KINE 3050
Biomechanics
Fall 2019

KINE 3050.001 Quick Links

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chris.bailey2@UNT.edu
(940) 565-3417 (office)
PEB 210E

Office Hours: Monday 11:00 am - 12:00 pm, Thursday 8:00 am - 10:00 am, or by appointment

Teaching Assistant: Jonathan Nicholson, jonathan.nicholson@UNT.edu

Class meeting time and location: Tuesday 9:30-10:50 am, PEB 216

Prerequisite(s): BIOL 2301/2311 (human anatomy), or consent of instructor. Basic mathematics skills (algebra, geometry) are needed to successfully complete this course.

Required text(s): McGinnis, PM. Biomechanics of Sport and Exercise, 3nd ed., 2013 (Electronic version is fine, 2nd Edition is fine)

Supplementary materials: Supplementary materials may be used in class and will be made available to you via Canvas, email, or passed out as handouts.

Course Description and Objectives: Biomechanics is an introductory course designed to educate kinesiology students on the basic principles of biomechanics and their applications to human movement. This course will involve the analysis of efficient movement through a study of mechanical and anatomical principles and their application to human movement. Students who are successful in this course will meet the following objectives.

1. **Understand** the mechanical aspects of human motion:
2. **Apply** physical laws of motion to quantitatively and qualitatively analyze human motion and performance.
3. **Understand and apply** physical laws of motion to solve problems of human motion.
4. Gain **understanding** of the relationship between mechanical properties and anatomical functions.
5. **Understand** how biomechanical principles can be applied to examine human activities such as sport and orthopedic rehabilitation.

Course Activities

1. Examine mechanical properties and how these affect human motion
2. Relate specific physical parameters to human motion, e.g.: force, velocity, acceleration, momentum, torque etc. A specific example: Understanding how muscle force vectors translate into torque generation at specific joints to effect motion (linear & angular).
3. Examine biomechanical principles by solving quantitative questions regarding motion. Throughout the semester we will apply mathematics to the physical parameters of specific human motions to achieve an overall understanding of biomechanics.
4. Examine how specific anatomical structures affect movement.
5. Relate all of the above to everyday activities, especially sport and orthopedic rehabilitation related activity.

This course will necessarily draw upon a variety of disciplines including: Anatomy, Physiology, Mathematics, and Physics.

Expectations and Attendance: It is expected that students will be active participants and prepared for each class meeting. This course uses a mixture of teaching methods such as, web-based and in-class lecture, classroom discussion, and in-class activities (labs). Class meetings will typically be an active learning environment; therefore, preparation is crucial for participation. While each student is responsible for their own class attendance, your attendance will benefit you and your success in this course. Make up assignments are given only in extreme cases and missing classes will likely have adverse effects on your overall grade. Similarly, participation in class is expected and encouraged. There will be many activities and discussions over the course of this semester and your participation is required. Class activities and discussions are designed to reinforce, and support topics and concepts and a lack of participation will likely be a detriment to your overall grade.

Dress: It is expected that you will dress appropriately for class and the activity being performed during a given class. For example, if you were performing physical activity, athletic wear would be appropriate. Similarly, if you were giving a presentation, nicer attire would be expected. If your dress prevents you from participating in class activities, you will not be given a grade for the assignment.

Academic Integrity Standards and Consequences: According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Communicating with Your Professor: It is expected that you have read this syllabus prior to asking your professor questions through email or Canvas message. This is not to discourage your communication, which is absolutely encouraged, but to minimize questions that have already been answered here. Prior to messaging your professor, please check the syllabus for your answer. Additionally, there will be an FAQ discussion board in Canvas, where I will answer frequently asked questions. If the answer is not in either of these places, then move forward with the email/Canvas message. When you email, please include the course title, number, and section so that I am sure of which course you are inquiring about. Finally, if you have a question, your email should have a “?” somewhere in the text. If your message text only has periods or completely lacks punctuation, it is difficult to understand what you are requesting.

Canvas: Many materials for this course will be available on Canvas (lecture slides, articles, syllabus, schedule, etc.). Papers and other assignments may be turned in through Canvas, unless otherwise notified. Exams will also be completed through Canvas. If you have issues with Canvas, contact your professor immediately. Many Canvas assignments may have time limits or strict deadlines and undocumented technical difficulties will not be accepted as an excuse for late/incomplete work.

Accommodations: UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation.
letter to be delivered to faculty to begin a private discussion regarding one’s specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

Emergency Notification & Procedures: Emergency Notification & Procedures. UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Sexual Assault Prevention: UNT is committed to providing a safe learning environment free of all forms of sexual misconduct. Federal laws and UNT policies prohibit discrimination on the basis of sex as well as sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking and/or sexual assault, there are campus resources available to provide support and assistance. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565-2648.

