

## COURSE SYLLABUS

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**Course Code and Title:** KIN459 Psychobiology of Physical Activity

(Previously listed as KIN489X)

**Class Meeting time(s):** Tuesday, Thursday 11:00am to 12:30pm

**Instructor Name:** Eli Puterman

**Contact Information:** [eli.puterman@ubc.ca](mailto:eli.puterman@ubc.ca) or 604.822.2854

**Office Hours:** By appointment, location: Zoom or 104-2176 Health Sciences Mall

**Teaching Assistant:** Boaz Injege [boaz.injege@ubc.ca](mailto:boaz.injege@ubc.ca)

**Class location:** Orchard Commons Room 1001

### ACKNOWLEDGEMENT OF MUSQUEAM FIRST NATION PEOPLE AND LAND

UBC's Point Grey Campus is located on the traditional, ancestral, occupied, and unceded territory of the xwməθkwəy̓əm (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on in their culture, history, and traditions from one generation to the next on this site.

### COURSE DESCRIPTION

This course offers an in-depth exploration of the effects of exercise and physical activity on psychiatric disorders, well-being, and brain structures, functions, and processes that mediate these effects. This course evaluates observational and intervention studies in humans, mostly, to provide a comprehensive examination of the concepts and methods used in health psychology and behavioural medicine.

### RATIONALE

In 2014, 23% of Canadians reported their lives to be quite or extremely stressful (Statistics Canada). 11% were at risk for depression at some point in their lifetime. With the emergence of COVID-19, depression, anxiety, and general stress levels have tripled to quadrupled nationally and internationally.

A wide literature has identified how depressed mood and stress gets ‘under our skin’, through poor engagement in healthy behaviours and by way of the biological ‘stress response.’ The question then is, what if those who are depressed or experiencing long-term stress become physically active? What psychological, social, and biological

response processes are altered following exercise? To better understand and appreciate the full extent to which physical activity and exercise improve health and well-being, it is necessary to have a fundamental understanding of the psychobiological processes that are modified by physical activity. We also review the effects of stress and psychobiological processes on engagement in physical activity and performance during exercise.

## AIMS

The aim of the course is for students to be confident in their understanding of the psychiatric and neurobiological effects of exercise and physical activity, and the varied conceptual and research methods utilized to scientifically frame and examine the psychobiological effects of physical activity and exercise.

Of particular importance is that this course is meant to support learners in their emerging capacities as 'evaluators' of evidence. Through in depth exploration of peer-reviewed manuscripts, learners will continue to develop their capacities in reading research articles, evaluating them appropriately, and linking them to similar topics.

## Educational outcomes

- Understand the effects of physical activity on depression, anxiety, and other mood states, and vice versa.
- Understand the effects of physical activity on psychobiological brain structures and functions
- Understand the stress response system, including psychological and neurobiological processes
- Appreciate the role the biological stress response system plays in disease development and progression
- Be familiar with the scientific methods used in both rodent and human research to discover the effects of physical activity and exercise on the varied psychobiological processes examined
- Understand the biological underpinnings of stress, threat, and challenge and how they may impact engagement in physical activity and exercise
- Develop skills in presenting research ideas and results in written assignments and in front of an audience

It is important for students in kinesiology to have knowledge of the psychobiological effects of physical activity and exercise. Many patients in hospital and clinic settings either come from backgrounds with high adversity or the experience of a disease diagnosis causes high levels of stress. In either circumstance, it is essential to understand how physical activity can directly improve their disease status and what pathways are corrected.

## **Specific Learning Objectives:**

Upon completion of the course, students will be able to

- Describe different methods for designing research trials for behavioural interventions
- Describe features of an exercise program that are needed to consider when planning an intervention trial
- Describe the symptoms of depression, its prevalence, impact on health
- Describe impact of exercise on depression levels in healthy adults and adults with depression
- Gain proficiency in evaluating trials for bias
- Describe different ways to assess mood and affect
- Describe the role of both acute and chronic effects of physical activity and exercise on mood and affect
- Describe strengths and weaknesses of experimental laboratory studies and naturalistic studies
- Describe areas of the brain impacted by physical activity
- Describe some of the neurotransmitters affected by physical activity
- Describe effects on the structure and function of brain regions following intervention trials
- Describe the hypothalamic-pituitary-adrenal axis and sympathetic adrenal medullary pathway and their relationships to health
- Describe the different observational, laboratory, and daily process methods to assess the psychobiological impacts of stress and physical activity
- Describe how stress impacts engaging in a physically active lifestyle
- Describe the differences between threat and challenge and how they differentially impact performance, including exercise performance
- Conduct literature searches in Pubmed, Web of Science, and other online databases
- Consolidate and present concepts and results from the extant literature in written and oral forms
- Design a research study based on the existing literature and write up the design

