1 Course Details

1.1 Calendar Description

Aging is accompanied by alterations in the physiological and biochemical functioning of body organ systems. The relationship between aging and the cardiovascular, respiratory, digestion/nutrition and reproductive systems will be discussed as will homeostatic functions associated with bone metabolism and fluid balance.

Pre-Requisite(s): 1 of BIOM*3200, HK*3810, HK*3940
Restriction(s): This is a Priority Access Course. Enrolment may be restricted to particular programs or specializations or semester levels during certain periods. Please see the department of Biomedical Sciences website for more information.

1.2 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

1.3 Final Exam

The final exam has been scheduled for Thursday April 18, 2019 from 7:00 to 9:00 PM. The location will be posted at a later date. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Pawel Bartlewski Dr.
Email: pmbart@uoguelph.ca
Telephone: +1-519-824-4120 x53330
Office: OVC 1677
2.2 Teaching Assistant(s)

Teaching Assistant: Nicholas Werry  
Email: nwerry@uoguelph.ca  
Telephone: 5198244120

Teaching Assistant: Elizabeth Hewitson  
Email: ehewitso@uoguelph.ca  
Telephone: 5198244120

3 Learning Resources

No single textbook is being recommended for the class. The following texts have been found to be useful references for students in previous years. The Library has copies of these textbooks.

3.1 Recommended Resource(s)

BIOLOGY OF AGING (3RD EDITION) by R. Arking, 2006 (Textbook)

PHYSIOLOGICAL BASIS OF AGING AND GERIATRICS (4th EDITION) by P.S. Timiras, 2007 (Textbook)

THE BIOLOGY OF AGEING AND ITS CLINICAL IMPLICATION : A PRACTICAL HANDBOOK By A. Abdulla and G.S. Rai, 2013 (Readings)

4 Learning Outcomes

The overall aim of this course is to introduce aspects of physiology, cell biology, genetics and biochemistry as they occur in cells, tissues and body organ systems in the aging human subject. Students are expected to gain an understanding of the alterations in biological functioning based on principles learned in earlier courses. Developing a critical attitude to the proposed theories of aging is an integral part of the course. The learning objectives are to foster independent learning, emphasize problem solving and to integrate information from varying disciplines.

4.1 Course Learning Outcomes
By the end of this course, you should be able to:

1. Integrate knowledge of basic physiology, biochemistry and cellular biology to an applied area, biomedical aspects of aging, which is of practical significance in today’s society.
2. Research specific biomedical topics in aging and present their findings to colleagues in a clear, concise and scientific manner using a variety of approaches.
3. Compose different types of scientific writing, e.g. short scientific articles appropriate for a lay publication, and short essay type answers.

5 Teaching and Learning Activities

Lectures: Tuesdays and Thursdays; 10:00 to 11:20 AM; Room 102, J.D. MacLachlan Building (MCLN 102)

Student Seminar/Poster Topics:

Topics are classified under general headings so that each group of presentations has a “theme” thus providing some cohesion to the symposium session. The same topic cannot be chosen for both the seminar and poster presentation.

For posters and seminars, students should incorporate recent (last five years) primary research results from journal publications with background information on the topic.

Most information/references (~80%) should be from primary research and review papers with limited references from reliable web sources.

Seminars:

Students should use PowerPoint format.

Seminars should be 20 minutes in length followed by 5 minutes for questions.

By 8:00 AM on the day of the seminar presentation each student group should e-mail the TAs a copy of the presentation so it can be uploaded onto the class computer for the seminar session.

Posters:

A poster is a visual display of information intended to catch and hold the attention of the observer long enough to implant a significant idea in the mind. The poster symposium sessions provide a forum for the exchange of scientific information on an aging subject.

Example poster template:

Posters can be produced using various computer programs (eg. PowerPoint, Adobe Illustrator) - PowerPoint templates will be available on CourseLink.
Posters must be uploaded to the PEAR system by noon on the Tuesday prior to the poster session to ensure all posters are printed in time for the symposium.

