

George Mason University
College of Education and Human Development
Kinesiology

KINE 400.A01 – Biomechanics
3 Credits, Summer 2022
ONLINE

Faculty

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Prerequisites/Corequisites

C or higher in BIOL 124, BIOL 125, ATEP 300, KINE 360.

University Catalog Course Description

Focuses on kinetic and kinematic concepts and how they apply to the quantitative assessment of human movement. Analyzes human movement and the functional dynamics of tissue such as muscle or bone.

Course Delivery Method

This course will be delivered online (76% or more) using [select either a synchronous or an asynchronous] format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available on May 23, 2022.

Overall, this will be a highly interactive class and students will be encouraged to participate.

Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see:
https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers

To get a list of supported operation systems on different devices see:

https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
 - Adobe Acrobat Reader: <https://get.adobe.com/reader/>
 - Windows Media Player:
<https://support.microsoft.com/en-us/help/14209/get-windows-media-player>
 - Apple Quick Time Player: www.apple.com/quicktime/download/

Expectations

- Course Week: Because asynchronous courses do not have a “fixed” meeting day, our week will start on Mondays, and finish on Sundays.
- Log-in Frequency:
Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least a minimum of 4 times per week.
- Participation:
Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence:
Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues:
Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.
- Workload:
Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the

student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.

- **Instructor Support:**

Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

- **Netiquette:**

The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words.* Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

- **Accommodations:**

Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

Learner Outcomes or Objectives

This course is designed to enable students to do the following:

- 1) Summarize and apply fundamental biomechanical principles to human movement.
- 2) Differentiate and appropriately apply concepts of kinematic and kinetic analysis to both linear and angular human motion.
- 3) Describe the equipment and techniques used for the quantitative assessment of human movement.
- 4) Examine the mechanics of exercises and activities as they affect the human body.
- 5) Apply biomechanical principles to human movement situations including but not limited to performance, training, rehabilitation, and injury prevention.
- 6) Apply principles related to internal tissue loading to improving tissue structure and function, and to reduce the likelihood of injury.

Professional Standards

This course meets the Commission on Accreditation of Allied Health Education Programs (CAAHEP) requirements and covers the following American College of Sports Medicine's Knowledge-Skills-Abilities (KSA's):

KSA	Description	Lecture, Lab, or both

	DOMAIN I: EXERCISE PRESCRIPTION AND IMPLEMENTATION: Conduct and interpret assessments of muscular strength, muscularendurance, and flexibility.	
4.f	Knowledge of the planes and axes in which each movement action occurs.	Both
4.g	Knowledge of the interrelationships among center of gravity, base of support, balance, stability, posture, and proper spinal alignment.	Both
4.h	Knowledge of the normal curvatures of the spine and common assessments of postural alignment.	Both
	DOMAIN II: EXERCISE PRESCRIPTION AND IMPLEMENTATION: Determine safe and effective exercise programs to achieve desired outcomes and goals, and translate assessment results into appropriate exercise prescriptions.	
1.i	Knowledge of the basic biomechanical principles of human movement, groups.	Both

Required Texts

McGinnis P. Biomechanics of Sport and Exercise, 4th ed. Champaign, IL: Human Kinetics; 2020.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

Students will be evaluated on content standards (knowledge gained) and performance (demonstration of the content). Content standards will be assessed via exams and homework assignments. Performance will be assessed through completion of case study activities. Once your FINAL GRADE, at the end of the semester is posted on mymasonportal/blackboard, you will have 24 hours to inquire about it. After that period, your grade will be posted as final on Patriot Web.

- **Assignments and/or Examinations**

- **Comprehensive Exam** (*Course objectives 1, 2, 3, 4 & 6*)

Each student will be required to complete a final exam. The final exam will be cumulative. The format for all exams will be multiple choice, true/false, short essays, and problem-solving questions. Examinations represent inquiries regarding student knowledge of fact regarding course content. Examinations demonstrate that the student can remember and apply facts as well as

demonstrate a hierarchy of knowledge information. ***Respondus lockdown browser and webcam will be used for exams.***

Reading Comprehension Quizzes (Course objectives 1, 2, 3, 4, 5 & 6)

These quizzes will assess your comprehension of the assigned readings. The format of quizzes may be true/false, multiple choice, short answer and/or problem solving.

Case Study Activities (Course objectives 1, 2, 3, 4, 5 & 6)

The intent of the case study activities is to show how the theory learned in class can be applied to a variety of common activities. The activities will require students to work in small groups. Recorded videos of data collection may be provided to students. In some instances, data will be pre-collected and a simple analysis will be required. The activities will include questions regarding the results and several discussion questions. ***For case study activities you will work in small groups and a portion of your individual grade will be anonymous ratings of your contributions from the other group members.***

Professionalism (Course objectives 1, 2, 3, 4, 5 & 6)

Students are expected to behave in a professional manner. Depending on the setting professionalism may look slightly different but generally consists of similar components. For undergraduate Kinesiology students in a classroom setting professionalism generally consists of the following components:

Participation (75% of Professionalism Grade) – Demonstrate that you have an interest in the subject matter. Students are expected to collaborate with group members for all assigned activities. Follow George Mason University policies for any missed work. Students who unexpectedly miss an assignment for an excused reason should contact the instructor within 24 hours. Make-up tests, quizzes, assignments, or other grades will be granted for excused absences only. Excused absences include: serious illness, official university excused absences and extenuating circumstances. It is the student's responsibility to contact the instructor in order to obtain the make-up work. ***Participation will be assessed by submitting the weekly checklists and random checking of whether students accessed course materials by specified dates.***

Communication (25% of Professionalism Grade) – When communicating with the instructor and classmates, either face-to-face or via email, students should address the other person appropriately, use appropriate language and maintain a pleasant demeanor.

