



**Land Acknowledgement**

We respectfully acknowledge the Syilx Okanagan Nation and their peoples, in whose traditional, ancestral, unceded territory UBC Okanagan is situated.

**HES 485: Advanced Circulatory Physiology**

**Faculty:** Faculty of Health and Social Development

**Department:** Health and Exercise Sciences

**Instructor:** Dr. Glen Foster

**Instructor Email:** glen.foster@ubc.ca

**Duration:** Term 1 Winter 2024

**Delivery Modality:** Hybrid

**Course Location:** ART 218

**Course Days:** Thu

**Class Hours:** 11:00 am - 2:00 pm (**check weekly schedule to make sure you show up at the right time!**)

**Office hours:** By Appointment

**Course Description**

Regulation and adaptation of the circulatory systems at rest, during exercise. Focus on adaptations and prescription implications following pathology. Formerly offered as HMKN 414. Credit will be granted for only one of HES 485 or HMKN 414.

**Course Format**

Each learning module includes several pre-recorded lectures to be completed by the student prior to attending each week's, small group discussion led by the instructor. Students will have the opportunity during small group meetings to ask informal questions and are encouraged to contribute to the overall discussion both during in person meetings and via the online discussion board. Additionally, each learning module requires the completion of an assessment to test comprehension. Throughout the term, students working in small groups will complete a group assignment culminating in a class presentation.

**Course Overview, Content and Objectives**

This course is designed to provide a comprehensive overview of the essentials for circulatory physiology. Specifically, you will focus your learning to the regulation and adaptation of the circulatory systems at rest, during exercise and physiological stress. A special emphasis will be placed on scientific and medical

research to describe physiological function, exercise response and adaptations. Your attendance and active discussion in small group seminars and online discussion boards is critical to your success in this course. This 3-credit course extends your learning from HES 105 and HES 305 with a specific focus on the circulatory system, its function at rest and during exercise. This course will begin with a simple overview of the circulation and blood. From there we will focus on cardiac electrophysiology, automaticity, and pump function. Next, we will examine hemodynamics, arterial pressure regulation and the microcirculation. Finally, we will examine the coronary circulation and the clinical and applied consequence of right-to-left shunt. This course is composed of recorded lectures and discussion-based learning techniques. Additionally, students will work collaboratively in small groups and present a scientific debate to their classmates.

### **Learning Outcomes**

*Upon successful completion of this course, students will be able to...*

1. Discuss and explain fundamental principles of circulatory physiology
2. Use concepts of circulatory physiology to explain pathological conditions or chronic disease
3. Outline an area of debate in circulatory physiology and recognize strengths and weaknesses of your argument

### **Assessments of Learning**

1. Active participation in small group discussions, discussion forums, and debates (LO1, LO2) - 20 %
2. Learning module assessments (LO1, LO2) - 50 %
3. Group assignment and presentation (LO3) - 30 %

### **Learning Activities**

1. Students are required to access and review lecture recordings each week in advance of small group meetings.
2. Groups will meet during our scheduled lecture time on **Thursdays, 11:00 am – 2:00 pm**. Each small group discussion will meet for up to 60 minutes.
3. Each grouping of students will be required to work collaboratively to research and present a scientific debate to their peers. Group presentations will be delivered to the entire class as scheduled throughout the term during our weekly in person meetings.
4. Comprehension of course content will be assessed weekly in the form of a quiz which must be completed by **11:59 pm each Monday**.
5. An online discussion board will serve as another opportunity for students to reflect on their learning (**due each Monday by 11:59 pm**).

### **Course schedule**

	<b>Topics and/or exam (quiz, midterm, final)</b>	<b>Required Reading (s) and/or Videos</b>	<b>Learning Outcome</b>
<b>Week 1</b> Sept 3-6	<u>Course Overview; Overview of the Circulatory System</u> <i>Whole Class, <b><u>Thursday @ 11:00 am</u></b></i>		LO1, LO2