**Suggested Seminar/Poster Topics:**

<table>
<thead>
<tr>
<th>Cardiovascular/Respiratory System</th>
<th>Nervous System Disorders</th>
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<tbody>
<tr>
<td>Aneurysms</td>
<td>Alzheimer’s diseases</td>
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<td>Angina</td>
<td>Parkinsonism</td>
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<tr>
<td>Arrhythmias</td>
<td>Vascular dementia</td>
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<tr>
<td>Hypotension</td>
<td>Dementias (non-Alzheimer's)</td>
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<tr>
<td>Hypertension</td>
<td>Stroke</td>
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<td>Myocardial infarction</td>
<td>Progressive supranuclear palsy</td>
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<td>Congestive heart failure</td>
<td>Amyotrophic lateral sclerosis</td>
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<td>Lung changes – alterations in pO2</td>
<td>Huntington’s disease</td>
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<td>Chronic obstructive pulmonary</td>
<td>Adult onset sporadic ataxia</td>
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<tr>
<td>disease/emphysema</td>
<td>Traumatic brain injury in the elderly</td>
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<tr>
<td>Respiratory infections in the elderly</td>
<td>Depression/anxiety</td>
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<td>(bacterial, influenza)</td>
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<thead>
<tr>
<th>Integument / Skeletal System</th>
<th>Special Senses/ Sleep Disorders</th>
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<tr>
<td>Skin aging / wrinkles</td>
<td>Hearing loss</td>
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<tr>
<td>Hair growth/loss in aging</td>
<td>Vision impairment (cataracts; glaucoma;</td>
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<td>macular degeneration)</td>
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<tr>
<td>Osteoporosis (male)</td>
<td>Taste/smell</td>
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<tr>
<td>Osteoporosis (female)</td>
<td>Sleep apnea</td>
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<tr>
<td>Arthritis</td>
<td>Insomnia</td>
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<tr>
<td>Sarcopenia (muscle loss)</td>
<td>Circadian rhythms</td>
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</table>
Skeletal system and balance

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<tr>
<th>Digestive/Urinary/Endocrine System</th>
<th>Genetics/Nutrition/Environment</th>
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<tbody>
<tr>
<td>Swallowing / aging esophagus</td>
<td>Mitochondrial DNA mutations</td>
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<td>Stomach ulcers / gallstones</td>
<td>Epigenetics</td>
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<td>Type II diabetes</td>
<td>Specific genes involved in aging</td>
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<td>Hormone replacement therapy</td>
<td>Antioxidant micronutrients</td>
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<td>Thermoregulation</td>
<td>Caloric restriction</td>
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<td>Aging neuroendocrine axis</td>
<td>Artificial environments</td>
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<tr>
<td>Incontinence</td>
<td>Barker hypothesis</td>
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<td>Pesticides and Parkinsonism</td>
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<td>Malnutrition and alcoholism</td>
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You can choose a topic not indicated in the above list. However, you should discuss your proposed topic choice with an instructor or TA before progressing.

