**SYLLABUS FOR KINE 7970 001**

**Maximal Oxygen Uptake**

**School of Kinesiology**

**Fall, 2024**

**Course Number:** KINE 7970 001

**Course Title:** Maximal Oxygen Uptake

**Credit Hours:** 3 hours

**Meeting Times:** In-Class; 3:30-4:45pm, TR on dates noted below.

Out of Class Work/Assignments; all other class days.

**Meeting Place:** Student Activities Ctr 247; or Zoom if needed.

**Instructor:** L. Bruce Gladden – 334-707-0102; [gladdlb@auburn.edu](mailto:gladdlb@auburn.edu)

Office Hours: 9:15am-10:15am Mondays/Wednesdays

Almost any time via appointment with short turnaround.

**Textbook:** None. We will use papers from the published literature.

**This class is planned for in-person but may switch to Zoom entirely or be supplemented with Zoom meetings, depending on ongoing events. You will receive a Zoom invitation for this class if needed. See the end of this syllabus for additional detailed information relative to COVID-19, RSV, and Flu considerations.**

This is a Graduate School course. It is imperative that you come to class prepared to discuss the topic of the day. To derive optimal benefits from our discussions, previous knowledge of the topic is required. Therefore, all students are expected to read all assignments prior to class, and to review material from previous class meetings as needed. You will be asked to provide evidence that you are already familiar with the readings.

**KINE 7970 Course Outline:**

The course outline that follows is a baseline schedule. It is subject to change. This allows flexibility in dealing with different topics. For example, if more discussion arises on a particular subject or set of papers, it may take longer to cover it. In other cases, less time may be required. You will be informed regularly and promptly of any changes.

T Aug 20 Orientation and planning/assignments for remainder of semester.

R Aug 22 Choosing papers and preparing presentations.

T Aug 27 **O2max Overview by Gladden.**

What is it?

Why do we care?

How do we measure it?

Materials: O2 Calculations on Canvas.

The Atmosphere: <https://www.noaa.gov/jetstream/atmosphere>

R Aug 29 Choosing papers and preparing presentations.

T Sep 3 **O2max Plateau by Gladden.**

Materials: Taylor HL, Buskirk E, Henschel A. Maximal oxygen intake as an objective measure of cardio-respiratory performance. *J Appl Physiol* 8(1):73-80, 1955.

Rossiter HB, Kowalchuk JM, Whipp BJ. A test to establish maximum O2 uptake despite no plateau in the O2 uptake response to ramp incremental exercise. *J Appl Physiol* 100:764-770, 2006.

Poole DC, Jones AM. Measurement of the maximum oxygen uptake O2max: O2peak is no longer acceptable. *J Appl Physiol* 122:997-1002, 2017.

R Sep 5 Choosing papers and preparing presentations.

T Sep 10 **The O2 cascade and meaning of O2max – by Gladden.**

Materials: Richardson RS, Duteil S, Wary C, Wray DW, Hoff J, Carlier PG. Human skeletal muscle intracellular oxygenation: the impact of ambient oxygen availability. *J Physiol* 571.2:415-424, 2006.

Mitchell JH, Sproule BJ, Chapman CB. The physiological meaning of the maximal oxygen intake test. *J Clin Invest* 37:538-547, 1958.

R Sep 12 **Distributed control of O2max – Readings.**

Materials: Wagner PD. Determinants of maximal oxygen consumption. *J Muscle Res Cell Motil* 44(2):73-88, 2023.

Broxterman RM, Wagner PD, Richardson RS. Endurance exercise training changes the limitation on muscle O2max in normoxia from the capacity to utilize O2 to the capacity to transport O2. *J Physiol* 602(3):445-459, 2024.

Gladden LB. Distributed control of O2max. *J Physiol* 602(3):421-422, 2024.

T Sep 17 **Distributed control of O2max – by Gladden.**

Materials: Readings from previous week.

R Sep 19 Choosing papers and preparing presentations.

T Sep 24 **Discussion: O2max and Pulmonary gas exchange.**

Materials: Dempsey JA, Hanson PG, Henderson KS. Exercise-induced arterial hypoxaemia in healthy human subjects at sea level. *J Physiol* 355:161-175, 1984.

Powers SK, Lawler J, Dempsey JA, Dodd S, Landry G. Effects of incomplete pulmonary gas exchange on O2max. *J Appl Physiol* 66(6):2491-2495, 1989.

Harms CA, McClaran SR, Nickele GA, Pegelow DF, Nelson WB, Dempsey JA. Effect of exercise-induced arterial O2 desaturation on O2max in women. *Med Sci Sports Exerc* 32(6):1101-1108, 2000.

Sep 26 Choosing papers and preparing presentations.

T Oct 1 **Discussion: O2max and Maximal Cardiac Output.**

Materials: Levine BD. O2max: what do we know, and what do we still need to know? *J Physiol* 586.1:25-34, 2008.

Bassett, Jr DR, Howley ET. Limiting factors for maximum oxygen uptake and determinants of endurance performance. *Med Sci Sports Exerc* 32(1):70-84, 2000.

