KINE 5328/6328 Neuromuscular Physiology of Exercise
Fall 2020

Instructor: Dr. Mark Ricard
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Office Phone: (817) 272-0764
Lab Phone: (817) 272-9185

Office Hours: By appointment

Location & Time: on Teams Wednesday, 5:00 PM – 9:50 PM

Faculty Profile: https://www.uta.edu/mentis/profile/?445

Required Textbook: None

Other Requirements: Matlab, Microsoft OneDrive and OneNote

Course Description: KINE 5328 NEUROMUSCULAR PHYSIOLOGY OF EXERCISE  The structure and function of muscle, including the motor unit, control and integration, central and peripheral modifiers of neuromuscular control and biochemical characteristics of fibers will be studied. These concepts will also be applied to concepts in strength and power development.

Student Learning Outcomes:
Upon successful course completion, students will demonstrate their:
1. Understanding of the role of actin, myosin and titin on muscle force generation on a written exam
2. Understanding of muscle force-length and force-velocity relationship on a written exam
3. Understanding of the role of fiber recruitment and firing rate upon EMG force/fatigue relationship on a written exam.
4. Understanding of the role of the golgi tendon organ and muscle spindle on emg reflex components on a written exam.
5. Ability to use Matlab to analyze emg activation
6. Ability to use Matlab to normalize emg signals
7. Ability to use Matlab to quantify reflex & preactivation components of EMG
8. Ability to use Matlab to analyze muscle force-velocity
9. Ability to use Matlab to analyze muscle force-length
10. Ability to use Matlab to analyze EMG onset and duration analysis

To install Matlab
Being associated with the UTA license will permit you to download, install, and activate your own copy of the latest version of Matlab. If you do not have an account established, you will need to create an account using your UTA e-mail address at http://www.Mathworks.com. Then you may reference the instructions provided at https://www.mathworks.com/help/install/ug/install-mathworks-software.html which will guide you further in obtaining, installing and activating the Matlab software.

Check the following toolboxes
Curve Fitting Toolbox
Signal Processing Toolbox
Wavelet Toolbox

https://www.mathworks.com/learn/tutorials/matlab-onramp.html
Matlab App Designer

Getting Started with Matlab

Required Readings:


Grading

Grades in this course will be based on the following percentages:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Grading Scale:**

- 90 - 100%   A
- 80 - 89%    B
- 70 - 79%    C
- 60 - 69%    D
- 0 - 59%     F
Attendance Policy: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I have established the following attendance policy: attendance is MANDATORY. I will use Echo360 to take attendance; students will receive a zero for all missed Echo360 quizzes. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student, a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

It is important that students understand that any attendance rules applied in your course are your own and not a matter of institutional policy. Doing so will keep the University in compliance with Federal regulations as they apply to Title IV funding. (For a summary, see [http://www.tgsic.org/pdf/Program-integrity-R2T4-Taking-Attendance.pdf](http://www.tgsic.org/pdf/Program-integrity-R2T4-Taking-Attendance.pdf).) If you are teaching a course in which attendance / hours must be tracked to meet other non-institutional requirements (e.g., to earn an academically-grounded professional credential), be sure to clearly indicate the agency that has established the requirement.