### 5.1 Lecture

**Tue, Jan 8**

**Topic(s):** Introduction and course information

Instructor: Kalisch

**Thu, Jan 10**

**Topic(s):** Measures and biomarkers

Instructor: Kalisch

**Tue, Jan 15**

**Topic(s):** Non-genetic causes of aging

Instructor: Kalisch

**Thu, Jan 17**
Topic(s): Cellular Senescence
Instructor: Kalisch

Tue, Jan 22
Topic(s): Cardiovascular system
Instructor: Kalisch

Thu, Jan 24
Topic(s): Assignment 1: Seminars – Cardiovascular/Respiratory system

Tue, Jan 29
Topic(s): Nervous system
Instructor: Kalisch

Thu, Jan 31
Topic(s): Nervous system
Instructor: Kalisch

Tue, Feb 5
Topic(s): Assignment 1: Seminars – Nervous system

Thu, Feb 7
Topic(s): Glucocorticoids and stress
Instructor: Kalisch

Fri, Feb 8
Topic(s): Assignment 2: Lay magazine article due

Tue, Feb 12
Topic(s): Assignment 1: Seminars – Special senses/ Sleep disorders

Thu, Feb 14
Reproductive System

Instructor: Bartlewski

Mon, Feb 18 - Fri, Feb 22

Topic(s): Winter break

Tue, Feb 26

Topic(s): Assignment 3: video – Rage Against the Darkness

Thu, Feb 28

Topic(s): Assignment 4: Poster session 1

Tue, Mar 5

Topic(s): Urinary system

Instructor: Kalisch

Thu, Mar 7

Topic(s): Assignment 4: Poster session 2

Tue, Mar 12

Topic(s): Assignment 1: Seminars
         Digestive/Urinary/Endocrine

Thu, Mar 14

Topic(s): Assignment 4: Poster session 2

Tue, Mar 19

Topic(s): Pharmacology

Instructor: Kalisch

Wed, Mar 20

Topic(s): Assignment 3: Patient report due

Thu, Mar 21
Wound healing and regeneration
Instructor: Vickaryous

Tue, Mar 26

Assignment 1: Seminars Integument/Skeletal system

Thu, Mar 28

Biomarkers of Aging (genetic)
Instructor: Kalisch

Tue, Apr 2

Assignment 1: Seminars – Genetics/Nutrition/Environment

Thu, Apr 4

Longevity and Society/Exam review
Instructor: Kalisch

6 Assessments

There will be four assignments and a final exam during the semester. In addition, 5% of your final grade will be based on peer assessments of seminar sessions and poster presentations (details for peer assessments will be provided on CourseLink).

6.1 Assessment Details

Assignment 1: Student Seminars (15%)
Involves students working in groups of five, preparing and presenting to the class a PowerPoint seminar on a selected subject from a list of aging topics (see table for suggestions).

These talks will be presented during designated classes as mini-symposia based on aging themes. When necessary, two sessions will be run on each day in two separate class rooms. A maximum of three groups will present in each session. Seminars should be 20 minutes in length followed by a 5-minute question period.

1. 15% of your final mark (including an assessment by group members)
2. An electronic file of your seminar will be submitted and made available to the entire class through the PEAR system (details to be provided on CourseLink).

3. **Seminar dates: January 24 (Cardiovascular/Respiratory); February 5 (Nervous System); February 12 (Special Senses/Sleep Disorders); March 12 (Digestive/Urinary/Endocrine); March 26 (Integument/Skeletal); April 2 (Genetics/Environment).**

**Assignment 2: Lay Magazine Article (10%)**

**Date:** Fri, Feb 8

Involves preparing a ~500-750 word article on an aging topic in a format and language style that would be suitable for a "lay" magazine, such as Macleans. Further details will be provided.

**Assignment 3: Problem based learning (PBL). In-class video – "Rage Against the Darkness". Aging and Quality of Life Program (15%)**

Elderly individuals often suffer from interacting physical, social and psychological conditions – both acute and chronic – that limit their independence and threaten their capacity to function in daily life.

1. From the documentary "Rage Against the Darkness", identify one age-related disability and produce a patient report consisting of three parts. The initial section of the report should briefly describe the physiology behind the condition and the second part, its social and psychological effects/impact on the individual. In the final section of the report suggest treatment options (medical, environmental, and/or behavioural), with justification(s), that may improve the patient's quality of life.

2. **Video shown in class February 26, 2019, report due date: Wednesday March 20, 2019.**

**Assignment 4: Poster Presentation (20%)**

Involves students working in groups of five, preparing and presenting to the class a poster presentation on a selected aging topic (see last page for suggested topics).

1. Scientific posters will be presented in class (or other venue) in one of three Poster Symposia on Aging open to all members of the Department of Biomedical Sciences.

2. **20%** of your final grade (including an assessment by group members)

3. **ALL posters are due** in pdf formats by noon on the Tuesday prior to the session the poster will be presented. The pdf version must be uploaded to the PEAR system (details to be provided on CourseLink).

4. **Presentation dates: February 28, March 7 and March 14, 2019.**
Final Examination (35%)

Date: Thu, Apr 18, 7:00 PM - , 9:00 PM

The examination will consist of completing several short answer questions based on material covered in lectures, student seminars and poster presentations.

7 University Statements

7.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

7.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

7.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-regregchgr.shtml

7.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

7.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared
responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website https://www.uoguelph.ca/sas

7.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University’s policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

7.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

7.8 Resources

The Academic Calendars are the source of information about the University of Guelph’s
procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars