

**George Mason University**  
**College of Education and Human Development**  
**Kinesiology**

KINE 400.001 —Biomechanics  
3 Credits, Fall 2020  
T, TH 12:00 – 1:15 PM, 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 a synchronous and 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 August 24, 2020. Overall, this will be a highly interactive class and students will be encouraged to participate.

**Under no circumstances, may 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](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](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/](http://www.apple.com/quicktime/download/)

### *Expectations*

- Course Week: Our course week will begin 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 5 times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- 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):

<b>KSA</b>	<b>Description</b>	<b>Lecture, Lab, or both</b>
	<b>GENERAL POPULATION/CORE: EXERCISE PHYSIOLOGY AND RELATED EXERCISE SCIENCE</b>	
1.1.4	Knowledge of the plane in which each movement action occurs and the responsible muscles.	Lecture
1.1.5	Knowledge of the interrelationships among center of gravity, base of support, balance, stability, posture, and proper spinal alignment.	Lecture
1.1.8	Knowledge of biomechanical principles that underlie performance of the following activities: walking, jogging, running, swimming, cycling, weight lifting, and carrying or moving objects.	Lecture
1.7.47	Ability to assess postural alignment and recommend appropriate exercise to meet individual needs and refer as necessary.	Lecture

## **Required Texts**

McGinnis, Peter. *Biomechanics of Sport and Exercise*, 4<sup>th</sup> Edition, Human Kinetics. Champaign, Illinois, 2020.

## **Supplementary materials**

Supplementary materials will be used in class and posted on BlackBoard/MyMason Portal. Please print these materials and bring them to class so that you have access to them when needed.

## **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 laboratory assignments. Performance will be assessed through completion of class 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 Examinations**

### **Exams and Final Exam** (*Course objectives 1, 2, 3, 4 & 6*)

Each student will be required to complete two exams and 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.

### **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.

### **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:

***Attendance and Participation (50% of Professionalism Grade)*** – Show up on time to online class meetings, pay attention, and engage yourself in the lessons, discussions, class activities, etc. Demonstrate that you have an interest in the subject matter. Follow George Mason University policies for any missed classes. Arriving to class late or leaving early will be counted as an absence. Students are expected to show up prepared to class and participate during class activities. Students who know they will need to miss a class for a legitimate reason should contact the instructor before the class. Students who unexpectedly miss a class for an excused reason should contact the instructor within 24 hours of missing the class. 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.

***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.

- **Technology Use During Class**

- As per GMU policy, all sound emitting technology is required to be turned off during the class meeting time. No sound emitting technology (e.g., cell phones, smart phones, iPads, Tablets, pagers, etc.) is allowed at any time during the class period. Students who are observed using any form of technology inappropriately (e.g., sending text messages from cell phones, visiting social networking sites from laptops, etc.) will be dismissed from class for the day, counted as an absence, and not permitted to make up missed assignments.

- **Course Performance Evaluation Weighting**

This course will be graded on a point system, with a total of 100 possible points.

Assignments		Number	%
#1	Exam I	1	15
#2	Exam II	1	15
#3	Final Exam	1	20
#4	Case Study Activities (CSA)	5	25
#5	Reading Comprehension Quizzes (RCQ)	13	20
#6	Professionalism	NA	5
<b>TOTAL</b>			<b>100%</b>

### Grading Scale

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

Notes:

- 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.

### Class schedule

Date		Suggested Activity for the Day	Assignments Due
Introductory Module	Week 1 Aug 24-30	<b>Entire Class Synchronous Meeting – August 25 @ Noon to 1:15 pm</b>  <i>Course Introduction</i>	Read syllabus
		Video Lecture Slides – Chapters 10&11: Review Musculoskeletal Considerations for Movement	Read Chapter 10&11
	Week 2 Aug 31-Sep 6	<b>Team 1 Synchronous Meeting – September 1 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – September 3 @ Noon to 1:15 pm</b>  <i>Review Musculoskeletal Considerations for Movement</i>	<b>Chapter 10&amp;11 RCQ Due Noon on Monday</b>
		Video Lecture Slides: Chapter 2 – Linear Kinematics	<b>CSA #1 Due Midnight Sept 6.</b> Read Chapter 12, 2 pp 51-68
Module 1	Week 3 Sep 7-13	<b>Team 1 Synchronous Meeting – September 8 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – September 10 @ Noon to 1:15 pm</b>  <i>Linear Kinematics</i>	<b>Chapter 12, 2 RCQ – Linear Kinematics Due Noon on Monday</b>
		Video Lecture Slides – Chapter 2: Projectile Motion  Work on Case Study Activity #2	Read Chapter 2 pp 69-79
		<b>Team 1 Synchronous Meeting – September 15 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – September 17 @ Noon to 1:15 pm</b>  <i>Projectile Motion</i>	<b>Chapter 2 RCQ – Projectile Motion Due Noon on Monday</b>
	Week 4 Sep 14-20	Video Lecture Slides – Chapter 1  Work on Case Study Activity #2	<b>CSA #2 Due Midnight Sept 20.</b> Read Chapter 1
Module 2	Week 5 Sep 21-27	<b>Team 1 Synchronous Meeting – September 22 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – September 22 @ Noon to 1:15 pm</b>  <i>Forces</i>	<b>Chapter 1 RCQ Due Noon on Monday</b>

