology
* The multidimensional changes in human movement capability that occur with maturation and as an adaptation to physical activity
* The professions and professional associations related to kinesiology

**Course Requirements & Grading**

|  |  |  |
| --- | --- | --- |
| Assignment | Date | Weight (Points out of 1000 total possible) |
| Quiz 1, HW1 | Wed, 8/29 | 30 (quiz worth 20, HW worth 10) |
| Quiz 2, HW2 | Fri, 9/7 | 30 |
| Quiz 3, HW3 | Wed, 9/19 | 30 |
| Mid-term Exam 1 | Mon, 9/24 | 150 |
| Quiz 4, HW4 | Wed, 10/3 | 30 |
| Quiz 5, HW5 | Mon, 10/15 | 30 |
| Quiz 6, HW6 | Mon, 10/22 | 30 |
| Mid-term Exam 2 | Fri, 10/26 | 150 |
| Quiz 7, HW7 | Fri, 11/2 | 30 |
| Quiz 8, HW8 | Fri, 11/9 | 30 |
| Quiz 9, HW9 | Fri, 11/16 | 30 |
| Quiz 10, HW10 | Wed, 11/28 | 30 |
| Final Exam | Wed, 12/12 | 300 |
| Participation | Weekly | 100 (10 pts awarded for lectures leading up to each quiz) |

**Extra Credit Opportunities:** Extra credit is typically not given in this class. If any opportunities for extra credit should arise, it will be announced in class as appropriate.

**Description of Graded Components**

**Quizzes (20% of total)**: A quiz will be given at the end of each topical section during class and following an in-class activity designed to support learning of the material. Each quiz is designed to be brief (~10-15 minutes) and follows the format of the pre-test given at the beginning of each section. The pre-test is designed to provide me with feedback on your prior knowledge of a subject, which will help me tailor the ensuing lectures to identify principles we may need more emphasis on. The quiz is a post-test designed to assess your learning. Only the post-test quiz will contribute to your final grade. The pre-test and post-test quiz may not be identical, but will cover similar topics covered in the corresponding lectures.

**Mid-term Exams (30% of total)**: Mid-term exams will be given twice in class during the semester. They are designed to test your knowledge and mastery of the material over several weeks of lectures. The format will be a mix of multiple choice, short and long answer. They will test recall as well as your ability to synthesize the material and apply it to novel contexts. You will need to bring a calculator to complete these exams (smart phones and other electronic devices are not allowed during the exam). One page of notes (front and back) are allowed for reference during the mid-term exams.

**Final Exam (30% of total)**: A comprehensive final exam will be given during exam week. Approximately half of the final exam will cover new material and the other half will be comprehensive in covering all material from the entire semester. The format will be the same as for the mid-term exams. You will need to bring a calculator to complete this exam (smart phones and other electronic devices are not allowed during the exam). Three pages of notes (front and back) are allowed for reference during the final exam.

**Homework (10% of total)**: One homework assignment will be due at the end of each topical section on the dates of each quiz. The format for these will be a range of multiple choice, short and long answer. Homework assignments will be graded to provide you with feedback, but you will receive full credit for the assignment if it is simply turned in on time and all questions are answered completely. You are allowed to work in groups for the homework, but you must indicate everyone you worked with for each assignment.

**Participation (10% of total)**: Participation in class consists of productively adding to discussion during class time and asking relevant questions. I expect each of you to be proactive learners and to contribute to the learning environment of the classroom. I will keep track of who speaks up in class and I expect each of you to do so at least twice per week to receive full participation credit. Participation grades will be assessed at the end of each topical section at or around the dates of each quiz.

**Grading Scale**

Every effort will be taken to provide you with timely and thorough feedback on your performance and if you have any questions, please ask me. Final average grades will be rounded to the nearest whole percentage point. Curving grades is rare and should not be expected. Your final grade will be assigned as a letter grade according to the following scale:

A 90-100%

B 80-89%

C 70-79%

D 60-69%

F 0-59%

**Course Materials**

**Required Course Text**

“**Biophysical Foundations of Human Movement**”, 3rd Edition, by Abernathy, et al.

