



# BIOM\*4050 Biomedical Aspects of Aging

Winter 2020

Section(s): 01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 1.00 - December 02, 2019

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## 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-Requisites:**

1 of BIOM\*3200, HK\*3810, HK\*3940

**Restrictions:**

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 time and location of the final exam are subject to change. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:**

Dr. Pawel Bartlewski

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### 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 Resources

**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)**

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### 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.

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## 5 Teaching and Learning Activities

**Lectures:** Tuesdays and Thursdays; 10:00 to 11:20 AM; Room 117, MacKinnon Building (MCKN)

A schedule of lecture topics will be provided on CourseLink.

### **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 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 (ppt or pptx) so it can be uploaded onto the class computer for the seminar session. A pdf copy must be uploaded to the PEAR system prior to presenting in class to ensure it is available for peer evaluation..

### **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 need to be sent to Ms. Kim Best by noon on the Tuesday prior to the scheduled poster presentation session to ensure they can be printed in time for the session. Details for

poster printing will be provided on the CourseLink course site. Posters (pdf format) must be uploaded to the PEAR system prior to the poster session to ensure they are available for peer evaluation.

**Suggested Seminar/Poster Topics:**

<b>Cardiovascular/Respiratory System</b>	<b>Nervous System Disorders</b>
Aneurysms	Alzheimer's diseases
Angina	Parkinson's disease
Arrhythmias	Vascular dementia
Hypotension	Other Dementias
Hypertension	Stroke
Myocardial infarction	Progressive supranuclear palsy
Congestive heart failure	Amyotrophic lateral sclerosis
Lung changes – alterations in pO <sub>2</sub>	Huntington's disease
Chronic obstructive pulmonary disease/emphysema	Adult onset sporadic ataxia
Respiratory infections in the elderly (bacterial, influenza)	Traumatic brain injury in the elderly
	Depression
	Anxiety
<b>Integument / Skeletal System</b>	<b>Special Senses/ Sleep Disorders</b>
Skin aging / wrinkles	Hearing loss
Hair growth/loss	Vision impairment (any one of: cataracts; glaucoma; macular degeneration)
Osteoporosis	Taste/smell

Arthritis	Sleep apnea
Sarcopenia (muscle loss)	Insomnia
Skeletal system and balance	Circadian rhythms
<b>Digestive/Urinary/Endocrine System</b>	<b>Genetics/Nutrition/Environment</b>
Swallowing / aging esophagus	Mitochondrial DNA mutations
Stomach ulcers / gallstones	Epigenetics
Type II diabetes	Specific genes involved in aging
Hormone replacement therapy	Antioxidant micronutrients
Thermoregulation	Caloric restriction
Aging neuroendocrine axis	Artificial environments
Incontinence	Barker hypothesis
	Pesticides and Parkinsonism
	Malnutrition and alcoholism

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.

## 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).

Marking rubrics for each assignment and details regarding late penalties for assignments will be posted on CourseLink.

This course will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to

maintain academic integrity at the University of Guelph.

## 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. Details on presentation dates and how to sign up for seminars will be posted on CourseLink.
4. **Seminar themes: Cardiovascular/Respiratory;Nervous System;Special Senses/Sleep Disorders; Digestive/Urinary/Endocrine; Integument/Skeletal; Genetics/Environment.**

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

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 on CourseLink.

Lay articles are **due** by 11:59 PM on **Friday February 7, 2020**.

### 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 25, 2020, report due date: Wednesday March 18, 2020.**

#### **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 table for suggested topics).

1. Scientific posters will be presented during class time in one of three Poster Symposiums 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 must be submitted** by noon on the Tuesday prior to the poster presentation session to ensure printing prior to the session. A pdf version must be uploaded to the PEAR system prior to the session for peer evaluations (details to be provided on Courselink).
4. **Presentation dates: February 27, March 5 and March 12, 2020.**

#### **Final Examination (35%)**

The examination will consist of completing several short answer questions based on material covered in lectures, student seminars and poster presentations. Additional details will be provided on CourseLink. The final examination will be scheduled and supervised by the Registrar's Office. Please see WebAdvisor for the latest information.

## **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>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### 7.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic 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-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.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.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website  
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

## 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>