Module 3			Video Lecture Slides – Chapter 3: Linear Kinetics  Work on Case Study Activity #3	Read Chapter 3
	Week 6	Sep 28 – Oct 4	<b>Team 1 Synchronous Meeting – September 29 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – October 1 @ Noon to 1:15 pm</b>  <i>Linear Kinetics</i>	<b>Chapter 3 RCQ Due 24 Noon on Monday</b>
			Video Lecture Slides – Chapter 4: Work, Power & Energy  Work on Case Study Activity #3	Read Chapter 4
	Week 7	Oct 5-11	<b>Team 1 Synchronous Meeting – October 6 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – October 8 @ Noon to 1:15 pm</b>  <i>Work, Power, &amp; Energy</i>	<b>Chapter 4 RCQ Due 24 Noon on Monday</b>
			Video Lecture Slides – Chapter 8: Fluid Mechanics  Work on Case Study Activity 3	<b>CSA #3 Due Midnight Oct 11</b> Read Chapter 8
	Week 8	Oct 12-18	<b>Entire Class Synchronous Meeting – October 13 @ Noon to 1:15 pm</b>  <i>Fluid Mechanics /Review for Exam #1</i>	<b>Chapter 8 RCQ Due 24 Noon on Monday</b>
			<b>Exam #1</b>	<b>Exam 1 is due by Midnight on Oct 18</b>
	Week 9	Oct 19-25	<b>Team 1 Synchronous Meeting – October 20 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – October 22 @ Noon to 1:15 pm</b>  <i>Review Exam 1 / Discuss any concepts from Module 1 &amp; 2 that are still unclear</i>	Review missed questions on exam 1
			Video Lecture Slide – Chapter 6: Angular Kinematics	Read Chapter 6
	Week 10	Oct 26-Nov 1	<b>Team 1 Synchronous Meeting – October 27 @ Noon to 1:15 pm</b>	<b>Chapter 6 RCQ Due Noon on Monday</b>



Module 4			<b>Team 2 Synchronous Meeting – October 29 @ Noon to 1:15 pm</b> <i>Angular Kinematics</i>	
			Video Lecture Slides – Chapter 5	Read Chapter 5
	Week 11	Nov 2-8	<b>Team 1 Synchronous Meeting – November 3 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – November 5 @ Noon to 1:15 pm</b> <i>Torques and Moments of Force</i>	<b>Chapter 5 RCQ Due Noon on Monday</b>
			Video Lecture Slides – Chapter 7: Angular Kinetics	Read Chapter 7
	Week 12	Nov 9-15	<b>Team 1 Synchronous Meeting – November 10 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – November 12 @ Noon to 1:15 pm</b> <i>Angular Kinetics</i>	<b>Chapter 7 RCQ Due Noon on Monday</b>
			Case Study Activity #4	<b>CSA #4 Due Midnight Nov 15</b>
	Week 13	Nov 16-22	<b>Team 1 Synchronous Meeting – November 17 @ Noon to 1:15 pm</b> <b>Team 2 Synchronous Meeting – November 19 @ Noon to 1:15 pm</b> <i>Review what is still unclear from modules 3 &amp; 4</i>	
			Video Lecture Slides – Chapter 9: Mechanical Properties of Biological Tissues  Work on Case Study Activity #5	Read Chapter 9
	Week 14	Nov 23-26	<b>Team 1 Synchronous Meeting – November 24 @ Noon to 12:30 pm</b> <b>Team 2 Synchronous Meeting – November 24 @ 12:40 to 1:10 pm</b> Mechanical Properties of Biological Tissues	<b>Chapter 9 RCQ Due Noon on Monday</b>
		Nov 27-29	<b>Thanksgiving Break</b>	<b>CSA #5 Due Midnight Nov 29</b>
	Week 15	Nov 30-Dec 2	<b>Entire Class Synchronous Meeting – December 1 @ Noon to 1:15 pm</b> Review for exam 2	<b>Exam 2 Due Midnight Dec 3</b>
		Dec 3-Dec 6	Study for Final Exam	Review missed questions on exam 2

	Week 16	Dec 7-Dec 10	<b>Study for Final Exam</b>	<b>Final Exam Due Midnight on Dec 10</b>
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*Note:*

- 1) The instructor reserves the right to make changes to the course syllabus and/or schedule at any time. Students will always be informed of any changes made*
- 2) Students will be assigned to Teams 1 and 2 during the first week of class.*

## 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](mailto: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](mailto:titleix@gmu.edu).

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

## Student Acknowledgement of Syllabus

I, \_\_\_\_\_, by signing below, attest to the following:  
(Print First and Last Name)

\*I have read the course syllabus for KINE 400 in its entirety, and I understand the policies contained therein. This syllabus serves as a binding contract for KINE 400 between the instructor and me.

\*I have a clear understanding of the due dates for assignments and examinations, and I accept responsibility for the material.

\*I am aware that failure to submit assignments by the dates assigned will result in no points awarded as late work will not be accepted.

\*I understand that if I am using emitting sound technology or personal computers I will be dismissed from class for the day, counted as an absence, and not permitted to make up missed assignments

\*I understand the instructor reserves the right to alter the provided schedules as necessary and I am responsible for the assignments and examination dates for the most current version of the syllabus schedule.

\*I accept responsibility for reading announcements that are sent to me via e-mail through BlackBoard/MyMason Portal; it is my responsibility to access my Blackboard/MyMason Portal e-mail for messages, or forward Blackboard/MyMason Portal e-mail as per the directions provided in the syllabus.

\*Points cannot be earned in this class until you have signed and handed this form to the instructor.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

*(Student Copy: This copy should remain attached to your syllabus)*



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\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

*(Instructor Copy: Submit to the instructor at the end of the first class meeting)*