Assignments, Evaluation, and Late Work Policy
There are multiple types of assignments for this course and descriptions of each are below. Assignments are planned to follow the course readings, lecture, labs, and in-class discussions. They will reinforce and facilitate application of the material learned from the readings and class sessions. All assignments have tentative due dates that coordinate to their topic and it is expected that they will be turned in on time. In rare cases, late assignments may be accepted for a reduced grade, but this is at the discretion of the professor. In extreme cases late assignments may be accepted for full credit, but this is entirely based on circumstances. If you are sick, have a medical or family emergency, etc. it is your responsibility to notify the professor in a timely manner and inquire about making up assignments. The assignments are as follows:

**Quizzes:** There will be 13 in-class small quizzes throughout the semester that follow each online lecture. These will be planned around the lectures and readings and will help to reinforce concepts and topics. These should be used as a measurement of how well you are understanding the material. Each will be very short and worth 3 points (39 pts total).

**Exams:** There will be three exams during the semester worth a total of 300 points. They will be given in class. Exams will cover the material specified in the course calendar unless otherwise delineated by the instructor. Although the exams are not designed to be cumulative, biomechanics is cumulative by nature. Thus, you will be required to use some of the skills you learned in earlier sections during later exams. Please read the exam policy on the final page for specific exam information. (300 pts total)

**Lab Assignments:** There will be two lab assignment that are planned around the lectures and readings and will help to reinforce concepts and topics. They are worth 5 points each (10 total points).

**Class Survey:** Near the end of the semester there will be a class survey where you will be awarded 1 point for completing it.
Optional points for extra credit: Practical Biomechanics Experience (20 potential points). The objective for this assignment is to provide you with an experience in practical or applied aspects of biomechanics. You are expected to complete 5 hours of involvement/observation for this assignment. You are responsible for locating and setting up the appointment(s) with an appropriate agency/location for this experience, as this is an important component of the assignment. At the end of your experience you are to write a 2-3 page summary paper on your practical experience (see grading rubric for specifics on what to include). A step-by-step guide (including forms and due dates) and the grading rubric for this assignment are posted on Canvas. Writing help: The University Writing Center is a good resource for help with the writing portion of this assignment; however, the work (ideas) must be yours. The Center is located in the Auditorium Building, Room 105. Call 565-2563 to make an appointment. All forms and papers must be uploaded on Canvas by the due dates to receive points. Many UNT computer labs have scanner you can use if needed.

Reading Assignments: (Please note) The reading assignments listed in this syllabus are intended to supplement the lecture materials. Some of the material in the text will not be covered in lecture but may be included on the exams. By the same token, all of the information given in lecture will not be found in the text but may also be included on the exams. I request and recommend that you read the assigned sections in the text before the scheduled lectures to which they apply. Due to the nature of the material in this class, it is very difficult to adequately catch up right before exams.

Grading: Grading for this course will be based on a point system with a tentative maximum of 350 points. All assignments will be graded in a timely fashion and the Canvas gradebook will be updated often. There is one extra credit opportunity offered, so please do not email me asking for another. Due to the availability of extra points, the grade cutoffs will be firm. If your grade will not round to the next value, I will not bump your grade up (for example, 79.5 = B, 79.4 = C). I will not respond to emails about extra credit or leniency in grading at the end of the semester. The grade breakdown is as follows:

<table>
<thead>
<tr>
<th>Item:</th>
<th>Max score:</th>
<th>Final Grade (points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1:</td>
<td>100 points</td>
<td>A ≥313.5</td>
</tr>
<tr>
<td>Exam 2:</td>
<td>100 points</td>
<td>B 278.5-313.4</td>
</tr>
<tr>
<td>Exam 3:</td>
<td>100 points</td>
<td>C 243.5-278.4</td>
</tr>
<tr>
<td>Learning module quizzes (13 @ 3 points each):</td>
<td>39 points</td>
<td>D 208.5-243.4</td>
</tr>
<tr>
<td>Laboratory assignments (2 @ 5 points each):</td>
<td>10 points</td>
<td>F &lt;=208.4</td>
</tr>
<tr>
<td>Class survey</td>
<td>1 point</td>
<td></td>
</tr>
<tr>
<td>Total points available</td>
<td>350 points</td>
<td></td>
</tr>
</tbody>
</table>
Class Schedule: The class schedule is tentative and subject to change at any time. It will be available on Canvas and you should check it often.

