THE UNIVERSITY OF BRITISH COLUMBIA

Land Acknowledgement

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

Truth and Reconciliation Commission of Canada: Calls to Action

HES 383: Physical Dimensions of Aging

Faculty: Faculty of Health and Social Development

Department: Health and Exercise Sciences

Instructor(s): Dr. Tori Stranges

Duration: Term 1 Winter 2026

Delivery Modality: In-Person

Course Location: ART 376

Course Days: Tues/Fri

Class Hours: 11:00AM- 12:30PM

Instructor's Office Hours: ART 125, Tuesdays 1-3 or *via Zoom appointment*

Course Description

Changes in physiological function with age. For students planning to become health professionals. Various dimensions of life, including health and functional capacity, are addressed.

Course Format

Three hours per week of instructional time, split into synchronous and asynchronous components. We will meet weekly on Tuesday (and some Fridays) for lecture in ART 376 11:00AM – 12:30PM. In lieu of most Friday classes you will have asynchronous activities to complete. The asynchronous component will consist of journal clubs, as well as case studies to be completed for marks. All course material will be posted in the Canvas course page and organized by weekly modules. All course resources, assignments, grades, journal club meetings, office hours and communication, will be accessed via the Canvas course page.

Course Overview, Content and Objectives

Growing old is an inevitable part of the life course. However, for the first time in history, more and more people are living beyond their predicted life expectancy, and overcoming barriers of physiological aging and decline. This course explores the age-associated changes in physiological function and how these changes influence the lifespan and healthspan of aging adults. In addition, this course focuses on how healthy lifestyle choices such as physical activity can optimize the aging process to provide an optimal aging experience.

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The content presented in this course is based on the following objectives:

- Understand the general aging process and current trends in aging society
- Develop an in-depth knowledge base of the age-associated changes that occur in major physiological systems (neuro-muscular, musculoskeletal, cardiovascular, respiratory, cognitive) and their impact on overall physical aging and quality of life
- Investigate the effect of acute and chronic physical activity as well as high-performance sport, on the process of aging
- Apply physiological assessments and physical activity/exercise treatment to real-world scenarios in the context of physical decline associated with aging
- Engage in aging research with application to optimal aging and knowledge translation to an aging society
- Practically promote healthy aging to older adults in their life

Learning Outcomes

Upon completion of this course, students will be able to:

1. Define aging and its effect upon the human body and society
2. Compare lifespan and healthspan and discuss factors that affect both
3. Discuss current trends and best practices of aging in Canada
4. Describe physiological changes associated with aging in relation to function, health, and overall well-being
5. Discuss the common chronic diseases of aging and ways to prevent or delay onset
6. Use and apply common age-related assessment tools to measure physical function
7. Explain how physical activity affects age-associated physical function and decline
8. Define and increase awareness of successful aging in relation to health promotion and disease prevention

Assessments of Learning

Journal Club Presentation & Participation OR Experiential Learning Opportunity	20%	Journal clubs are designed as peer-led learning activities in groups of 4. You will coordinate your groups sessions on Zoom **during allotted Friday class time** indicated below. You will meet 5 times over the semester. In the first meeting (Intro to Journal Clubs) you will meet each other on zoom and take turns sharing the title of the paper you will be presenting. For the subsequent 4 meetings, each of you will lead one of those meetings and present a research paper of your choosing to your group. At the meetings where you are not presenting, you will come prepared, having read the paper that is being presented, and will ask 2 questions for discussion at the end of the presentation. The due dates for journal clubs are the last possible date to meet (you can meet at any point to complete your journal club). You will be recording these zoom meetings so the presentation and discussion can be marked.
		In lieu of journal club, students will have the opportunity to volunteer for an experiential learning opportunity with a Certified Exercise Professional (CEP) across local community organizations. Students who participate will complete six in-person sessions (approximately 2 hours each) and will be assessed on their learning and engagement throughout the experience. **Please note, participation is voluntary.**
Case Studies	15%	There are 3 case studies in total (5% each). The case studies are designed as self-directed asynchronous learning activities. **I encourage you to complete these during Friday class time.**
Midterm	30%	The midterm exam will cover all material up until the Midterm date.
Final Exam	35%	The final exam will be scheduled during exam period and will be cumulative.

