GMS 6486 | Biology of Aging

Course Syllabus

Instructor Information

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Office Hours: By appointment via Zoom
Preferred Method of Communication: Email

Office Location

On Zoom. Link available on the course website.

Course Details

Course Format: Online
Credit Hours: 3 (Students are expected to engage in approximately 9 hours of coursework per week for this 3-credit course)

Course Description

Aging is a fundamental biological process that shapes resilience, vulnerability and longevity across the lifespan. This course examines the biological foundations of aging, exploring how cellular, molecular and organ-level changes influence health, resilience and longevity.
Rather than focusing on aging as a collection of diseases, the course explores aging as a biological process shared across species, including humans.

Students will develop a conceptual framework for understanding how aging emerges from changes at the cellular, organ and whole-body levels, and why these changes increase vulnerability to conditions such as frailty, cardiovascular disease, cognitive decline and sensory loss. Drawing on examples from human studies and model organisms, the course connects fundamental biology to everyday questions about longevity, vitality and healthy living across the lifespan.

Throughout the semester, we will examine how aging affects major organ systems—such as the immune system, heart, brain and sensory systems—and explore why these systems become less resilient over time. The course also investigates evidence-based interventions, including nutrition, intermittent fasting and exercise, that influence biological aging, mitochondrial health and promote healthy longevity.

Required Materials

There are no items required or recommended for this course.

Learning Resources

Learning resources in this course may include the following:

1. Articles will be provided through the course website and are coordinated with lecture materials to support key concepts and serve as primary course readings.
2. Recorded lectures, presentations, or other multimedia content may be provided to reinforce course topics and enhance understanding.
3. Weekly discussions may be available to address questions related to lectures and course materials. Discussion prompts are designed to encourage critical thinking and engagement with course concepts.

Course Goals

The goals of the course are two-fold: (1) to provide a foundation of the fundamental concepts and terminology of aging and age-related diseases; and (2) to promote critical thinking of the clinical consequences of aging and associated diseases.

Expectations and Student Learning Outcomes

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

- Explain molecular and cellular hallmarks of aging.
- Connect biological mechanisms to clinical vulnerability and resilience across the lifespan, and why their regulation changes with age.
- Evaluate interventions such as intermittent fasting and regular physical activity and how it can influence the pace of aging and promote healthy longevity.
- Integrate geroscience principles into translational aging research.

Course Outline and Assignments

The course is divided into 15 modules. Each module consists of specific reading assignments, videos, and other internet resources. For each module students will: (1) review the learning objectives and corresponding lecture notes; (2) read and complete the assignments as given; (3) participate in weekly discussion boards as assigned. Examples of course assignments include:

Reading Assignments:

- Each module includes carefully selected readings from textbooks, peer-reviewed articles, and other online resources that provide in-depth information about the module topic.

- Students are expected to read (and/or view) all assigned materials before completing the activities for that module. These readings will form the foundation for assignments and discussions.

Writing Assignments:

- Short essays or case studies: Students will respond to questions or real-world scenarios, demonstrating their ability to apply course concepts to practical situations.
- In certain modules, students may be asked to create a "lecture" or narrated power point presentation that addresses a certain question or problem.

Discussion Boards:

- Students are required to participate in online discussion forums. Each forum will feature a discussion prompt based on the module's topic.
- Participation involves posting thoughtful responses to the prompt, referencing course materials, and engaging in meaningful dialogue with peers.
- Peer Interaction: Students should reply to at least two peers' posts, offering constructive feedback or asking questions to deepen the conversation.
- Discussion board posts should demonstrate critical thinking and an understanding of the module's content, encouraging collaborative learning.

Quizzes and Short Answer

- Some modules' assignments are in quiz and short answer format

Projects:

Project will require students to apply the knowledge gained from preceding modules to a comprehensive analysis. Each project is a bit different; however, the idea is to create content so that the student may use the intermediate projects to help construct the larger final project.

