

Course Syllabus CAPS 301 Human Physiology

CAPS 301 - Human Physiology:

Welcome to CAPS 301, a comprehensive overview of human physiology. At the end of this course you will have a broad understanding of the principles and mechanisms of most physiologic systems, and how this relates to your everyday life experience.

This is a team-taught course with each faculty member teaching their area of expertise. While we have coordinated our approach, there will be subtle variation in style by each of your teachers. We will ensure that all of our faculty are available regularly to answer questions you may have, or to guide your learning. There will be scheduled office hours.

Course Director:

Dr. Barry Mason

Life Science Centre Rm. 1382

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Teaching Team: Drs. Mason, Moukles, Accili, Hull, Osborne, Kindler, Johnson

Format:

This is a 6-credit, two-term course* with a blend of synchronous classes and asynchronous modules. For W2020 academic session, we meet online 3 times each week, **Monday, Wednesday and Friday from 11:00-11:50am PST**. For some sections (e.g. Neurophysiology) there will be some days allocated to asynchronous modules but most classes will be synchronous each week.

All course material and communication will occur through the UBC Learning Management System (LMS) **Canvas**.

Please ensure you have good Wi-Fi connectivity and you come prepared to participate and learn and enjoy physiology.

*Both Term-1 and Term-2 must be taken during the same academic year. Please consult course director and UBC Calendar for prerequisites

Text book:

Suggested: **HUMAN PHYSIOLOGY**, From Cells to Systems; Lauralee Sherwood and Robert Kell, Latest Canadian Edition, Nelson

MindTap Course Key: **MTPN-M7PN-JQX3**

Assessment:

Grades in CAPS 301 will be determined via a combination of quizzes/assignments and exams. These will all be accessed via CANVAS

Mark Distribution

Quizzes and Assignments (10 @ 5% each)	50%
Exams (Dec and April @ 25% each)	50%

Quizzes and Assignments Will be hosted on Canvas and are designed to test your understanding of concepts and details within each section (neuro, muscle, cardiophysiology, etc.) of the course. Formats include Multiple Choice Questions (MCQ), True/False and short answer questions. Some Faculty may offer a take-home assignment, with a specified due date, in lieu of an online quiz.

Exams These will take place during the UBC examination period and will cover all material from the term. Exams will be hosted on Canvas and have a time-window for completion (e.g. 2 hour time-limited exam to be completed within a 24-hour window).

Academic Concession

Academic concessions are not guaranteed and made at the discretion of the course director.

Missed Classes

Attendance at classes will help you understand the course material. Attendance is strongly advised but not mandatory. Recordings of synchronous sessions will be available via Canvas.

Missed Quiz

Students can request concession to miss **one quiz/assignment**, without penalty, for valid medical and compassionate grounds only. Students will not be granted concession for conflicting responsibilities. Missed quizzes will receive a mark of zero.

Missed Midterm Exam

Students may request academic concession from the course coordinator along with supporting documentation for valid medical and compassionate grounds only. If concession is granted, the midterm exam must be completed within the academic session (W2020-2021). Be aware that students are not granted concession for conflicting responsibilities for this course. Students must resolve such conflicting matters in advance of the midterm examination. Missed exams that are not granted concession will receive a mark of zero.

Statement of 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 may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

Detailed Schedule below:

W2020 Schedule:

Topic	# of Sessions	Dates	Faculty Member
Term 1 Fall 2020			
Neurophysiology 1	7	Sept 09 - Sept 23	B Mason
Neurophysiology 2	12	Sept 30 - Oct 23	B Mason
Muscle	4	Oct 28 - Nov 04	H Moukhles
Blood and Fluids	5	Nov 06 - Nov 16	C Hull
Cardiovascular	7	Nov 18 - Dec 02	E Accili
Term 2 Spring 2021			
Respiratory	8	Jan 11- Jan 27	S Osborne
Renal	8	Jan 29 - Feb 22	C Hull
Gastrointestinal	8	Feb 24 - Mar 12	B Mason
Endocrine 1	5	Mar 15 - Mar 24	P Kindler
Blood Glucose	3	Mar 26 - Mar 31	J Johnson
Endocrine 2	4	April 07 – April 14	P Kindler

Important Dates W2020:

	<u>Date</u>	<u>Event</u>
Term 1	Sept 08	First Day of Term 1
	Oct 12	Thanksgiving
	Nov 11	Remembrance Day
	Dec 03	Last Day of Classes
	Dec 07-22	Examination Period
Term 2	Jan 11	First Day of Term 2
	Feb 15	Family Day
	Feb 15-19	Winter Break
	Apr 14	Last Day of Classes
	Apr 19-29	Examination Period

CAPS 301: COURSE OUTLINE.