Example email with instructor:

Dr. Last Name,

I have a question regarding....

Regards,

Student's Name

Example in-person interaction with instructor:

Student: Professor (*instructor's last name*) I have a question regarding....

Professor: (Student's name) I would be happy to help you. What is your question?

Student: My question is.....

Professor: The answer to that question is...

Student: Professor (*instructor's last name*) thank you for your time and availability to answer my questions.

Responsibility/Accountability/ Honesty/Integrity– Professionals take responsibility for their actions and are accountable. This can occur at multiple levels but generally consists of completing assignments on time, submitting work that is of the appropriate quality, honoring commitments and owning up to mistakes. Students are expected to be honest with the instructor, classmates, and themselves. Professionals keep their word when committing to something and act in an ethical manner. See George Mason University policy for further guidance.

Self-Improvement/Self-awareness– One should be aware of their strengths/weaknesses and constantly seek to improve. Professionals regularly seek out opportunities to increase their knowledge and improve their current skill set. Specific to this class an example of how a student may demonstrate self-improvement/self-awareness is by attending office hours following a poor grade on an exam or assignment.

Professionalism evaluation – Any professionalism violation will be documented by the instructor. Violations will result in a 1-point deduction from the final average. In extreme cases the student may be dismissed from the class at the discretion of the instructor.

- **Other Requirements**

- **Email Correspondence**

- Only messages that originate from a George Mason University email address will be accepted. ***Emails with no subject or no text in the body will not be acknowledged.*** All email will be responded to in the order in which it is received. Students should allow 48 hours for a response.

- **Course Performance Evaluation Weighting**

This course will be graded on a percentage system.

Assignments	Number	%
#1 Comprehensive Exam	1	20
#2 Case Study Activities (CSA)	5	35
#3 Syllabus and Reading Comprehension Quizzes (RCQ)	5	35
#4 Professionalism & Participation	NA	10
TOTAL		100%

Grading Scale

A+ = 95 – 100	B+ = 87 – 89	C+ = 77 – 79	D = 60 – 69
A = 94 – 100	B = 84 – 86	C = 74 – 76	F = 0 – 59
A- = 90 – 93	B- = 80 – 83	C- = 70 – 73	

Note:

- 1) Although a B- is a satisfactory grade for a course, students must maintain a 3.00 average in their degree program and present a 3.00 GPA on the courses listed on the graduation application.
- 2) Any student asking for their grade to be rounded up, increased a letter grade, extra credit only for themselves at the end of the semester, etc. may have their final average reduced by up to 2 points at the discretion of the instructor.

Professional Dispositions

See <https://cehd.gmu.edu/students/policies-procedures/>

Students are held to the standards of the George Mason University Honor Code. You are expected to attend all class sections, actively participate in class discussions, and complete all assignments.

No late work will be accepted in this course without evidence of a dire or extenuating circumstance. Approval of extensions or make up opportunities are at the instructor's discretion.

Class Schedule

		Date	Suggested Activity for the Day	Assignments Due
Introductory Module	Week 1	5/23-5/29	Course Introduction & Review previous material	Read syllabus Review: Chapters 10, 11, & 12 Join a group – due May 24 at Midnight CSA #1 Due May 29 at 11:59PM RCQ #1: Chapters 10 + 11+ 12. Due May 29 at 11:59 PM
Module 1	Week 2	5/30-6/5	Video Lecture Slides: Chapter 2 – Linear Kinematics Video Lecture Slides – Chapter 2: Projectile Motion / Work on Case Study Activity #2 Work on Case Study Activity #2 Video Lecture Slides – Chapter 1	Read Chapter 2 pp 51-68 Read Chapter 2 pp 69-79 Read Chapter 1 RCQ #2: Chapters 1 + 2. Due June 5 at 11:59 PM CSA #2 Due June 5 at 11:59 PM
Module 2	Week 3	6/6-6/12	Video Lecture Slides Chapter 3: Linear Kinetics Video Lecture Slides – Chapter 4: Work, Power & Energy Video Lecture Slides – Chapter 8: Fluid Mechanics Work on Case Study Activity #3	Read Chapter 3 Read Chapter 4 Read Chapter 8 RCQ #3: Chapters 3 + 4 + 8 Due June 12 at 11:59 PM CSA #3 Due June 12 at 11:59 PM

Module 3	Week 4	6/13-6/19	<p>Video Lecture Slide – Chapter 6: Angular Kinematics</p> <p>Video Lecture Slides – Chapter 5: Torques Work on Case Study Activity #4</p>	<p>Read Chapter 6</p> <p>Read Chapter 5</p> <p>RCQ #4: Chapters 5 + 6 Due June 19 at 11:59 PM</p> <p>CSA #4 Due June 19 at 11:59 PM</p>
Module 4	Week 5	6/20-6/24	<p>Video Lecture Slides – Chapter 7: Angular Kinetics</p> <p>Video Lecture Slides – Chapter 9: Mechanical Properties of Biological Tissues</p>	<p>Read Chapter 7</p> <p>Read Chapter 9</p> <p>RCQ #5: Chapters 7 + 9 Due June 23 at 11:59 PM</p> <p>CSA #5 Due June 24 at 11:59 PM</p> <p>Final Exam Due June 24 at 11:59 PM</p>

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/>).
- Students must follow the university policy for Responsible Use of Computing (see <https://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).

- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <https://ds.gmu.edu/>).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:

As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/>.