Methods of Evaluation

Each student's final grade for the course will be calculated as follows:

- Assignments: 60%
- Midterm Project: 20%
- Final project: 20%

Total: 100%

Grading Scale

Letter grade and percentage

Letter	Percentage Value
A	90-100%
A-	87-89.9%
B+	84 -86.9%
B	81-83.9%
B-	78-80.9%
C+	75-79.9%
C	72-74.9%
C-	69-71.9%
D+	66-68.9%
D	63-65.9%
D-	60-62.9%
E	59.9% and below

A grade of incomplete (I) may be given if a student fails to complete the course as scheduled for unforeseen circumstances beyond the student's control.

Late Work Policy

All assignments/projects must be submitted via the deadline provided on the course website. Unless you have an approved excused absence, a 10% deduction will be applied for each week an assignment is late.

Course Schedule

Week	Module
Week 1	What Is Aging? How Do We Age? The Hallmarks of Aging Framework
Week 2	Living Past 100: What Can Centenarians Teach Us About Aging?
Week 3	Why Do Women Live Longer Than Men?
Week 4	Hormones and Aging: How Growth Hormone Signaling Shapes Longevity
Week 5	Mitochondria and Aging: Powering Cells, Organs, and Life
Week 6	The Immune System and Aging: Why Resistance to Disease Declines With Age
Week 7	Stem Cells and Aging: Why Our Ability to Repair Ourselves Fades Over Time

Week 8	Frailty and Aging: Why Strength and Resilience Decline with Age
Week 9	Heart Health and Aging: Why Cardiovascular Risk Rises with Age
Week 10	Brain Aging: How and Why Cognitive Function Declines Over Time
Week 11	Sensory Aging: Why Hearing Declines with Age
Week 12	Calorie Restriction: Can Eating Less Slow Aging?
Week 13	Intermittent Fasting: Does When We Eat Matter for Aging?
Week 14	Exercise and Aging: How Physical Activity Promotes Healthy Longevity
Week 15	Final Project: Integrating the Biology of Aging

University Policies and Resources

Information about grading policies, support for students with disabilities, course evaluations, the Honor Code, and other course policies and campus resources can be found on the Syllabus Policies page.

Attendance Policy

Requirements for class attendance and make-up work for this course are consistent with UF policies and can be found on the Attendance Policies page.

Academic Integrity

UF students are bound by The Honor Pledge which states "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the UF Conduct Code website for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Accessibility and Accommodations

Students requesting accommodations for disabilities must first register with the Disability Resource Center (DRC). The DRC will provide documentation to the student, who must then provide this documentation to the instructor when requesting accommodation.

Accommodations are not retroactive. Therefore, students should contact the DRC as early as possible in the semester to ensure timely support. For more information, please visit the UF Disability Resource Center website.

Technology Requirements

To successfully participate in this course, students are expected to have regular access to a reliable internet connection and a computer capable of accessing the University of Florida's learning management system (Canvas).

Students should be able to:

- Access course materials, including readings, recorded lectures, and multimedia content
- Submit assignments through Canvas
- Participate in online discussions and course activities

Students are responsible for ensuring their technology meets the minimum requirements for Canvas. For technical assistance, please contact the UF Computing Help Desk at 352-392-4357 or visit the UF Computing Help Desk website.

Copyright Information

Please review the policy for the use of copyrighted materials on the UF Smathers Library Copyright Guide.

Technology in the Classroom

For this graduate level course, GMS6486 Biology of Aging, it is imperative that all work submitted is your own. The use of AI tools, including but not limited to, generative language models, code generation tools, and automated essay writer, is strictly prohibited for all assignments. Any work found to have been produced with the aid of such AI tools will result in a zero for that assignment. This policy is in place to ensure the integrity of your learning experience and to respect the academic standards of this course. If you have any questions about this policy or need assistance with your work, please do not hesitate to reach out to your instructor.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways:

1. The email they receive from GatorEvals
2. Their Canvas course menu under GatorEvals

3. The central Portal at https://my-ufl.bluera.com

Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/publice-results/.

Student Support Services

As a student in a distant learning course or program, you have access to the same student support services that on campus students have. For course content questions contact your instructor. For related to your course please contact the UF computing Help Desk at 352-392-4357. For Help Desk hours visit the UF Computing Help Desk website.