Publisher: Human Kinetics

ISBN: 9781450431651

New, Used, and Digital Copies available at GT Barnes & Noble: <https://gatech.bncollege.com/webapp/wcs/stores/servlet/BNCBTBListView>

## Additional Materials/Resources

Additional readings and lecture slides will be made available as appropriate.

## Course Website and Other Classroom Management Tools

Additional materials, announcements, and resources will be posted to the course website on Canvas.

**Course Expectations & Guidelines**

**Tips for Success in this Course:**

* You are in college; be accountable for your own education; actively seek knowledge, don't wait for it!
* Come prepared to think and respond—it’s a small class, I know when you are not engaged.
* Use the textbook and assigned readings as a resource to reinforce principles covered in lectures.
* Come to class prepared (i.e., having read all assigned material) and ready to go.
* Be mindful of the **‘ rule’**: however long you expect a task to take, multiply by and that is how long it will *actually* take! (works surprisingly well...)
* Have respect for your classmates and your instructor: playing nice with others means team-*building*, not team-*destroying*.

## Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

## Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

## Attendance and/or Participation

I have designed a fast paced and intensive course. Missing any class will put you at a serious disadvantage to complete the course requirements. Please let me know as soon as possible if you need to miss a class. If you are absent for class, you are still responsible for the work assigned for that day, as well as any information given out that day. Please contact fellow students to find out what you missed before you reach out to me.

You will be expected to come to class on time. Tardiness will be documented and result in a lower participation grade.

I encourage you to participate in class. Chances are if you have a question, someone else is wondering the same thing. Please ask so I can help clarify.

## Collaboration & Group Work

I expect all students to adhere to the university’s Honor Code. Your work on all quizzes and exams must be your own. During class, please leave at least one space between you and the next student(s) to reduce temptation or perception of any violation of the Honor Code. Homework can be done in groups, but you must disclose everyone that you worked with on that assignment.

## Extensions, Late Assignments, & Re-Scheduled/Missed Exams

10% of the total possible grade on the assignment will be deducted for **EACH DAY** an assignment is LATE. For example, work that would normally earn 100% of possible points will instead earn a grade of 90% if turned in one day late. Extensions may be allowed under some circumstances, but require prior approval from the instructor. Requests for an extension after the assignment deadline will not be accepted.

Exams may be rescheduled for pre-approved excused absences (sick with doctors note, car accident in route to test, hospitalization, death in your immediate family). You should not assume that an absence is automatically excused. Please contact me as soon as possible to ensure that the absence will be excused.

## Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

## Student Use of Mobile Devices in the Classroom

As research on learning shows, unexpected noises and movement automatically divert and capture people's attention, which means you are affecting everyone’s learning experience if your cell phone, pager, laptop, etc. makes noise or is visually distracting during class.

The use of cell phones to make phone calls is not permitted during class time.

Many students find it useful to have a mobile device on hand to access course materials or to take notes. Laptops and mobile devices will be allowed for class-related activity if the sound is turned off. Please do not abuse this privilege by checking email, Facebook, YouTube, web surfing, etc. during class. If this becomes a distraction in class, the right to deny this privilege to an individual or the entire class can be taken away at my discretion.

## Additional Course Policies

**Institute-Approved Absences**

As per Georgia Tech policy, you are permitted to be absent from class to participate in athletic events, official field trips, and religious observances. For planning purposes, please provide me with written notice of your upcoming absence at least two weeks before the event, and ideally within the first two weeks of class. When I receive this notice, you and I will discuss opportunities to make up work you will miss in your absence. Please see <http://catalog.gatech.edu/rules/4/> for more information about receiving official notice from the Registrar about the nature and timing of your upcoming Institute-approved absence.

**Food and Drink**

I ask that you do not eat during class time as it could be a distraction for you and your classmates. Drink is allowed as long as it is in spill-free, covered containers.

**Freedom of Expression and Guidelines for Discussion**

I respect your right to freedom of speech and peaceful assembly. I am also committed to maintaining an orderly learning environment for all students and ensuring that all facilities are used in a way that facilitates teaching, learning, and research. Therefore, I encourage you to voice your opinions respectfully, as long as they are related to the content of this class and as long as doing so does not infringe unduly on the rights of other.