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Course schedule

There is no required textbook for this course. Weekly required readings and videos will be posted in the course Canvas modules. Projected readings are listed in the table below but are subject to change. Please refer to the weekly canvas modules for the most up-to-date reading list.

Date	Lecture Topic & Asynchronous Assessments	Readings
Week 1		
Sept 8	Introduction	• Review syllabus and familiarize yourself with Canvas. • Learn more about experiential learning opportunity (Dr. Gina Whitaker)
Sept 11	What is Aging? Changes in Life Expectancy, Lifespan vs. Health span	• Decady, Y. & Greenberg, L. (2014) Ninety Years of Change in Life Expectancy. *Health at a Glance* Statistics Canada Catalogue no. 82-624-X Seals, D.R., Justice, J.N., LaRocca, T.L. (2016) Physiological geroscience: targeting function to increase healthspan and achieve optimal longevity. *J Physiol* 594(8): 2001-2024
Week 2		
Sept 15	General Physical Changes with Aging	• Jafari Nasablan, P. et al. (2017). Aging human body: changes in bone, muscle and body fat with consequent changes in nutrient intake. Journal of Endocrinology. 234, R37-R51
Sept 18	Journal Club & Experiential Learning Opportunity	Come meet your journal club group and connect with Gina about the experiential learning opportunity.
Week 3		
Sept 22	Hormone and Reproductive Changes with Aging	• Pinkerton, J.V., & Stovall, D.W. (2010). Reproductive Aging, Menopause and Health Outcomes. Ann. N.Y. Acad. Sci. 1204: 169-178 • Reproductive aging in men. Endocrinol Metab Clin. 42(2), 255-270
Sept 25		**Asynchronous: Intro to Journal Clubs**
Week 4		
Sept 29	Skeletal changes, Osteoporosis & Osteoarthritis	• Dawson, A., & Dennison, E. (2016, April 23). Measuring the musculoskeletal aging phenotype. Maturitas in Press. doi:10.1016/j.maturitas.2016.04.014 • Boros, K., & Freemont, T. (2017). Physiology of ageing of the musculoskeletal system. Best practice & research. Clinical rheumatology, 31(2), 203–217. • Troy, K. L., Mancuso, M. E., Butler, T. A., & Johnson, J. E. (2018). Exercise Early and Often: Effects of Physical Activity and Exercise on Women's Bone Health. International journal of environmental research and public health, 15(5), 878. • "Too Fit to Fracture" - OP Canada's Series on Exercise Recommendations for fall and fracture prevention
Oct 2		**Asynchronous: Presentation 1**
Week 5		
Oct 6	Neuromuscular Aging	• Wu, R., De Vito, G., Delahunt, E., & Ditroilo, M. (2020). Age-related Changes in Motor Function (I). Mechanical and Neuromuscular Factors. International journal of sports medicine, 41(11), 709–719. • Wu, R., Ditroilo, M., Delahunt, E., & De Vito, G. (2021). Age Related Changes in Motor Function (II). Decline in Motor Performance Outcomes. International journal of sports medicine, 42(3), 215–226. • Hunter SK, Pereira HM, Keenan KG. The aging neuromuscular system and motor performance. J Appl Physiol (1985). 2016 Oct 1;121(4):982-995.
Oct 9		**Asynchronous: CASE STUDY 1 DUE**
Week 6		
Oct 13	Balance, Falls, Frailty	• Short Physical Performance Battery Protocol • Seniors' Falls in Canada: 2nd Report, PHAC. Chapters 3&4 • Sherrington, *et al*. Exercise to prevent falls in older adults: an updated systematic review and meta-analysis. *British Journal of Sports Medicine* 2017;**51:**1750-1758. • Bray, *et.al.* Exercise prescription to reverse frailty. *Appl. Physiol. Nurr. Metab.* 2016; 41: 112-116