*Term 1***Neurophysiology**

Ionic basis of resting potentials, Nernst equation. Voltage-gated ion channels and the action potential. Refractoriness. Myelination and saltatory conduction. Electrical and chemical synapses. Ligand-gated ion channels. EPSPs and IPSPs. The neuromuscular junction. Overview of the autonomic nervous system and autonomic reflexes.

CNS and Special Senses

Overview of functional anatomy of CNS and motor, sensory and autonomic function of cranial and spinal nerves. General properties of sensory receptors. Synaptic transmission in spinal cord. Spinal reflexes. Muscle spindle and muscle tone. Spinal, brainstem and cortical mechanisms in transmission of touch, proprioception pain and temperature. Corticospinal and corticobulbar systems. Functions of cerebellum and basal ganglia. Functions of the visual, vestibular and auditory systems.

Muscle

Comparison of structure/function relationships in smooth, cardiac and skeletal muscle. Excitation-contraction coupling. Neuromuscular junction.

Body fluids/Blood

Distribution and composition of body fluids. Composition and functions of blood: formed elements and plasma. Regulation of Haemopoiesis: iron metabolism, heme formation, haemoglobin synthesis. Functions and formation of platelets. Haemostasis: platelet aggregation, plug formation, biological and classical model of coagulation, clot formation and retraction, and fibrinolysis. Prevention and disorder of haemostasis.

Cardiovascular Physiology

Systemic and pulmonary circulations. Electrical and mechanical events during cardiac cycle. Neuronal, hormonal and intrinsic control of cardiovascular function. Starling's forces and fluid exchange. Blood pressure control and heart failure.

*Term 2***Respiratory Physiology**

Airway Structure & Function, Flow Regimes, Airway Clearance, Mechanics of Eupneic Breathing, Elastic Properties Of The Lungs And Chest Wall, Muscles Of Respiration, Airways Resistance, Static Lung Compliance, Simple Spirometry, Mechanisms of Obstructive and Restrictive Ventilatory Failure, Gas Exchange, Ventilation-Perfusion Ratios, Blood Gas Transport, Role of Central And Peripheral Chemoreceptor In Control of Breathing

Renal Physiology

Functional anatomy of the kidney. Renal circulation. Glomerular filtration. Concept of Clearance. Renal tubular transport and handling of solutes. Renal handling of sodium and potassium. Renal regulation of acid/base. Formation of dilute and concentrated urine. Regulation of body fluid osmolality and volume. Functional anatomy of bladder. Micturition.

Gastrointestinal Physiology

Functional anatomy of digestive tract. Functions of various GI polypeptides. Neuronal and hormonal control of exocrine secretions of salivary, gastric, pancreatic and intestinal glands. Functions of the Liver and the formation of bile. Regulation of bile secretion and its functions. Functions and control of GI motility. Digestion and absorption of nutrients, including sugars, carbohydrates and fats, in the GIT. Distribution and functions of intestinal microbiota.

Endocrine

Hormones: classes, modes of delivery, transport and action. Pituitary gland and pituitary-hypothalamus interactions. Endocrine regulation of growth. Synthesis and function of thyroid hormones. Adrenal gland. Thyroid and metabolism. Endocrine control of calcium metabolism and circulating Ca^{++} levels. Role of renin-angiotensin-aldosterone in electrolyte homeostasis and body fluid volume/osmolality maintenance. Regulation of “fuel homeostasis” – insulin, glucose, cortisol, adrenaline, growth hormone.

Reproduction

Structure of male and female reproductive systems. Testis and spermatogenesis. Role of hormones of the hypothalamo-pituitary-gonadal axis in male and female reproduction. Ovary and follicular development. Menstrual cycle. Placenta. Hormonal control of pregnancy.

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/policies-resources-support-student-success) (<https://senate.ubc.ca/policies-resources-support-student-success>)