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Homework &amp; Quizzes in Canvas</th>
<th>Lab Topic &amp; Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 26</td>
<td>Introduction to Matlab A/D conversion in Matlab</td>
<td>Complete Matlab Onramp course</td>
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<tr>
<td>Sept 2</td>
<td>Enoka RM. A primer on motor unit physiology</td>
<td>EMG data collection of force and the First Dorsal Interosseous (FDI)</td>
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<tr>
<td>Sept 9</td>
<td>Matlab EMG-Force Analysis</td>
<td>Root Mean Square (RMS)</td>
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<tr>
<td>Sept 16</td>
<td>Bilodeau Emg power spectra of elbow extensors during ramp and step isometric contractions</td>
<td>Linear Envelope</td>
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<td>Sept 23</td>
<td>EMG Normalization Methods</td>
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<tr>
<td>Sept 30</td>
<td>Manual Muscle Testing</td>
<td></td>
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<tr>
<td>Oct 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 14</td>
<td>EMG Methods and Analysis using Matlab</td>
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<tr>
<td>Oct 21</td>
<td>Muscle Force-Velocity</td>
<td>Introduction to Biodex force-velocity and force-length</td>
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<tr>
<td>Oct 28</td>
<td>Muscle Force-Length</td>
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<td></td>
<td>Collect elbow flexor full force-velocity curve</td>
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<tr>
<td>Nov 4</td>
<td>Muscle Preactivation and Reflex</td>
<td>Hop on force plate</td>
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<td>Nov 11</td>
<td>Gastroc, Soleus and Tib Ant balance analysis on force plate</td>
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<td></td>
<td>Loram ID, Lakie M. Human balancing of an inverted pendulum</td>
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<tr>
<td>Nov 18</td>
<td>NeuroCom anterior – posterior plate translation (Ga, So, Ta)</td>
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<tr>
<td>Dec 2</td>
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<td>Dec 9</td>
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<tr>
<td>Dec 16</td>
<td>Final Exam Wednesday, Dec 16 5:00 PM</td>
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**Make-up Exams:** If you miss an exam due to illness or a planned trip it is your responsibility to arrange a make-up exam.

**Expectations for Out-of-Class Study:** Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student’s responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

**Institution Information**

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (http://www.uta.edu/provost/administrative-forms/course-syllabus/index.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

**Lab Safety Training:**

[Required for laboratory courses in the Colleges of Engineering and Science where students may be working with chemicals, biological material, radiological material or lasers] **Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities.** Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., Fall through Summer II) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education
Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit [www.uta.edu/titleIX](http://www.uta.edu/titleIX) or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

**Academic Integrity:** Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

> I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
>
> I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at [http://www.uta.edu/oit/cs/email/mavmail.php](http://www.uta.edu/oit/cs/email/mavmail.php).

**Campus Carry**

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit [http://www.uta.edu/news/info/campus-carry/](http://www.uta.edu/news/info/campus-carry/).

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit [http://www.uta.edu/sfs](http://www.uta.edu/sfs).

**Final Review Week:** for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of
the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at the rear of the classroom and at the front right & left of classroom. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.  
http://www.uta.edu/police/Evacuation Procedures.pdf

Students should also be encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at https://mavalert.uta.edu/ or https://mavalert.uta.edu/register.php

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

**The IDEAS Center (2nd Floor of Central Library)** offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

**Emergency Phone Numbers:** In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Home Page library.uta.edu

Resources for Students

**Academic Help**

Academic Plaza Consultation Services library.uta.edu/academic-plaza

Ask Us ask.uta.edu/

Library Tutorials library.uta.edu/how-to

Subject and Course Research Guides libguides.uta.edu

Subject Librarians library.uta.edu/subject-librarians

**Resources**

A to Z List of Library Databases libguides.uta.edu/az.php
Course Reserves pulse.uta.edu/vwebv/enterCourseReserve.do

FabLab fablab.uta.edu/

Special Collections library.uta.edu/special-collections

Study Room Reservations openroom.uta.edu/

**Teaching & Learning Services for Faculty**

Copyright Consultation library-sc@listserv.uta.edu

Course Research Guide Development, Andy Herzog

amherzog@uta.edu or your subject librarian

Data Visualization Instruction, Peace Ossom-Williamson peace@uta.edu

Digital Humanities Instruction, Rafia Mirza rafia@uta.edu

Graduate Student Research Skills Instruction, Andy Herzog amherzog@uta.edu or your subject librarian

Project or Problem-Based Instruction, Gretchen Trkay gtrkay@uta.edu

Undergraduate Research Skills Instruction, Gretchen Trkay gtrkay@uta.edu or your subject librarian.