## **CLASS FORMAT AND PROCEDURES:**

This course is held on Tuesdays and Thursdays at 11:0 – 12:30 pm.

The course is structured as a lecture/seminar. The course will include weekly readings of review articles and meta-analyses, professor-led discussions, and student participation. It is strongly encouraged that all students come to class prepared to discuss the weekly readings.

## COURSE REQUIREMENTS

The course is structured as follows:

Each new concept (presented as a module) will be introduced with a series of chapters, peer-reviewed systematic/narrative reviews, or meta-analyses. On these days, students are expected to come to each class prepared to engage in discussion on the readings, however, the Instructor will lead the class with presentations on the topic. On the last day of the Instructor-led scheduled classes for every module, students are expected to send a Commentary (four in total over the course) and 2-3 comments on the readings and lectures for the section (see assignments below). On the final day for each section, students and the instructor will engage in a didactic exploration to discuss the materials presented based on the commentaries submitted. Please see the Evaluation section below to see how in-class participation and comments/questions sent to the professor will be graded.

## UNIVERSITY POLICIES

It is your responsibility to become familiar with the University of British Columbia's Academic Honesty and Plagiarism Policies, as well as the Student Declaration and the consequences of violating these policies.

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here (<https://senate.ubc.ca/policiesresources-support-student-success>).

## POLICIES AND EXPECTATIONS

**Absences due to Illness:** If you are sick, it is important that you stay home. Complete a self-assessment for COVID-19 symptoms here: <https://bc.thrive.health/covid19/en>. In this course, the schedule can be accommodated so that you can prioritize your health and still succeed. It is imperative that you take care of your health!

### *Class Attendance*

While you are not graded on attendance, you should attend all lectures. You are responsible for all material covered in class and any information given whether in attendance or not. You are also responsible for getting your own notes from class, as well as information pertaining to changes in the course outline, readings, and assignments.

### *Academic Accommodation for Students with Disabilities*

The University's goal is to ensure fair and consistent treatment of all students, including students with a disability, in accordance with their distinct needs and in a manner consistent with academic principles. Students with a disability who wish to have an academic accommodation should contact Access and Diversity without delay. The Instructor should be informed of any accommodations.

#### *Email*

Attempting to teach or explain material over e-mail can be difficult and ineffective. If you have questions about course material or concepts, those questions should be addressed in person. Please seek clarification on course material in class, during breaks, after class, or by scheduling an office visit with the instructor. E-mail should be used for a limited number of reasons, including: scheduling a time to meet, in cases of emergency that may cause you to miss an assignment, or situations otherwise detailed in class. It may take up to 48 hours to respond to your email during the week and I do not check my email on weekends, nor will your teaching assistant. Please keep this in mind around the time your assignments are due. Please include "KIN 459" in the subject line of emails.

#### *Academic Integrity*

All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action. It is your responsibility to become familiar with the University of British Columbia's Academic Honesty and Plagiarism Policies, as well as the Student Declaration and the consequences of violating these policies.

From the School of Kinesiology Academic Advising Office:

Any cases of academic misconduct are passed on to the Dean of the Faculty of Education or Dean of Graduate and Postdoctoral Studies at UBC. The first course of action is typically a "0" for the coursework or exam where academic misconduct was observed. However, cases of misconduct are all investigated and can be forwarded to the President's Advisory Committee on Academic Misconduct. This can result in anything from failing a course to expulsion. It is an ugly process to be accused of academic misconduct, so please advise the students to adhere to UBC policies on academic integrity.

Please review UBC's content on academic integrity. <https://academicintegrity.ubc.ca/>.