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Oct 16	**Midterm Review**	**Midterm Review**
Week 7		
Oct 20	**MIDTERM**	**MIDTERM DURING CLASS TIME**
Oct 23	Cardiovascular Aging 1	• Seals, D.R., Brunt, V.E., & Rossman, M.J. (2018) Keynote lecture: strategies for optimal cardiovascular aging. Am J Physiol Heart Circ Physiol. • Seals, D. R., Kaplon, R. E., Gioscia-Ryan, R. A., & LaRocca, T. J. (2014). You're only as old as your arteries: translational strategies for preserving vascular endothelial function with aging. Physiology (Bethesda, Md.), 29 (4), 250–264. 315: H183-H188
Week 8		
Oct 27	Cardiovascular Aging 2	• Rossman, M. J., LaRocca, T. J., Martens, C. R., & Seals, D. R. (2018). Healthy lifestyle-based approaches for successful vascular aging. Journal of applied physiology (Bethesda, Md. : 1985) • O'Rourke, M. F., Safar, M. E., & Dzau, V. (2010). The Cardiovascular Continuum extended: aging effects on the aorta and microvasculature. Vascular medicine (London, England), 15(6), 461–468. • Seals, D. R., Nagy, E. E., & Moreau, K. L. (2019). Aerobic exercise training and vascular function with ageing in healthy men and women. The Journal of physiology, 597(19), 4901–4914.
Oct 30		**Asynchronous: Presentation 2**
Week 9		
Nov 3	Pulmonary Aging	• Skloot, G.S. The effects of aging on lung structure and function (2017) Clinics in Geriatric Medicine. 33(4): 447-457 • Roman, M. A., Rossiter, H. B., & Casaburi, R. (2016). Exercise, ageing and the lung. The European respiratory journal, 48(5), 1471–1486.
Nov 6		**Asynchronous: CASE STUDY 2 DUE**
Week 10 - READING BREAK No Class		
Week 11		
Nov 17	Cognitive Aging	• Harada, C. N., Natelson Love, M. C., & Triebel, K. L. (2013). Normal cognitive aging. Clinics in geriatric medicine, 29(4), 737-752. https://doi.org/10.1016/j.cger.2013.07.002 • Mini Mental State Exam (MMSE) Hedden, T., & Gabrieli, J. D. (2004). Insights into the ageing mind: a view from cognitive neuroscience. Nature reviews. Neuroscience, 5(2), 87–96.
Nov 20		**Asynchronous: Presentation 3**
Week 12		
Nov 24	Aging in Place	**Guest Lecture**, Dr. Jennifer Jakobi
Nov 27		**Asynchronous: Presentation 4**
Week 13		
Dec 1	Healthy Aging, Successful Aging, Longevity Studies	• Lazarus, N. R., Lord, J. M., & Harridge, S. (2019). The relationships and interactions between age, exercise and physiological function. The Journal of physiology, 597(5), 1299–1309. • Gopinath B, Kifley A, Flood VM, Mitchell P. Physical Activity as a Determinant of Successful Aging over Ten Years. Sci Rep. 2018 Jul 12;8(1):10522. • Urtamo, A., Jyväkorpi, S. K., & Strandberg, T. E. (2019). Definitions of successful ageing: a brief review of a multidimensional concept. Acta bio-medica : Atenei Parmensis, 90(2), 359–363. • Halaschek-Wiener, J., Tindale, L. C., Collins, J. A., Leach, S., McManus, B., Madden, K., Meneilly, G., Le, N. D., Connors, J. M., & Brooks-Wilson, A. R. (2018). The Super-Seniors Study: Phenotypic characterization of a healthy 85+ population. PloS one, 13(5), e019757.
Dec 4		**Asynchronous: CASE STUDY 3 DUE**
Week 14		
Dec 8	**Final Exam Review**	**Final Exam Review**
Dec 11	**No Class**	Final Day of Class Dec 9th

