

# BIOS 4200 Syllabus

## Kinesiological Basis of Human Movement

Section BIOS-4200-A, APPH8803-A\*, 3 credits  
Mondays, Wednesdays, Fridays; 11:00am - 11:50am  
Room 271, Skiles building

### Instructor Information

#### Instructor

Dr. Young-Hui Chang, PhD (he/him/his)  
Prof. of Biological Sciences

#### Email

[yh.chang@ap.gatech.edu](mailto:yh.chang@ap.gatech.edu)

#### Office Hours Online:

(see Canvas page for link)  
By appt

#### Teaching Assistant

• TBD

#### Email

#### Office Hours:

TBD or by appt. meetings

### General Information

#### Course Mode Expectations

BIOS 4200 will be offered using the traditional in-person teaching mode. I expect you to attend classes and participation grades will be affected by your attendance. Recorded lectures will be made available **after** the in-person lecture, but should not be used as a substitution for missing a class period.

#### Course Communication Strategy (*at all times, let's be respectful online!*)

**Canvas:** All official course communications will be done via Canvas; go here first!

- Lectures: Any recorded lecture videos will be uploaded to Canvas **after** the in-person lecture
- Links to anything course related will be found on Canvas (office hour links, etc.)
- Announcements and other communications
- Discussions/Q&A: please use the official course discussion platform for content-related and logistics-related questions that all students would benefit from. As of now we will plan to do asynchronous course discussions via **Ed Discussion** on Canvas. Your participation will be affected by your participation on Ed Discussion
- All quizzes and exams will be completed on Canvas and/or in person in the classroom.
- Your grades will be posted on Canvas.

**Teams:** Online synchronous video discussions and weekly Office Hours will be on Teams:

- Check course Canvas site for the updated link

**Email:** please use direct email only for specific, personal issues that do not relate to course content. If it is a general question about the course, others are probably interested in the answer. E.g.1, if you are sick and will be absent from class, this is a great reason to email me directly. E.g. 2, wondering what day the next quiz will be is a great question for Ed Discussion.

### 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 for course

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 *physiology* course 1 (one from this list):

BIOL 1510 or BIOL 1511 or BIOL 1520 or BIOL 3751 or BIOL 3753 or APPH 3751 or APPH 3753

AND,

- Pre-requisite *math* 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

\*students enrolled in APPH8803 will be required to complete an additional assignment TBD with instructor.

## Course Requirements & Grading

### Description of Graded Components

**\*\*\*Honor Code for quizzes and exams:** All quizzes and exams are an assessment of *your* knowledge. These are to be completed on your own without any outside help from others, the internet, AI/LLM resources (e.g., ChatGPT), or any other resources unless explicitly stated by the instructor prior to starting the exam/quiz. Please approach the course with integrity and pride in doing your own work.

**Quizzes (30% of total):** 10 online quizzes will be given throughout the semester at the end of each of 10 topics/sections. These are meant to be challenging, but not stressful. Each quiz will be brief (~10-15 minutes) and will cover topics covered in the previous lectures on a given topic. I will automatically drop the lowest quiz grade. Also, quizzes will be graded such that they will be rounded up to the nearest 5pts (e.g., if you get between 25-29 pts out of 30, you will receive a grade of 30/30 for that quiz, 20-24 will be rounded to a 25/30, etc.). A 0 due to an incomplete will not be rounded up.

**3 Mid-term Exams (45% of total, 15% each):** Three mid-term exams will be given 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 use a calculator to complete these exams. One page of notes (front and back) are allowed for reference during the mid-term exams and you will need to turn in your notes as part of your exam grade.

**Final Exam (15% of total):** An online final exam will be given during exam week, but it will only cover new material. The format will be the same as for the mid-term exams. You will need to use a calculator to complete this exam. One page of notes (front and back) are allowed for reference during the final exam and you will need to turn in your notes as part of your exam grade.