R Oct 3 Choosing papers and preparing presentations.

T Oct 8 **Discussion:** **O2max and Muscle Gas Exchange.**

Materials: Poole DC, Musch TI. Capillary-mitochondrial oxygen transport in muscle: paradigm shifts. *Function* 4(3):zqad013; 1-23, 2023.

R Oct 10 **Fall Break.**

T Oct 15 **Discussion: O2max and Muscle Mitochondrial O2 Utilization.**

Materials: Gifford JR, Garten RS, Nelson AD, Trinity JD, Layec G, Witman MAH, Weavil JC, Mangum T, Hart C, Etheredge C, Jessop J, Bledsoe A, Morgan DE, Wray DW, Rossman MJ, Richardson RS. Symmorphosis and skeletal muscle O2max:  *in vivo* and *in vitro* measures reveal differing constraints in the exercise-trained and untrained human. *J Physiol* 594.6:1741-1751, 2016.

Broxterman RM, Wagner PD, Richardson RS. Endurance exercise training changes the limitation on muscle O2max in normoxia from the capacity to utilize O2 to the capacity to transport O2. *J Physiol* 602.3:445-459, 2024.

R Oct 17 Choosing papers and preparing presentations.

T Oct 22 **Gladden out of town (VA Tech Review).**

R Oct 24 Choosing papers and preparing presentations.

T Oct 29 **Student Presentation #1.**

R Oct 31 Choosing papers and preparing presentations.

T Nov 5 **Student Presentation #2.**

R Nov 7 Choosing papers and preparing presentations.

T Nov 12 **Student Presentation #3.**

R Nov 14 Choosing papers and preparing presentations.

T Nov 19 **Student Presentation #4.**

R Nov 21 **Gladden out of town (IPE Meeting).**

T Nov 26 **Thanksgiving Break (Nov 25-29).**

R Nov 28 Choosing papers and preparing presentations.

T Dec 3 **Student Presentation #5.**

R Dec 5 Wrap-Up.

**ASSIGNMENTS**

Each class member will choose a published paper (to be cleared **two weeks** ahead of time by Dr. Gladden) and prepare a 20-min PowerPoint presentation (minimum of 20min; maximum of 25min) for the class. The paper must be an original data article on a limiting/determining factor for O2max. This paper will be shared in advance with all class members.

Everyone (including the presenter) must read the chosen paper carefully and submit **three** questions about the paper. Be prepared to ask at least one of your questions in class if the opportunity allows. The three questions are due by midnight on the Friday immediately preceding the week during which the corresponding paper will be discussed. Each question is worth one point.

For every Tuesday that Gladden presents or there is a Discussion, everyone must submit **three** questions on the topic.

**GRADING**

1. There will be 39 questions, each worth 1 point, for a total of 39 points.

3. Surprise quizzes are a possibility. If given, they would be worth 10 points each.

90.00% or greater = A

80.00%-89.99% = B

70.00%-79.99% = C

60.00%-69.99% = D

less than 60.00% = F

**Curving** – DO NOT request that grades be adjusted (curved); the grading scheme above is based on 40+ years of teaching this class.

**Extra Credit** – There is no scheduled extra credit in this class; there is only credit. Should “extra” credit opportunities arise, they will be offered to all students in the class.

**Class Policy Statements:**

**Covid-19, RSV, Flu issues –** please see the end of this syllabus for details.

**Unannounced Quizzes -** There could be unannounced quizzes in this class.

**Email –** You are responsible for checking your e-mail regularly and in a timely manner for any communications related to this class. The University has requested that all students use their Auburn University email accounts. This is the most efficient way for instructors to communicate with an entire class, and the University will occasionally send global notices that are important for all students. For this class, it is a requirement that you check your Auburn University email frequently.

**Electronic Devices** - As a courtesy to others, turn your cell phone completely off during class or individual meetings with me. If you are expecting an extremely important call, please let me know at the beginning of class or appointment. Similarly, texting, surfing, or other electronic use (e.g., computer, iPad, etc.), unless directly related to the class or appointment, is strictly prohibited. If these policies are violated, you will be asked to leave class or the appointment.

**Attendance -** Although roll will not be taken specifically, it is expected that students taking a graduate class will attend every class meeting and will actively participate in class discussions. Please refer to the Student Policy eHandbook (<http://www.auburn.edu/student_info/student_policies/>) for the definition of excused absences. Students are expected to show evidence of thorough reading of assigned materials. Students are responsible for initiating arrangements for missed work.

**Disability Accommodations -** Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. If you have not established accommodations through the Office of Accessibility, but need accommodations, make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096 (V/TT).

**Honesty Code** – The University Academic Honesty Code and the Student Policy eHandbook (<http://www.auburn.edu/student_info/student_policies/>) pertaining to Cheating will apply to this class.