<p><b>Week 2</b> Sept 9-13</p>	<p><u>Cardiac Electrophysiology</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <i>Groups 5 - 6 @ 1:00 pm</i> <b><u>Complete Quiz by Monday, Sept 16 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. In preparation for your group assignments please watch: <a href="#">How to run a debate!</a> Don't forget to contribute each week to the small group discussion and the online discussion board (<b>by Monday Sept 16 @ 11:59 pm!</b>)</p>	<p>LO1, LO2</p>
<p><b>Week 3</b> Sept 16-20</p>	<p><u>Cardiac Automaticity, Conduction, Electrocardiogram</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 5 - 6 @ 12:00 pm</i> <i>Groups 1 - 2 @ 1:00 pm</i> <b><u>Complete Quiz by Monday, Sept 23 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. Don't forget to contribute each week to the small group discussion and the online discussion board (<b>by Monday Sept 23 @ 11:59 pm!</b>)</p>	<p>LO1, LO2</p>
<p><b>Week 4</b> Sept 23-27</p>	<p><u>Cardiac Pump</u> Small Group Discussions “in Person” on Thursday <i>Groups 5 - 6 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <i>Groups 3 - 4 @ 1:00 pm</i> <b><u>Complete Quiz by Monday, Sept 30 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. Don't forget to contribute each week to the small group discussion and the online discussion board (<b>by Monday, Sept 30 @ 11:59 pm!</b>)</p>	<p>LO1, LO2</p>
<p><b>Week 5</b> Sept 30 – Oct 4</p>	<p><u>Arterial System</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <i>Groups 5 - 6 @ 1:00 pm</i> <b><u>Complete Quiz by Monday, Oct 7 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. Don't forget to contribute each week to the small group discussion and the online discussion board (<b>by Monday, Oct 7 @ 11:59 pm!</b>)</p>	<p>LO1, LO2</p>
<p><b>Week 6</b> Oct 7-11</p>	<p>Group Assignment (Groups 1 - 2) <i>Whole Class – Thursday @ 11:00 am</i> <b><u>Groups 1 &amp; 2 complete and submit peer review by 5:00 pm</u></b></p>	<p>Read: <a href="#">Bradycardia in the trained athlete is attributable to high vagal tone</a></p>	<p>LO3</p>

		<p><i>Please read all 4 letters</i></p> <p><i>And if available comments, and last words</i></p> <p><i>Attendance and participation are required!</i></p>	
<p><b>Week 7</b> Oct 14-18</p>	<p><u>Hemodynamics</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 5 - 6 @ 12:00 pm</i> <i>Groups 1 - 2 @ 1:00 pm</i> <b><u>Complete Quiz by Monday, Oct 21 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<b><u>by Monday, Oct 21 @ 11:59 pm</u></b>)!</p>	LO1, LO2
<p><b>Week 8</b> Oct 21-25</p>	<p><u>Peripheral Circulation</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 5 - 6 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <i>Groups 3 - 4 @ 1:00pm</i> <b><u>Complete Quiz by Monday, Oct 28 @ 11:59 pm</u></b></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<b><u>by Monday, Oct 28 @ 11:59 pm</u></b>)!</p>	LO1, LO2
<p><b>Week 9</b> Oct 28- Nov 1</p>	<p>Group Assignment (Groups 3 - 4) <i>Whole Class – <b><u>Thursday @ 11:00 am</u></b></i> <b><u>Groups 3 &amp; 4 complete and submit peer review by 5:00 pm</u></b></p>	<p>Read: <a href="#">Acute exercise elicits damage to the endothelial layer of systemic blood vessels in healthy individuals</a></p> <p><i>Please read all 4 letters</i></p> <p><i>And if available comments, and last words</i></p> <p><i>Attendance and participation are required!</i></p>	LO3
<p><b>Week 10</b> Nov 4-8</p>	<p><u>Right-to-left Shunt</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <i>Groups 5 - 6 @ 1:00 pm</i></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<b><u>by Monday, Nov 11 @ 11:59 pm</u></b>)!</p>	LO1, LO2