From the website: "At UBC, you have an incredible opportunity to learn and grow with a global community of students. Over the course of your program, you will cement knowledge, competencies, skills, as well as personal values and principles that will guide your decisions for the rest of your life. Learning with integrity will set the stage for being an ethical professional after you graduate. Breaching integrity at UBC or in your

professional life can have irreversible consequences such as a course mark of zero, suspension, or expulsion from the university.”

“Using someone else’s work without permission or having someone else do the work means that students are not contributing what is expected of them.”

### **“Types of Academic Misconduct”**

“Academic misconduct includes any conduct by which a student gains or attempts to gain an unfair academic advantage or benefit thereby compromising the integrity of the academic process, or helping or attempting to help another person commit an act of academic misconduct or gain, or attempt to gain, an unfair academic advantage.

- 1. Falsification**
- 2. Cheating**
- 3. Plagiarism and patchwriting**

If you use any ideas or knowledge that you did not generate on your own, you must provide proper attribution and citations.

...simply changing some of the words in the written work of others does not make it OK to present as your own work. This is known as *patchwriting*, and is still a form of plagiarism if attribution is not provided.

- 4. Self-plagiarism**
- 5. Impersonation**
- 6. Contract cheating**

This form of academic misconduct occurs when a student willfully uses a third-party to generate work or provide answers

Using a third-party website to provide answers during an online exam or assignment is another example of this. If you willingly use work that was generated by someone else for the express purpose of being submitted by you, you have committed contact cheating.

### *Statement on Diversity and Inclusivity*

Education is a multidisciplinary field that brings together faculty, students and others from diverse academic and personal backgrounds. UBC’s Faculty of Education is committed to creating a respectful workplace and learning environment that supports inclusion based on the principles of equity, diversity and social justice in order to create an environment that supports its community members’ full participation. The Faculty of Education is committed to providing accessible, usable, and welcoming spaces for faculty, staff, students, and visitors who have disabilities, are members of racialized communities, Indigenous, transgender, two-spirit and gender-diverse people, regardless

of their age, sexual orientation, social status, religion, ethno- linguistic, nationality and/or citizenship status.

Faculty of Education courses take place in learning environments that are inclusive of gender identity, gender expression, sex, race, ethnicity, class, sexual orientation, ability, age, etc. Learners and educators expect to be treated respectfully at all times and in all interactions. Non-sexist, non-racist, non-homophobic, non-transphobic, and non-heterosexist language is expected in Faculty of Education classes, course content, discussions, and assignments.

Please feel welcome to e-mail your instructor your name and pronoun and how you would like these to be used.

### **Course Content Warning**

The classroom provides an open space for the critical and civil exchange of ideas. Some readings and other content in this course will include topics that some students may find difficult. I'll aim to forewarn students about potentially disturbing content and I ask all students to help to create an atmosphere of mutual respect and sensitivity.

### **READINGS AND RESOURCES**

Required readings are presented in the Course Schedule. It is expected that the articles assigned be read prior to each class.

For classes with class slides, class slides will be made available in pdf file-format through the course website on CANVAS. Students are encouraged to bring these slides along with paper and pen to class. Slides will be posted within 24-hours prior to each class (hopefully!). Please keep in mind that these notes provide an overview of what will be covered and do not contain information related to discussions, in-class assignments, or detailed examples, which will be covered in class. The instructor will not make a full set of notes available online.

### **COURSE EVALUATION**

The breakdown of marking for the course is as follows:

1. **FOUR commentaries on course readings: 50% (each 12.5%)**
  2. **Self-assessment of participation: 10%**
  3. **Viewpoint: 40%**
1. **FOUR commentaries on course readings: 50% (each 12.5%)**

Students will be required to prepare a 1-2-page Commentary (single-spaced) on the weekly reading(s) for EACH of the 4 modules, submitted TWO days prior to class, at 4pm PST, at the latest. The commentary should be evidence-based with 5-10 references to support the commentary, of which the majority should NOT be the required course

readings. Commentaries can include personal thoughts on the work presented, but should integrate content from the readings, other readings students complete on the topic, integration from other readings in the course or from other courses students completed. These are not meant to be summaries of the material. Rather, they are intended to give you an opportunity to develop and express your thoughts about the readings, or some aspect of them, prior to our class discussion, and to integrate your knowledge across disciplines. Each commentary should be followed with 2-3 questions about the materials, as these might be used to initiate discussions during the In-Class Discussions.

Feedback on each assignment will be provided within two weeks.