Late policy

It is expected that case studies are completed by the posted due dates. However, in order to accommodate busier weeks or other life events, each student is permitted a **flex deadline** for up to a 72-hour extension on a maximum of 2 case studies over the semester. Please note, you do not need to ask for this extension. They will be excused when calculating final grades at the end of the term. This means that although Canvas may show that your assignment was submitted 'late', we will ignore 2 of these late submissions (up to 72-hours).

If your group requires an extension on a journal club meeting, please reach out the course instructor to determine whether you are eligible. This may be due to a member's illness, travel due to sport, or other scheduling conflicts related to academics.

There are certain extenuating circumstances that will allow for further extension of an assignment due date. These are: health concerns, family emergency, travel for team sports. Please note that the instructor will not make accommodations for work schedule or other extracurricular activities. Please reach out to your instructor BEFORE the upcoming assignment due date and the instructor will determine eligibility for further extension on a case-by-case basis. The instructor may require that you submit a self-declaration form in order to be eligible for further extension.

Missed exam policy

If you need to miss the midterm for an extenuating circumstance, you must contact your instructor BEFORE the midterm and fill out the school's self declaration form online. You can access this form on MyHES canvas page (forms and policies).

If you miss the final exam for an extenuating circumstance, you must contact your instructor immediately and also apply for an out-of-time exam through the department, and provide valid documentation of the reason for the missed final exam. You can access the out-of-time exam form on MyHES canvas page (forms and policies).

Learning Materials

All learning materials will consist of online, open access readings and multimedia. Learning material and links to online resources will be posted within the weekly canvas modules. Proposed readings are included in the weekly schedule above but they are subject to change. Please refer to the weekly modules for up to date resources and learning materials. Each weekly module will be published the week before to allow students to see the plan for the following week in advance and get ahead on readings.

UBC-O Course Policies

Artificial Intelligence

Students are permitted to use artificial intelligence tools, including generative AI, to gather information, review concepts or to help produce assignments. However, students are ultimately accountable for the work they submit, and any content generated or supported by an artificial intelligence tool must be cited appropriately through an AI statement. Use of AI tools is not permitted during midterm exams and final exams in this course. Learn more through the Generative AI website. Note that this is a course-specific policy. Check with your instructor before using these kinds of tools in other classes.

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 at:
http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,54,111,0

Final Examinations

You can find the Senate-approved term and examination dates here. Please ensure that you are present for this time and do not make any travel plans until you receive your exam schedule (mid-Oct). 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 Okanagan Academic Calendar http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0

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 Services Resources:

UBC Okanagan Disability Resource Centre

The DRC facilitates disability-related accommodations and programming initiatives to remove barriers for students with disabilities and ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course please contact the DRC at:
UNC 215 250.807.8053
email: drc.questions@ubc.ca
Web: www.students.ok.ubc.ca/drc

UBC Okanagan Equity and Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.

UNC 325H 250.807.9291
email: equity.ubco@ubc.ca
Web: www.equity.ok.ubc.ca

Student Wellness

At UBC Okanagan health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Student Wellness for more information or to book an appointment.

UNC 337 250.807.9270
email: healthwellness.okanagan@ubc.ca
Web: www.students.ok.ubc.ca/health-wellness

Student Learning Hub

The Student Learning Hub is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with study skills and learning strategies**. Students are encouraged to visit often and early to build the skills, strategies and behaviors that are essential to being a confident and independent learner. For more information, please visit the Hub's website.

LIB 237 250.807.8491
email: learning.hub@ubc.ca
Web: www.students.ok.ubc.ca/slh

Safewalk

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

For more information, see: www.security.ok.ubc.ca