**Participation (10% of total):** Online participation in class or online will involve productively participating in person during class, during office hours, or on the asynchronous discussion thread in Ed Discussion (asking questions, adding your thoughts, etc.). I expect each of you to be proactive learners and to contribute to the learning environment of the classroom even when it is a virtual discussion. I will also take note of who participates during class sessions and on asynchronous discussions.

| Assignment      | Date   | Weight (Points out of 1000 total possible) |
|-----------------|--------|--|
| Quiz 0          | TBD    | (+5 extra credit pts)                      |
| Quiz 1          | TBD    | 30   |
| Quiz 2          | TBD    | 30   |
| Quiz 3          | TBD    | 30   |
| Mid-term Exam 1 | TBD    | 150  |
| Quiz 4          | TBD    | 30   |
| Quiz 5          | TBD    | 30   |
| Quiz 6          | TBD    | 30   |
| Mid-term Exam 2 | TBD    | 150  |
| Quiz 7          | TBD    | 30   |
| Quiz 8          | TBD    | 30   |
| Mid-term Exam 3 | TBD    | 150  |
| Quiz 9          | TBD    | 30   |
| Quiz 10         | TBD    | 30   |
| Final Exam 4    | TBD    | 150  |
| Participation   | Weekly | 100 (total over semester)                  |

**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, but do not count on it.

### 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. 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 and Software

- “Biophysical Foundations of Human Movement”, 3<sup>rd</sup> Edition, by Abernathy, et al.  
Publisher: Human Kinetics  
ISBN: 9781450431651  
New, Used, and Digital Copies available at GT Barnes & Noble: <https://gatech.bncollege.com/>
- MotorLab software, we will be using this software in the second half of the course. Software & license will cost you about \$5. <https://motorlab.ca>

### Additional Materials/Resources

Additional readings and lecture slides will be made available on Canvas 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
- Use the textbook and assigned readings as a resource to reinforce principles covered in lectures
- Be prepared by reading all assigned material and attending/watching all lectures
- Be mindful of the ‘ $\pi$  rule’: however long you expect a task to take, multiply by  $\pi$  and that is about how long it will actually take! (not exact, but works surprisingly well...)
- Have respect for your classmates and instructor: *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, visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing in the course 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 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 and provide any relevant documentation if you need to miss a class.** If you are absent for class, you are still responsible for the work assigned for that day, and information given out that day. Please contact fellow students to find out what you missed before you reach out to me (e.g., via Ed Discussion).

I encourage you to actively participate in the course. Chances are if you have a question, someone else is wondering the same thing. Please ask so I can help clarify for everyone. This also counts toward class participation.

### **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. Any 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. Any grade that is typically rounded up (e.g. quizzes), will not be rounded up if late and unexcused.

Exams may be rescheduled for pre-approved and/or excused absences (sick with doctors note, car accident in route to test, hospitalization, etc.). You should not assume that an absence is automatically excused. Please contact me as soon as possible to confirm whether 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.

### **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.

#### **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 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 results are given 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 is subject to be regraded. Note that your grade may actually 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 of different kinds. 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

- General resources for mental health: <https://cos.gatech.edu/mental-health-counseling>
- The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2<sup>nd</sup> floor
  - You also may request assistance at [https://gatech-advocate.symplicity.com/care\\_report/index.php/pid383662?](https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?)
- Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 2<sup>nd</sup> 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>; 404-385-0230
- LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; 404-385-2679
- Veteran's Resource Center: <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 where all students feel safe and included. Because we are individuals with varying needs, I rely on your feedback to achieve this goal. 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

(dates and order are subject to change)