**Professionalism** – As faculty, staff, and students interact in educational settings, they are expected to demonstrate professional behaviors as defined in the College of Education’s conceptual framework. These professional commitments or dispositions are as follows: 1) engage in responsible and ethical practices, 2) contribute to collaborative learning communities, 3) demonstrate a commitment to diversity, and 4) model and nurture intellectual vitality.

**COVID-19, RSV, Flu CONSIDERATIONS/POLICIES**

**Health and Well-Being Resources**

These are difficult times, and academic and personal stress is a natural result. Everyone is encouraged to take care of themselves and their peers. If you need additional support, there are several resources on campus to assist you:

● COVID Resource Center (http://auburn.edu/covid-resource-center/)

● Student Counseling and Psychological Services (http://wp.auburn.edu/scs/)

● AU Medical Clinic (https://cws.auburn.edu/aumc/)

● If you or someone you know are experiencing food, housing or financial insecurity, please visit the Auburn Cares Office (http://aucares.auburn.edu/)

**A Healthier U Campus Community Expectations**

We are all responsible for protecting ourselves and our community. Please go to the AU COVID Resource Center for AU’s information/instructions about COVID, and be aware of other communicable diseases (e.g., RSV and the Flu) that might be circulating within our community.

**Course contingency**

If normal class is disrupted due to illness, emergency, or crisis situation, the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials.

**Face Covering Request**

Should health conditions within Auburn University or the Auburn community at large warrant it, I may ask that you wear a properly worn, acceptable face mask in our in-person class meetings.

**Physical Distancing Policy Request**

Face coverings are not a substitute for physical distancing. Should local health conditions warrant it, I will request that students observe appropriate physical distancing and follow all classroom signage. If the instructional space has designated entrance and exit doors, you should use them.

**Possibility of going remote**

This course may require particular technologies to complete coursework. If you need access to additional technological support, please contact the AU Bookstore at aubookstore@auburn.edu. In the event that the University is forced to move to fully online instruction, please be assured that the learning goals and outcomes of the course will not change; however, some aspects of the course will change in terms of the mode of delivery, participation, and testing methods. Those details will be shared via an email message within 24 hours of the announcement that we are going remote. Please be prepared for this contingency by ensuring that you have access to a computer and Internet.

**Assignment/Schedule subject to change due to health conditions**

Please be aware that the situation regarding communicable diseases is frequently changing, and the delivery mode of this course may adjust accordingly. In the event that the delivery method is altered, please be assured that the learning goals and outcomes of the course will not change; however, some aspects of the course will change in terms of the mode of delivery, participation, and testing methods. Those details will be shared via email as soon as possible. Please be prepared for this contingency by ensuring that you have access to a computer and reliable Internet. The course schedule and assignments are designed with the most up-to-date information and policies in mind. If the situation changes, I will make every effort to keep the schedule as consistent as possible; however, please note that the due dates for assignments and tests may be changed during the semester in response to the changing health and safety requirements or policies of the University. When changes are made, they will be communicated via email and all assignment due dates will be updated.

In the event a student in class becomes ill, and in-person meetings are occurring, please contact me immediately and I will make arrangements for you to receive class instruction at home until you feel better.

If I am unable to attend any in-person portions of the class, we will transition to a fully online course until I am allowed to return. If I become ill or unable to lead the class, a backup instructor will be identified and he/she will communicate any changes or updates to the course schedule or mode of instruction as soon as possible.

**Zoom policies**

If we meet on Zoom, your attendance, attention, and participation are expected. Zoom participation requires you to keep your video on and your microphone muted when you are not speaking. Although you may be participating from your domicile, our Zoom meetings are professional interactions. You should dress and behave as you would in a normal in-person classroom. To the extent possible, please minimize distractions in the background. I reserve the right to dismiss anyone from a Zoom meeting whose environment or behavior is distracting or problematic. If you have any issues with sharing your video feed, adhering to this policy, or anything else related to your use of Zoom please notify me via email in the first week of class. I’m happy to consider and provide accommodations, but you will need to be in communication with me.

**Attendance**

Your health and safety, and the health and safety of your peers, are my top priorities. If you are experiencing any symptoms of COVID-19 or other contagious diseases, or if you discover that you have been in close contact with others who have symptoms or who have tested positive, you should not attend in-person classes. You will not be penalized for such an absence nor will you be asked to provide formal documentation from a healthcare provider. My hope is that if you are feeling ill or if you have been exposed to someone with the virus or other contagious illness, you will stay home to protect others.

Please do the following in the event of any illness or COVID-related absence:

* Notify me in advance of your absence if possible
* If you are quarantined or otherwise need to miss class because you have been advised that you may have been exposed to COVID-19, you will be expected to develop a plan to keep up with your coursework during any such absences
* Participate in class activities and submit assignments electronically as much as possible
* Notify me if you require a modification to the deadline of an assignment or exam

Students with questions about COVID-related illnesses should reach out to the COVID Resource Center at (334) 844-6000 or at <http://auburn.edu/covid-resource-center/>.

Finally, if remaining in a class and fulfilling the necessary requirements becomes impossible due to illness or other COVID-related issues, please let me know as soon as possible so we can discuss your options.