***Submission Deadline Commentary Module 1: January 31, 2023, 11:59pm***

***Submission Deadline Commentary Module 2: February 24, 2023, 11:59pm***

***Submission Deadline Commentary Module 3: March 21, 2023, 11:59pm***

***Submission Deadline Commentary Module 4: April 07, 2023, 11:59pm***

## **2. Self-assessment of participation: 10%**

At the end of this term, you will be asked to assign yourself a mark for participation in the course. Asking you to assess yourself is a step toward viewing the learning experience as a more collaborative endeavour, in which your own self-evaluation is valued as part of your course mark. You will assign yourself a grade that encompasses the extent to which you participated in class discussions and/or the depths to which you participated in your weekly readings. It is important that you submit a short paragraph to justify your grade, and this will be revised by the instructor if it is not a valid representation of your participation.

***Submission Deadline: April 14, 2022, 11:59pm***

## **3. Final Paper, Viewpoint: 40%**

From the JAMA website: “Viewpoints may address virtually any important topic in medicine, public health, research, discovery, prevention, ethics, health policy, or health law and generally are not linked to a specific article. Viewpoints should be well focused, scholarly, and clearly presented but should not include the findings of new research or data that have not been previously published.” Maximum length: up to 1200 words of text—or 1000 words of text with 1 small table or figure—and no more than 10 references, which should be as current as possible.

In students’ final papers, give thought to the diversity of participants represented in the included research. Students must also confirm with the instructor or TA their topic before they begin this assignment.

Papers should include the following:

- A title page containing the title of the article and student name.
- A word count (from abstract to conclusions, not counting references).
- An abstract (75 to 150 words) clearly labelled as such.
- No more than 10 references. Use JAMA referencing.
- A figure count of 1 maximum (not required).
- A table count of 1 maximum (not required). Tables must include titles.

***Submission Deadline: April 18, 2022, 11:59pm***

## MISSED ASSIGNMENTS

If you anticipate that you won't be able to complete an assessment, please contact me **before you miss the assessment**. Assessments will not be rescheduled for any reason other than self-declared medical circumstances, compassionate grounds, religious observation, or conflicting responsibilities.

Missing an assignment completely will lead to losing the total grade for that assignment. If you do not contact your instructor, you will be given a score of zero on the assessment.

### *Grading*

All assignments and assessments will be given a score on 100, and then scaled appropriately to their weight of the final course grade.

The final written assignment is due no later than **April 18, 2022**, unless negotiated with the instructor. Late Final Assessments will be penalized by a loss of 5 points per day of the grade (based on a 100) of the assignment.

### *Policy on Text-Matching Software:*

UBC subscribes to Turnitin, an online system that compares written material with the Web and with other material submitted to its database. The instructor will scan submissions and check for duplication of material in other sources and possible plagiarism.

## **THE PSYCHOBIOLOGY OF PHYSICAL ACTIVITY KIN 459 COURSE SCHEDULE**

The topics and assigned readings for each class are listed below, although this may be subject to change.

<i>Date</i>	<i>Lecture Slides/Readings</i>
<b>MODULE 1: Physical activity and depression</b>	