**C:** to be taken on canvas \*

| Date | Mode: Topic                                    | Reading, Notes, due dates, and more                 |
|------|--|---|
| WK1: | Intro, overview, terminology (L1)              | Text CH 1-2   |
| WK1: | Musculoskeletal Anatomy 1 (L2-3)               | Text CH 3-4<br><b>C: Quiz 0: Introduce yourself</b> |
| WK1: | Musculoskeletal Anatomy 2 (L2-3)               | Text CH 3-4   |
| WK2: | Musculoskeletal changes: age (L4-5);           | Text CH 5<br><b>C: Quiz 1: L1, L2, L3</b>           |
| WK2: | Musculoskeletal changes: training (L4-5)       | Text CH 6   |
| WK2: | Review: Functional Anatomy                     | <b>C: Quiz 2: L4, L5</b>                            |
| WK3: | <b>NO CLASS</b>                                | <b>LABOR DAY</b>                                    |
| WK3: | Kinematics 1 (L6)                              | Text CH 7 (kinematics portions)                     |
| WK3: | Kinematics 2 (L7)                              | Text CH 7 (kinematics portions)                     |
| WK4: | Review: Kinematics                             | <b>C: Quiz 3: L6, L7</b>                            |
| WK4: | EXAM 1 Review                                  | Text CH 1-7   |
| WK4: | <b>C: EXAM 1—no class</b>                      | <b>Weeks 1-4 Material (L1-L7)</b>                   |
| WK5: | Mechanics & energetics of gait (L8)            | Text CH 8   |
| WK5: | Biomechanical changes: age & training (L9-L10) | Text CH 9-10  |
| WK5: | Review: Biomechanics                           | <b>C: Quiz 4: L8-10</b>                             |
| WK6: | Gait transitions (L11)                         | Additional readings (horse papers)                  |
| WK6: | Gait transitions (L12)                         | Additional readings (human papers)                  |
| WK6: | Kinetics 1 (L13)                               | Text CH 7 (kinetics portions)                       |
| WK7: | Kinetics 2 (L14)                               | Text CH 7 (kinetics portions)                       |
| WK7: | Review: Kinetics 1-2                           | <b>C: Quiz 5: L11-14</b>                            |
| WK7: | Kinetics 3 (L15)                               | Text CH 7 (kinetics portions)                       |
| WK8: | <b>NO CLASS</b>                                | <b>FALL BREAK</b>                                   |
| WK8: | Kinetics 4 (L16)                               | Text CH 7 (kinetics portions)                       |
| WK8: | Review: Kinetics 3-4                           | <b>C: Quiz 6: L15-L16</b>                           |

| Date  | Mode: Topic  | Reading, Notes, due dates, and more      |
|-------|--|--|
| WK9:  | Exam 2 Review  | Text CH 7-10                             |
| WK9:  | <b>C: EXAM 2</b> —no class                               | Weeks 5-8 Material (L8-L16)              |
| WK9:  | Metabolism 1 (L17)                                       | CH 11                                    |
| WK10: | Metabolism 2 (L18)                                       | CH 11                                    |
| WK10: | Metabolism 3 (L19)                                       | CH 12                                    |
| WK10: | Review: Metabolism                                       | <b>C: Quiz 7: L17-L19</b>                |
| WK11: | Physiological Changes: age (L20)                         | Text CH 13                               |
| WK11: | Physiological Changes: training (L21)                    | Text CH 14                               |
| WK11: | Review: Physiological changes                            | <b>C: Quiz 8: L20-L21</b>                |
| WK12: | EXAM 3 Review  | Text CH 11-14, additional readings       |
| WK12: | Neuromuscular control 1 (L22)                            | Text CH 15                               |
| WK12: | <b>C: EXAM 3</b> —no class                               | Weeks 9-12 material (L17-L21)            |
| WK13: | Neuromuscular control 2 (L23)                            | Text CH 15                               |
| WK13: | Neuromuscular control 3 (L24)                            | Text CH 15                               |
| WK13: | Review: Neuromuscular Control                            | <b>C: Quiz 9: L22-L24</b>                |
| WK14: | Cog. motor control theories (L25-26)                     | Text CH 16, 17                           |
| WK14: | Motor control changes (L26-27)                           | Text CH 17, 18                           |
| WK14: | Review: Motor Control                                    | <b>C: Quiz 10: L25-L27</b>               |
| WK15: | <b>NO CLASS</b>  | Asynchronous Review Session              |
| WK15: | <b>NO CLASS</b>  | <b>STUDENT RECESS</b>                    |
| WK15: | <b>NO CLASS</b>  | <b>THANKSGIVING BREAK</b>                |
| WK16: | Review: Final Exam                                       | Text CH 15-18, Weeks 13-15 (L22-L27)     |
| WK16: | <b>NO CLASS</b>  | <b>READING DAY</b>                       |
| WK17: | <b>C: Exam 4</b> (final exam; <i>new material only</i> ) | Weeks 13-15 material (L22-L27, CH 15-18) |

\* Assessments on Canvas will be done asynchronously over a given pre-determined window of time unless otherwise announced