



Land Acknowledgement

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

HES 383: Physical Dimensions of Aging

Faculty: Faculty of Health and Social Development

Department: Health and Exercise Sciences

Instructor(s): Dr Gina Whitaker

Duration: Term 1 Winter 2024

Delivery Modality: In-Person

Course Location: ART 103

Course Days: Wed/Fri

Class Hours: 3:30pm – 5pm

Instructor's Office Hours: TBA – Weekly office hours will be posted on canvas during the first week

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 Wednesdays (and some Fridays) for lecture in ART 103 3:30 – 4:50pm. 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.

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

- Case Studies	30%
- Journal Club Presentation & Participation	15%
- Midterm	20%
- Final Exam (Dec 9 – 20)	30%
- Class Participation	5%

Learning Activities

Every Friday, the following week's learning modules will be posted. Students are encouraged to go through the learning outcomes and readings prior to coming to class on Wednesday.

During class time we will use i-clickers (iclicker app) to keep engaged and record participation.

Lectures will be recorded and posted to canvas after class.

Case studies will be posted on Fridays and due Tuesday night, 11 days later. There are 5 case studies in total. The case studies are designed as self-directed asynchronous learning activities.

Journal clubs are designed as peer-led learning activities. These will take place on zoom and will be in groups of 3. You will meet 4 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. This first

meeting is just a quick touch point to ensure that you have been able to connect as a group of 3 and will count as part of your participation grade for journal clubs. For the subsequent 3 meetings, each of you will lead one of those meetings and present a research paper to your group. At the meetings where you are not presenting, you will come prepared, having read the paper that is being presented and you 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 together at any point to complete your journal club). You will be recording these zoom meetings so the presentation and discussion can be marked.

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.

	Topics	Readings	Asynchronous Work & Assessments
Week 1 Sept 3 - 6	What is Aging? Changes in Life Expectancy, Lifespan vs. Healthspan	<ul style="list-style-type: none"> Decady, Y. & Greenberg, L. (2014) Ninety Years of Change in Life Expectancy. <i>Health at a Glance</i> 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. <i>J Physiol</i> 594(8): 2001-2024 	
Week 2 Sept 9 – 13	General Physical Changes with Aging	<ul style="list-style-type: none"> JafariNasablan, P. et al. (2017). Aging human body: changes in bone, muscle and body fat with consequent changes in nutrient intake. <i>Journal of Endocrinology</i>. 234, R37-R51 	
Week 3 Sept 16 – 20	Hormone and Reproductive Changes with Aging	<ul style="list-style-type: none"> Pinkerton, J.V., & Stovall, D.W. (2010). Reproductive Aging, Menopause and Health Outcomes. <i>Ann. N.Y. Acad. Sci.</i> 1204: 169-178 Reproductive aging in men. <i>Endocrinol Metab Clin.</i> 42(2), 255-270 	(Friday Sept 20 th Asynchronous work: Watch Journal Club Demo & pick papers)
Week 4 Sept 23 - 27	Skeletal changes, Osteoporosis & Osteoarthritis	<ul style="list-style-type: none"> Dawson, A., & Dennison, E. (2016, April 23). Measuring the musculoskeletal aging phenotype. <i>Maturitas</i> in Press. doi:10.1016/j.maturitas.2016.04.014 Boros, K., & Freemont, T. (2017). Physiology of ageing of the musculoskeletal system. <i>Best practice & research. Clinical rheumatology</i>, 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. <i>International journal of environmental research and public health</i>, 15(5), 878. "Too Fit to Fracture" - OP Canada's Series on Exercise Recommendations for fall and fracture prevention 	(Friday, Sept 27 th Asynchronous work: Case study 1)
Week 5 Sept 30 – Oct 4	Neuromuscular Aging	<ul style="list-style-type: none"> Wu, R., De Vito, G., Delahunt, E., & Ditroilo, M. (2020). Age-related Changes in Motor Function (I). <i>Mechanical and Neuromuscular Factors. International journal of sports medicine</i>, 41(11), 709–719. Wu, R., Ditroilo, M., Delahunt, E., & De Vito, G. (2021). Age Related Changes in Motor Function (II). <i>Decline in Motor Performance Outcomes. International journal of sports medicine</i>, 42(3), 215–226. Hunter SK, Pereira HM, Keenan KG. The aging neuromuscular system and motor performance. <i>J Appl Physiol</i> (1985). 2016 Oct 1;121(4):982-995. 	Case study 1 due by Oct 1 Intro to Journal Clubs due by Oct 6 (Friday, Oct 4 th Asynchronous work: Case study 2, Intro to Journal Clubs)