	<b><u>Complete Quiz by Monday, Nov 11 @ 11:59 pm</u></b>		
MIDTERM BREAK NOV 11 – 15	<b>No Classes or Material This Week!</b>	<b>Finish assessments from previous week due by <u>Monday, Nov 11<sup>th</sup>, @ 11:59 pm.</u></b>	
<b>Week 12</b> Nov 18-22	<u>Group Assignment</u> (Groups 5 - 6) <i>Whole Class – <b>Thursday @ 11:00 am</b></i> <b>Groups 5 - 6 complete and submit peer review by 5:00 pm</b>	Read: <a href="#">Most of the cardiovascular consequences of OSA are/are not due to increased sympathetic activity</a>  <i>Please read all 4 letters</i> <i>And if available comments, and last words</i> <i>Attendance and participation are required!</i>	LO3
<b>Week 13</b> Nov 25-29	<u>Coronary Circulation</u> Small Group Discussions “in Person” on <b>Thursday</b> <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 5 - 6 @ 12:00 pm</i> <i>Groups 1 - 2 @ 1:00 pm</i> <b>Complete Quiz by Monday, Dec 2 @ 11:59 pm</b>	Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board ( <b>by Monday, Nov 25 @ 11:59 pm</b> )!	LO1, LO2
<b>Week 14</b> Dec 2-Dec 6	<b>No Class</b> – classes end Dec 9 <sup>th</sup> .	<b>Finish assessments from previous week due by <u>Monday, Dec 2<sup>nd</sup>, @ 11:59 pm.</u></b>	

### **Learning Materials**

All required readings for this course will be available via Canvas. Under the weekly module within Canvas you will see a "weekly prep" section. In this section you will find links to all of the required readings and assigned videos that are freely available.

### **Late policy**

Late submissions will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

### **Missed exam policy**

Missed exams will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

**Missed Activity Policy:**

Failure to participate in small group discussions and online discussion board will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

**Other Course Policies**

**UBC Values**

UBC creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada, and the world. UBC's core values are excellence, integrity, respect, academic freedom, and accountability.

**Policies and Regulations**

Visit [UBC Okanagan's Academic Calendar](#) for a list of campus-wide regulations and policies, as well as [term dates and deadlines](#).

**Academic Integrity**

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. **For example, incidences of plagiarism or cheating usually result in a failing grade or mark of zero on the assignment or in the course.** Careful records are kept to monitor and prevent recidivism.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the [Academic Calendar](#).

**Academic Misconduct**

The academic enterprise is founded on honesty, civility, and integrity. Violations of academic integrity (i.e., [academic misconduct](#)) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred for consideration for academic discipline. Careful records are kept to monitor and prevent recurrences. Any instance of cheating or taking credit for someone else's work, whether intentionally or unintentionally, can and often will result in at minimum a grade of zero for the assignment, and these cases will be reported to the Head of the Department and Associate Dean Academic of the Faculty.

**Final Examinations**

You can find the [Senate-approved term and examination dates here](#). Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 27-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job.

Further information on Academic Concession can be found under Policies and Regulation in the [Academic Calendar](#).

### **Grading Practices**

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to University, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record.

<http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014>

### **STUDENT SERVICE RESOURCES:**

#### **Walk-In Well-Being Clinic**

The Walk-In Well-Being clinic offers no-fee, brief, single-session psychological services. Sessions are led by a doctoral student in clinical psychology and supervised by a registered psychologist (UBCO Faculty member). Clinicians can provide support with stress management, sleep, self-care, depression, anxiety, interpersonal issues, substance misuse, coping with academic demands/stressors, and provide options for connecting to additional resources. Virtual or in-person sessions are available at the UBCO Psychology Clinic, located in ASC 167 with or without an appointment, on Tuesdays and Thursdays between 10 am and 3 pm from September to June, excluding campus closures.

**UNC 337**      250.807.8421 (ext. 1)

Email: [ipc.ok@ubc.ca](mailto:ipc.ok@ubc.ca)

Web: <https://psych.ok.ubc.ca/psychology-clinic/walk-in-wellness/>

#### **Student Supports, Resources & Campus Services**

Visit the [Student Support and Resources page](#) to find one-on-one help or explore resources to support your experience at UBC Okanagan, as well as many other campus services available to all students.

#### **Advising Options**

Visit the [Advising Options page](#) to find out about the variety of advising options available to students including but not limited to academic, career and accessibility.

#### **Safewalk**

Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at **250-807-8076**.

Web: [www.security.ok.ubc.ca](http://www.security.ok.ubc.ca)

#### **© Copyright Statement**

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