**Re-grading and Re-submission**

I try to be fair in my grading and generally try to give as much partial credit as possible. As such, please consider carefully any requests you have for regrading other than obvious errors on my part in calculating your grade. Requests for regrading of a homework assignment or an exam may be submitted in writing within one week of the day the homework or exam is handed back to the class (regardless of whether or not you attend class that day). You must justify in writing the technical basis for the regrade. If the regrading request is accepted, your entire homework or exam may be regraded. Note that your grade may decrease after regrading, and you should not assume that your grade will always go up after regrading.

**Campus Resources for Students**

In your time at Georgia Tech, you may find yourself in need of support. There are many on campus who are here to help in this regard. Below you will find some resources to support you both as a student and as a person.

**Academic support**

* Center for Academic Success <http://success.gatech.edu>
  + 1-to-1 tutoring <http://success.gatech.edu/1-1-tutoring>
  + Peer-Led Undergraduate Study (PLUS) <http://success.gatech.edu/tutoring/plus>
  + Academic coaching http://success.gatech.edu/coaching
* Residence Life's Learning Assistance Program

<https://housing.gatech.edu/learning-assistance-program>

* + Drop-in tutoring for many 1000 level courses
* OMED: Educational Services (<http://omed.gatech.edu/programs/academic-support>)
  + Group study sessions and tutoring programs
* Communication Center (<http://www.communicationcenter.gatech.edu>)
  + Individualized help with writing and multimedia projects
* Academic advisors for your major

<http://advising.gatech.edu/>

**Personal Support**

Georgia Tech Resources

* The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
  + You also may request assistance at <https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?>
* Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 2nd floor
  + Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.
  + *Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at* ***404-894-2204****.*
* Students’ Temporary Assistance and Resources (STAR): <http://studentlife.gatech.edu/content/need-help>
  + Can assist with interview clothing, food, and housing needs.
* Stamps Health Services: <https://health.gatech.edu>; **404-894-1420**
  + Primary care, pharmacy, women’s health, psychiatry, immunization and allergy, health promotion, and nutrition
* OMED: Educational Services: <http://www.omed.gatech.edu>
* **Women’s Resource Center:** [**http://www.womenscenter.gatech.edu**](http://www.womenscenter.gatech.edu)**; 404-385-0230**
* **LGBTQIA Resource Center:** [**http://lgbtqia.gatech.edu/**](http://lgbtqia.gatech.edu/)**; 404-385-2679**
* **Veteran’s Resource Center:** [**http://veterans.gatech.edu/**](http://veterans.gatech.edu/)**; 404-385-2067**
* **Georgia Tech Police:** **404-894-2500**

**Statement of Intent for Inclusivity**

As a member of the Georgia Tech community, I am committed to creating a learning environment in which all of my students feel safe and included. Because we are individuals with varying needs, I am reliant on your feedback to achieve this goal. To that end, I invite you to enter into dialogue with me about the things I can stop, start, and continue doing to make my classroom an environment in which you feel safe to participate in learning.

**Course Schedule**

|  |  |  |
| --- | --- | --- |
| Date | Topic | Reading, Notes, due dates, and more |
| WK1: Mon Aug 20 | Introduction, overview, terminology | Text CH 1-2 (pre-test) |
| WK1: Wed Aug 22 | Musculoskeletal Anatomy 1 | Text CH 3 |
| WK1: Fri Aug 24 | Musculoskeletal Anatomy 2 | Text CH 3 |
| WK2: Mon Aug 27 | Anthropometry | Text CH 4 |
| WK2: Wed Aug 29 | Functional Anatomy | Learning, Practice & Assessment (**Quiz 1**) |
| WK2: Fri Aug 31 | Kinematics 1 | Text CH 7, additional readings (pre-test) |
| WK3: Mon Sep 3 | - NO CLASS - | LABOR DAY |
| WK3: Wed Sep 5 | Kinematics 2 | Text CH 7, additional readings |
| WK3: Fri Sep 7 | Motion Analysis | Learning, Practice & Assessment (**Quiz 2**) |
| WK4: Mon Sep 10 | Kinetics 1 | Text CH 7, additional readings (pre-test) |
| WK4: Wed Sep 12 | Kinetics 2 | Text CH 7, additional readings |
| WK4: Fri Sep 14 | Kinetics 3 | Text CH 7, additional readings |
| WK5: Mon Sep 17 | Kinetics 4 | Text CH 7, additional readings |
| WK5: Wed Sep 19 | Mechanics of movement | Learning, Practice & Assessment (**Quiz 3**) |
| WK5: Fri Sep 21 | Exam 1 Material Review | Text CH 1,2,3,4,7, additional readings |
| WK6: Mon Sep 24 | **EXAM 1** | **Week 1-5 Material** |
| WK6: Wed Sep 26 | Respiration and ventilation | Text C11, additional readings (pre-test) |
| WK6: Fri Sep 28 | Exercise and metabolism | Text C11, additional readings |
| WK7: Mon Oct 1 | Nutrition, substrate utilization and exercise | Text C12 |
| WK7: Wed Oct 3 | Mechanics and energetics of movement | Learning, Practice & Assessment (**Quiz 4**) |
| WK7: Fri Oct 5 | Mechanics and energetics of gait | Additional readings (pre-test) |
| WK8: Mon Oct 8 | - NO CLASS - | FALL RECESS |
| WK8: Wed Oct 10 | Neuromuscular physiology 1 | Text CH 15, additional readings |
| WK8: Fri Oct 12 | Neuromuscular physiology 2 | Text CH 15, additional readings |
| WK9: Mon Oct 15 | Neuromuscular physiology | Learning, Practice & Assessment (**Quiz 5**) |
| WK9: Wed Oct 17 | Neuromuscular control of movement | Text CH 15, additional readings |
| WK9: Fri Oct 19 | Cognitive theories of motor control | Text CH 16 |
| WK10: Mon Oct 22 | Motor Control | Learning, Practice & Assessment (**Quiz 6**) |
| WK10: Wed Oct 24 | Exam 2 Material Review | Text CH 11,12,15,16, additional readings |
| WK10: Fri Oct 26 | **EXAM 2** | **Week 6-10 Material** |
| WK11: Mon Oct 29 | Musculoskeletal changes with age | Text CH 5 (pre-test) |
| WK11: Wed Oct 31 | Musculoskeletal adaptations to training | Text CH 6 |
| WK11: Fri Nov 2 | Musculoskeletal changes with age & training | Learning, Practice & Assessment (**Quiz 7**) |
| WK12: Mon Nov 5 | Biomechanical changes with age | Text CH 9 (pre-test) |
| WK12: Wed Nov 7 | Biomechanical adaptations to training | Text CH 10 |
| WK12: Fri Nov 9 | Biomechanical changes with age and training | Learning, Practice & Assessment (**Quiz 8**) |
| WK13: Mon Nov 12 | Physiological capacity changes with age | Text CH 13 (pre-test) |
| WK13: Wed Nov 14 | Physiological adaptations to training | Text CH 14 |
| WK13: Fri Nov 16 | Physiological changes with age and training | Learning, Practice & Assessment (**Quiz 9**) |
| WK14: Mon Nov 19 | Motor control changes with age | Text CH 17 (pre-test) |
| WK14: Wed Nov 21 | - NO CLASS - | STUDENT RECESS |
| WK14: Fri Nov 23 | - NO CLASS - | THANKSGIVING BREAK |
| WK15: Mon Nov 26 | Motor control adaptations to training | Text CH 18 |
| WK15: Wed Nov 28 | Motor control changes with age and training | Learning, Practice & Assessment (**Quiz 10**) |
| WK15: Fri Nov 30 | Development and training effects | Learning, Practice & Assessment |
| WK16: Mon Dec 3 | Final Exam - New Material Review | Text CH 5,6,9,10, 13,14,17,18 |
| WK16: Wed Dec 5 | - NO CLASS - | Reading Period |
| WK17: Wed Dec 12 | **Comprehensive Final Exam** | **12/12, 8am-10:50am**, Place TBD |