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

This course is offered in synchronous (AD-S; VIRTUAL) format. This means that most Tuesday and Thursday mornings from 10:00 to 11:20 the class will interact online for course activities. Please refer to the activities section of the course outline for the lecture and presentation schedule. Updates, reminders and additional details will also be posted in the announcements on CourseLink.

1.3 Final Exam

The final exam in this course is a take-home exam. Details will be provided on CourseLink.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Dr. Pawel Bartlewski
Email: pmbart@uoguelph.ca
2.2 Teaching Assistants

<table>
<thead>
<tr>
<th>Teaching Assistant</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simran Bhullar</td>
<td><a href="mailto:bhullars@uoguelph.ca">bhullars@uoguelph.ca</a></td>
</tr>
<tr>
<td>Andrila Collins</td>
<td><a href="mailto:andrila@uoguelph.ca">andrila@uoguelph.ca</a></td>
</tr>
</tbody>
</table>

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)

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 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, assignments and short essay type answers.

5 Teaching and Learning Activities

Learning Activities: Synchronous (AD-S; VIRTUAL); Tuesdays and Thursdays; 10:00 to 11:20 AM; Lectures and student presentations will take place via ZOOM

5.1 Lecture

Tue, Jan 12
Topics: Introduction and Course Information

Thu, Jan 14
Topics: Measures and Biomarkers

Tue, Jan 19
Topics: Non-genetic Causes of Aging

Thu, Jan 21
Topics: Cellular Senescence

Tue, Jan 26
Topics: Cardiovascular System

Thu, Jan 28
Topics: Seminars – Cardiovascular/Respiratory System

Tue, Feb 2
Topics: Nervous System

Thu, Feb 4

Topics: Seminars – Nervous System

Tue, Feb 9

Topics: Glucocorticoids and Stress

Thu, Feb 11

Topics: Seminars – Special Senses/ Sleep Disorders

Mon, Feb 15 - Fri, Feb 19

Topics: Monday February 15 to Friday February 19 – Winter break

Tue, Feb 23

Topics: Video – Rage Against the Darkness

Thu, Feb 25

Topics: Reproductive System

Tue, Mar 2

Topics: Urinary System

Thu, Mar 4

Topics: Seminars – Digestive/Urinary/Endocrine

Tue, Mar 9

Topics: Pharmacology

Thu, Mar 11
Topics: Seminars – Integument/Skeletal System

Tue, Mar 16
Topics: Genetics and Aging

Thu, Mar 18
Topics: Seminars – Genetics/Nutrition/ Environment

Tue, Mar 23
Topics: Poster Presentations - Aging Issues

Thu, Mar 25
Topics: Poster Presentations - Aging Issues

Tue, Mar 30
Topics: Poster Presentations - Aging Issues

Thu, Apr 1
Topics: Poster Presentations - Aging Issues

Tue, Apr 6
Topics: Poster Presentations - Aging Issues

Thu, Apr 8
Topics: Poster Presentations - Aging Issues

6 Assessments

There are four assignments and a take-home final exam scheduled during the semester. These assessments are worth 95 % of your final grade in the course. In addition, 5 % of your final grade will be based on the completion of peer assessments of seminar sessions and poster presentations.
Instructions and marking rubrics for each assignment and details one peer assessments and late penalties for assignments will be posted on CourseLink.

As part of the ongoing efforts to maintain academic integrity at the University of Guelph, this course will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying.

6.1 Assessment Details

Assignment 1: Reflections on Aging (10%)

The purpose of this assignment is for you to reflect on your personal view of aging. No minimum or maximum length is required for this assignment – as a guideline 500 to 1000 words. Additional details will be provided on CourseLink.

Personal reflections are due by 11:59 PM on Friday January 22, 2021.

Assignment 2: Student Seminars (15%)

Involves students working in groups of five, preparing and presenting to the class a PowerPoint seminar on an aging topic (see table below 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 virtual 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. Each presentation must incorporate recent (last five years) primary research results from journal publications with background information on the topic.

1. 15% of your final mark (including a within group assessment)
2. An electronic file of the seminar will be submitted prior to the presentation for peer review 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. Potential 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 by more than one group.

<p>| Cardiovascular/Respiratory System | Nervous System Disorders |</p>
<table>
<thead>
<tr>
<th>Aneurysms</th>
<th>Alzheimer's diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angina</td>
<td>Parkinson's disease</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>Vascular dementia</td>
</tr>
<tr>
<td>Hypotension</td>
<td>Other Dementias</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Stroke</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>Progressive supranuclear palsy</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>Amyotrophic lateral sclerosis</td>
</tr>
<tr>
<td>Lung changes – alterations in pO2</td>
<td>Huntington’s disease</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease/emphysema</td>
<td>Adult onset sporadic ataxia</td>
</tr>
<tr>
<td>Respiratory infections in the elderly (bacterial, influenza)</td>
<td>Traumatic brain injury in the elderly</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td>Anxiety</td>
</tr>
</tbody>
</table>