<table>
<thead>
<tr>
<th>Week/Day</th>
<th>Topics and Exams</th>
<th>Reading etc.</th>
<th>Assignments due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (8/27)</td>
<td>Class outline/Syllabus Introduction</td>
<td>Syllabus, Introduction Appendix A,</td>
<td>Intro Quiz due by 11:59 pm 9/1</td>
</tr>
<tr>
<td>2 (9/3)</td>
<td>Forces</td>
<td>Ch. 1</td>
<td>Lab 1 &amp; Forces quiz due by 11:59 pm 9/8</td>
</tr>
<tr>
<td>3 (9/10)</td>
<td>Linear Kinematics</td>
<td>Ch. 2</td>
<td>Linear Kinematics quiz due by 11:59 pm 9/15</td>
</tr>
<tr>
<td>4 (9/17)</td>
<td>Linear Kinetics</td>
<td>Ch. 3</td>
<td>Lab 2 &amp; Linear Kinetics quiz due by 11:59 pm 9/22</td>
</tr>
<tr>
<td>5 (9/24)</td>
<td>Exam 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (10/1)</td>
<td>Work, Power, Energy</td>
<td>Ch. 4</td>
<td>WPE quiz due by 11:59 pm 10/6</td>
</tr>
<tr>
<td>7 (10/8)</td>
<td>Torques &amp; Moments</td>
<td>Ch. 5</td>
<td>Torque quiz due by 11:59 pm 10/13</td>
</tr>
<tr>
<td>8 (10/15)</td>
<td>Angular Kinematics</td>
<td>Ch. 6</td>
<td>Angular Kinematics quiz due by 11:59 pm 10/20</td>
</tr>
<tr>
<td>9 (10/22)</td>
<td>Angular Kinetics</td>
<td>Ch. 7</td>
<td>Angular Kinematics quiz due by 11:59 pm 10/27</td>
</tr>
<tr>
<td>10 (10/29)</td>
<td>Exam 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 (11/5)</td>
<td>Tissues Stress, Bone &amp; Joints</td>
<td>Ch. 9 &amp; 10</td>
<td>Tissue Stress &amp; Bone &amp; Joint quizzes due by 11:59 pm 11/10</td>
</tr>
<tr>
<td>12 (11/12)</td>
<td>Tendons &amp; Ligaments</td>
<td>Ch. 9 &amp; 10</td>
<td>Tendons &amp; Ligaments quiz due by 11:59 pm 11/17</td>
</tr>
<tr>
<td>13 (11/19)</td>
<td>Muscle I</td>
<td>Ch. 11 &amp; 12</td>
<td>Muscle I quiz due by 11:59 pm 11/24</td>
</tr>
<tr>
<td>14 (11/26)</td>
<td>Muscle II</td>
<td>Ch. 11 &amp; 12</td>
<td>Muscle II quiz due by 11:59 pm 12/1</td>
</tr>
<tr>
<td>15 (12/3)</td>
<td>Exam 3</td>
<td></td>
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<tr>
<td>16 (12/12)</td>
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Examination Policies
1. Two exams will be scheduled during the semester. Each exam will consist of objective items (true-false, multiple choice, matching etc.). The exams will not be cumulative.
2. Students will not be allowed to leave the room during exams and quizzes. Please attend to any personal needs before the exam.
3. Quizzes are administrated at the beginning of class on assigned dates. If you are late you will not be granted additional time to complete the quiz. If you arrive after the quiz has been completed, you will not be allowed to complete the quiz (with the exceptions stated in #4 below).
4. Make-up exams and quizzes will be considered only for exceptional circumstances or university approved absence. (Note: “I overslept”, “I’m tired”, “I’m not prepared”, etc. are not exceptional circumstances). Any student who fails to contact the instructor prior to any missed exam or quizzes might not be allowed to make-up the exam. It is your responsibility to contact the instructor in case of an emergency
5. Absence for medical reasons requires written dated verification by a physician.
6. Exams and quizzes will not be rescheduled based on a student’s personal work/school schedule. Please plan ahead.
7. Questions/concerns regarding grading for any exam, quiz, or assignment must be resolved with the instructor within one week of the date graded exams are returned to the student.
8. All exams and quizzes are non-circulating.
9. Make-up exams will only be granted in cases of extreme circumstances.
10. During exams and quizzes, hats must be removed or turned backwards and phones/pagers must be turned off and stored out of sight.

11. In the event that a student arrives late to an exam or quiz and one or more students have already completed the exam, the late student will not be allowed to take the exam and will receive a 0 for that exam.

12. Students must bring #2 pencils and a calculator to each exam and quiz. **No cell phone, PDA etc. calculators will be allowed.** I will not have any for you to borrow and you may not share calculators with others in the class.