Week 1 01.10.23	<p><i>Lecture Slides Module 1.1 Depression defined and global rates</i></p> <p><i>Readings:</i></p> <p>Syllabus</p> <p>Malhi, Mann (2018). Depression. <i>The Lancet</i>, 392: 2299–2312.</p>
Week 1 01.12.23	<p><i>Lecture Slides Module 1.2 Consequences and mechanisms of depression</i></p> <p><i>Readings:</i></p> <p>Kessler (2012). The Costs of depression. <i>Psychiatr Clin North Am</i>, 35(1): 1–14.</p> <p>Whooley (2006). Depression and cardiovascular disease: Healing the broken-hearted. Jun 28;295(24):2874-81</p>
Week 2 01.17.23	<p>Watch In-Class: The Truth About Depression (<a href="https://www.tvthird.com/the-truth-about-depression">https://www.tvthird.com/the-truth-about-depression</a>)</p>
Week 2 01.19.23	<p><i>Lecture Slides Module 1.3 Studies on Exercise and Depression</i></p> <p><i>Readings:</i></p> <p>Blumenthal et al. (1999). Effects of exercise training on older patients with major depression. <i>Archives of Internal Medicine</i>, 159: 2349-2356</p> <p>Puterman et al. (2022). COVID-19 Pandemic and Exercise (COPE) Trial: A multigroup pragmatic randomised controlled trial examining effects of app-based at-home exercise programs on depressive symptoms. <i>British Journal of Sports Medicine</i>, 56, 546-552.</p>
Week 3 01.24.23	<p><i>Lecture Slides Module 1.3 Studies Exercise and Depression (Continued)</i></p> <p><i>No Readings</i></p> <p><i>Lecture will end at 11:40 and students invited to attend public lecture by Penn State University's Professor, Dr. David Almeida, titled, "Health as a daily experience: Lessons from 42,343 Days of Midlife Adults." Lecture to be held 12-1pm at the Rudy North Lecture Theatre in the Djavad Mowafaghian Centre for Brain Health</i></p>
Week 3 01.26.23	<p><i>Lecture Slides Module 1.4 Meta-Analyses of Exercise Effects on Depression</i></p> <p><i>Readings:</i></p> <p>Pearce et al. (2022). Association between physical activity and risk of depression: A systematic review and meta-analysis. <i>JAMA Psychiatry</i>, 79(6):550-559.</p> <p>Schuch et al. (2016). Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. <i>Journal of Psychiatric Research</i>, 77, 42-51.</p>

Week 4 01.31.23	<p><i>Lecture Slides Module 1.5 Exercise Prescription for Depression</i></p> <p><i>Reading:</i> Belvederi Murri et al (2018). Physical exercise in major depression: Reducing the mortality gap while improving clinical outcomes. <i>Frontiers in Psychiatry</i>, 9, 762</p> <p>In-class group work: Review Belvederi Murri individually for 15 minutes; discuss in groups of 4 perspectives and implications for clinical practice (anything to highlight/surprising?)</p>
Week 4 02.02.23	<p><i>In-Class Discussion</i></p> <p>Each student required to provide COMMENTARY ON MODULE 1 two days prior to the date and be prepared for in-class discussion about the readings and discoveries.</p>

## MODULE 2:

### Physical Activity and Well-Being/Affect

Week 5 02.07.23	<p><i>Module 2.1 Mood, Emotions, and Affect Defined</i></p> <p><i>Readings:</i> Ekkekakis (2017). People have feelings! Exercise psychology in paradigmatic transition. <i>Current Opinion in Psychology</i>, 16, 84-88.</p> <p>Buecker, Simacek, Ingwersen, Terwiel, Simonsmeier (2020). Physical activity and subjective well-being in healthy individuals: a meta-analytic review. <i>Health Psychology Review</i>, 15, 574-592.</p>
Week 5 02.09.23	<p><i>Lecture 2.2. Effects of Physical Activity on Daily Affect</i></p> <p><i>Readings:</i> Epel et al. (2016). “Eat, drink and be sedentary: A review of health behaviors’ effects on emotions and affective states, and implications for interventions,” in <i>Handbook of Emotions (chapter 40)</i>. Read pages 685-691. Stop at section titled, Sleep.</p> <p>Liao, Shonkoff, Dunton (23 December 2015). The acute relationships between affect, physical feeling states, and physical activity in daily life: A review of current evidence. <i>Frontiers in Psychology</i>. Online Only. Pages 1-7.</p>
Week 6 02.14.23	<p><i>Lecture Slides Module 2.3 Dual Mode Theory of Physical Activity and Affect</i></p> <p><i>Reading:</i> Ekkekakis et al (2011). The pleasure and displeasure people feel when they exercise at different intensities. <i>Sports Medicine</i>, 41, 641-671</p>

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Week 6 02.16.23	<p><i>Lecture Slides Module 2.4 Affective Responses to Exercise and Exercise Maintenance</i></p> <p><i>Reading:</i> Stevens et al. (2020). Affective determinants of physical activity: A conceptual framework.</p> <p>In-class group work: Review Stevens et al 2020 with students, discuss individual experiences with the different components influencing your own physical activity engagement.</p>
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**READING WEEK**  
February 20-24, 2023

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Week 7 02.28.23	<p><i>In-Class Discussion</i></p> <p>Each student required to provide COMMENTARY ON MODULE 2 two days prior to the date and be prepared for in-class discussion about the readings and discoveries</p>
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**MODULE 3:**