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<p>Week 6 Oct 7 - 11</p>	<p>Balance, Falls, Frailty</p>	<ul style="list-style-type: none"> Short Physical Performance Battery Protocol Seniors' Falls in Canada: 2nd Report, PHAC. Chapters 3&4 Sherrington, <i>et al.</i> Exercise to prevent falls in older adults: an updated systematic review and meta-analysis. <i>British Journal of Sports Medicine</i> 2017;51:1750-1758. Bray, <i>et.al.</i> Exercise prescription to reverse frailty. <i>Appl. Physiol. Nutr. Metab.</i> 2016; 41: 112-116 	<p><i>Midterm Review</i> Friday Oct 11 (in class)</p>
<p>Week 7 Oct 14 - 18</p>	<p>Cardiovascular Aging 1</p>	<ul style="list-style-type: none"> Seals, D.R., Brunt, V.E., & Rossman, M.J. (2018) Keynote lecture: strategies for optimal cardiovascular aging. <i>Am J Physiol Heart Circ Physiol.</i> 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. <i>Physiology</i> (Bethesda, Md.), 29 (4), 250–264. 315: H183-H188 	<p>Case study 2 due by Oct 15 Midterm Oct 16</p>
<p>Week 8 Oct 21 – 25</p>	<p>Cardiovascular Aging 2</p>	<ul style="list-style-type: none"> Rossman, M. J., LaRocca, T. J., Martens, C. R., & Seals, D. R. (2018). Healthy lifestyle-based approaches for successful vascular aging. <i>Journal of applied physiology</i> (Bethesda, Md. : 1985) O'Rourke, M. F., Safar, M. E., & Dzau, V. (2010). The Cardiovascular Continuum extended: aging effects on the aorta and microvasculature. <i>Vascular medicine</i> (London, England), 15(6), 461–468. 	<p>Journal Club 1 due by Oct 27 (Friday, Oct 25th Asynchronous work: Journal Club 1)</p>
<p>Week 9 Oct 28 - Nov 1</p>	<p>Cardiovascular Aging 3</p>	<ul style="list-style-type: none"> Seals, D. R., Nagy, E. E., & Moreau, K. L. (2019). Aerobic exercise training and vascular function with ageing in healthy men and women. <i>The Journal of physiology</i>, 597(19), 4901–4914. 	<p>Journal Club 2 due by Nov 3 (Friday, Nov 1 Asynchronous work: Journal Club 2, Case Study 3)</p>
<p>Week 10 Nov 4 - 8</p>	<p>Pulmonary Aging</p>	<ul style="list-style-type: none"> Skloot, G.S. The effects of aging on lung structure and function (2017) <i>Clinics in Geriatric Medicine</i>. 33(4): 447-457 Roman, M. A., Rossiter, H. B., & Casaburi, R. (2016). Exercise, ageing and the lung. <i>The European respiratory journal</i>, 48(5), 1471–1486. 	<p>Case Study 3 – Due by Nov 5 Friday, Nov 8 Asynchronous work: Case Study 4)</p>
<p>Week 11 - READING WEEK NOV 11 – 15</p>			
<p>Week 12 Nov 18 - 22</p>	<p>Cognitive Aging 1</p>	<ul style="list-style-type: none"> Harada, C. N., Natelson Love, M. C., & Triebel, K. L. (2013). Normal cognitive aging. <i>Clinics in geriatric medicine</i>, 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. <i>Nature reviews. Neuroscience</i>, 5(2), 87–96. 	<p>Case Study 4 – Due by Nov 19 Journal Club 3 – Due by Nov 24 Friday, Nov 22 Asynchronous work: Journal Club 3)</p>
<p>Week 13 Nov 25 - 29</p>	<p>Cognitive Aging 2</p>	<ul style="list-style-type: none"> Serrano-Pozo, A., & Growdon, J. H. (2019). Is Alzheimer's Disease Risk Modifiable?. <i>Journal of Alzheimer's disease : JAD</i>, 67(3), 795–819. https://doi.org/10.3233/JAD181028 Kivipelto M, Häkansson K. A Rare Success against Alzheimer's. <i>Sci Am.</i> 2017;316(4):32–37. doi:10.1038/scientificamerican0417-32 	<p>Friday, Nov 29 Asynchronous work: Case Study 5)</p>
<p>Week 14 Dec 2 - 6</p>	<p>Healthy Aging, Successful Aging, Longevity Studies, Review Dec 6</p>	<ul style="list-style-type: none"> Lazarus, N. R., Lord, J. M., & Harridge, S. (2019). The relationships and interactions between age, exercise and physiological function. <i>The Journal of physiology</i>, 597(5), 1299–1309. 	<p>Case study 5 due by Dec 3</p>

		<ul style="list-style-type: none"> • Gopinath B, Kifley A, Flood VM, Mitchell P. Physical Activity as a Determinant of Successful Aging over Ten Years. <i>Sci Rep.</i> 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. <i>Acta bio-medica : Atenei Parmensis</i>, 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. <i>PLoS one</i>, 13(5), e0197578. 	<p><i>Final Exam Review Friday Dec 6 (in class)</i></p>
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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 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

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](#). The exam period for this term is Dec 10–21. 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

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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