**Integument / Skeletal System**

<table>
<thead>
<tr>
<th>Skin aging / wrinkles</th>
<th>Hearing loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hair growth/loss</td>
<td>Vision impairment (any one of: cataracts; glaucoma; macular degeneration)</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Taste/smell</td>
</tr>
<tr>
<td>Arthritis</td>
<td>Sleep apnea</td>
</tr>
<tr>
<td>Sarcopenia (muscle loss)</td>
<td>Insomnia</td>
</tr>
<tr>
<td>Skeletal system and balance</td>
<td></td>
</tr>
<tr>
<td>Digestive/Urinary/Endocrine System</td>
<td>Genetics/Nutrition/Environment</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Swallowing / aging esophagus</td>
<td>Mitochondrial DNA mutations</td>
</tr>
<tr>
<td>Stomach ulcers / gallstones</td>
<td>Epigenetics</td>
</tr>
<tr>
<td>Type II diabetes</td>
<td>Specific genes involved in aging</td>
</tr>
<tr>
<td>Hormone replacement therapy</td>
<td>Antioxidant micronutrients</td>
</tr>
<tr>
<td>Thermoregulation</td>
<td>Caloric restriction</td>
</tr>
<tr>
<td>Aging neuroendocrine axis</td>
<td>Artificial environments</td>
</tr>
<tr>
<td>Incontinence</td>
<td>Barker hypothesis</td>
</tr>
<tr>
<td></td>
<td>Pesticides and Parkinsonism</td>
</tr>
<tr>
<td></td>
<td>Malnutrition and alcoholism</td>
</tr>
</tbody>
</table>

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.

**Assignment 3: Problem based learning (PBL). “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 will be posted on CourseLink - class time to view the video has been scheduled on February 23 but the video can be watched any time. Report due date: Monday, March 15, 2021.**

**Assignment 4: Issues Affecting Aging Individuals (25%)**
Involves students working in groups of five, preparing and presenting to the class a poster presentation describing an important issue affecting aging individuals and submitting a summary of the issue, along with suggestions for addressing the issue selected.

**Part one: Poster presentation**

1. Scientific posters will be presented during the last three weeks of the semester.
2. 15% of your final grade (including an assessment by group members)
3. A copy of the poster must be uploaded to the PEAR system prior to the presentation for peer evaluations (details to be provided on Courselink).
4. **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 sessions provide a forum for the exchange of scientific information on an aging subject. Posters can be produced using various computer programs (eg. PowerPoint, Adobe Illustrator) - PowerPoint templates will be available on CourseLink.

**Part two: Aging Issue Summary**

Only one member of each group needs to submit the summary assignment, which makes up 10% of the final course grade. Each paper should be no more than two single-spaced (four-double-spaced) pages in length. The paper should include a discussion of the significance of and suggestions for addressing the aging issue selected.

**Final Examination (25%)**
The final examination is a take-home exam that will consist of questions based on material covered in lectures, student seminars and poster presentations. Additional details will be provided on CourseLink. The examination will be posted on the first day of the examination schedule (April 15, 2021) and is due on or before the final day of examinations (April 27, 2021).

---

**7 Course Statements**

**7.1 Course Website**
For course information, learning materials, assessment dates, and grades, please consult the course website (accessible via Courselink). Instructors will aim to post learning materials on Courselink by 7 pm the evening before each scheduled learning activity and recordings of the lectures will be posted by 4 pm on the day of the lecture.

7.2 Netiquette

Online Behaviour
Inappropriate online behaviour will be referred to the office of the Associate Dean (Students and Academic) for investigation. The range of possible penalties is listed in the Undergraduate Calendar, Section VIII: Undergraduate Degree Regulations and Procedures, Academic Misconduct, Penalties, Part A: Range of Penalties That May Be Assessed, which includes loss of marks, loss of university scholarships or bursaries, suspension or expulsion from the university, and other penalties, depending on the offence.

Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students
- Using obscene or offensive language online
- Copying or presenting someone else’s work as your own
- Adapting information from the Internet without using proper citations or references
- Buying or selling term papers or assignments
- Posting or selling course materials to course notes websites
- Having someone else complete your quiz or completing a quiz for/with another student
- Stating false claims about lost quiz answers or other assignment submissions
- Threatening or harassing a student or instructor online
- Discriminating against fellow students, instructors and/or TAs
- Using the course website to promote profit-driven products or services
- Attempting to compromise the security or functionality of the learning management system
- Sharing your user name and password
- Recording lectures without the permission of the instructor

7.3 Course Evaluations

Students will be asked to complete an online questionnaire about the course during the last
two weeks of classes. This is part of the information required by the University to evaluate faculty performance for purposes of Tenure, Promotion and Selective Increases. Administered by a third party rather than the instructors, these evaluations will be delivered to the respective instructors ONLY after the final grades have been submitted to the Registrar's Office. Note: only the numerical ratings from the form will be made available to the Chair for administrative purposes - the Chair will NOT see any comments that are written on the evaluation forms unless signed by the student.

8 University Statements

8.1 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.

8.2 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

8.3 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-regregchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml
8.4 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.

8.5 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

8.6 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-ami misconduct.shtml
8.7 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.

8.8 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

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

8.10 Illness

The University will not normally require verification of illness (doctor’s notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.