**Physical Activity and the Brain**

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Week 7 03.02.23	<p><i>Lecture Slides 3.1 Brain Structures and Functions</i></p> <p><i>Lecture Slides 3.2 Exercise and Brain Health</i></p> <p><i>Reading:</i> Erickson, Hillman, Stillman, Ballard, Bloodgood, Conroy, Macko, Marquez, Petruzzello, Powell. Physical activity, cognition, and brain outcomes: A review of the 2018 physical activity guidelines. <i>Medicine &amp; Science in Sports and Exercise</i>. 51, 1242-1251.</p>
Week 8 03.07.23	<p><i>Lecture Slides 3.3 Exercise and Cognitive Function</i></p> <p><i>Readings:</i> Falck et al. (2019). Impact of exercise training on physical and cognitive function among older adults: A systematic review and meta-analysis, 79, 119-130.</p> <p>Lopez-Ortiz et al. (2021). Exercise interventions in Alzheimer's disease: A systematic review and meta-analysis of randomized controlled trials. <i>Ageing Research Reviews</i>, 72, 101479.</p>

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Week 8 03.09.23	<i>Lecture Slides 3.4 Exercise and Neurotransmitters</i>  <i>Readings:</i> Dinoff et al. (2016). The effect of exercise training on resting concentrations of peripheral brain-derived neurotrophic factor (BDNF): A meta-analysis. <i>PLoS ONE</i> , 11(9): e0163037.  Dinoff et al. (2017). The effect of acute exercise on blood concentrations of peripheral brain-derived neurotrophic factor (BDNF) in healthy adults: A meta-analysis. <i>European Journal of Neuroscience</i> , 46, 1635-1646.
Week 9 03.14.23	In-Class Video: Stress, Portrait of a Killer (PBS)
Week 9 03.16.23	<i>Lecture Slides 3.5 Exercise and Stress Physiology</i>  <i>Readings:</i> Dickerson, Kemeny (2004). Acute stressors and cortisol responses: a theoretical integration and synthesis of laboratory research. <i>Psychological Bulletin</i> , 130, 355-391.  Smyth et al. (2013). Stress and Disease: A structural and functional analysis. <i>Social and Personality Psychology Compass</i> , 7/4, 217-227.
Week 10 03.21.23	<i>Lecture Slides 3.5 Exercise and Stress Physiology (continued)</i>  <i>Reading:</i> Mücke et al. (2018). Influence of regular physical activity and fitness on stress reactivity as measured with the trier social stress test protocol: A systematic review. <i>Sports Medicine</i> , 48, 2607-2622.
Week 10 03.23.23	<i>In-Class Discussion</i> Each student required to provide COMMENTARY ON MODULE 3 two days prior to the date and be prepared for in-class discussion about the readings and discoveries

#### MODULE 4:

Stress (Threat and Challenge) and Physical Activity Engagement and Performance

Week 11 03.28.23	<i>Reading:</i> Stults-Kolehmainen, Sinha (2014). The effects of stress on physical activity and exercise. <i>Sports Medicine</i> , 44, 81-121.
Week 11 03.30.23	<i>Reading:</i> Seery, M. D. (2013). The biopsychosocial model of challenge and threat: Using the heart to measure the mind. <i>Social and Personality Psychology Compass</i> , 7(9), 637–653. <a href="https://doi.org/10.1111/spc3.12052">https://doi.org/10.1111/spc3.12052</a>
Week 12 04.04.23	<i>Reading:</i> Behnke, Kaczmarek (2018). Successful performance and cardiovascular markers of challenge and threat: a meta-analysis. <i>International Journal of Psychophysiology</i> , 130, 73-79.
Week 12 04.06.23	<i>Reading:</i> Meijen, Turner, Jones, Sheffield, McCarthy (2020). A theory of challenge and threat states in athletes: A revised conceptualization. <i>Frontiers in Psychology</i> . 06 February, 1-17. <a href="https://doi.org/10.3389/fpsyg.2020.00126">https://doi.org/10.3389/fpsyg.2020.00126</a>
Week 13 04.11.23	In-Class Activity/Discussion Each student required to send in 2-3 questions or comments on the readings from the previous lectures, two days prior to the date.
Week 13 04.13.23	Review of Term/Feedback to Professor