

GERO 440 / BISC 440: Biodemography of Aging

Units: 4.0 Spring 2025



Time: Thursdays, 3:00pm – 5:50pm

Location:

Instructor: [Tara L. Mastro, PhD](#)

Communication: Email: mastro@usc.edu

Email is the best way to contact me. I will respond within 24 hours. Message again if you haven't heard back. (Messages can get lost.)

Office Hours: Before and after class for short help sessions or by appointment. Schedule them through this link:

<https://calendar.app.google/EaQpwXV6f4XVU2Da8>

If you need another time to meet, send me an email!

Physical Office: GERO 231A

This syllabus, schedule, and stated policies may change during the semester but if/when it does, I will point it out clearly during class and/or through announcements.

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Important Dates!

Monday, January 13th, 2025	First Day of Class
Monday, January 20th, 2025	Martin Luther King's Birthday Holiday
Friday, January 31st, 2025	Last Day to Add Class, Refunds, Pass/No Pass Grading
Monday, February 17th, 2023	
Friday, February 28th, 2023	Last Day to Drop without a "W", Change grading basis to letter grade
March 16th-23rd, 2023	Spring Recess – No Class
Friday, April 11th, 2023	Last day to drop with a W
Friday, May 2nd, 2023	Last Day of Classes
May 3rd – 6th	Study Days
Thursday, May 13th, 2025	Final Exam 2-4 pm

Welcome and About Me

Hello everyone and welcome to class!

This class is going to teach you a lot, and you will have fun while doing it.

I look forward to being your guide in learning new topics and challenging how you view the world. I am a scientist to the core. I live my life by the scientific method, as do many of you, even if you haven't realized this yet. My research career has taken me to many places, including the evolution of complex organs, the intersection of reproductive fidelity and cancer, and, more recently, neuroscience. I think constantly about how we think and learn at the biochemical level. All these experiences have shaped how I approach learning, teaching, and the topics we will discuss this semester.

This class is designed to be as stress-free and interactive as possible. We have one class meeting a week. During each lecture period, we will have one hour of traditional lecture, a short break, an interactive assignment, and a group (you can also do it alone) to enhance your understanding of the class. I believe in the power of "yet," so there are always opportunities to try again or show a deeper understanding of the material than you did before. We will approach learning in many ways, and I use the mastery-based grading system. This means you will get multiple opportunities to perform well, and you can choose which assessments and formats to complete to show what you know. This class aims to learn about the biological, environmental, and social causes of aging in contexts that matter. Yes, we will talk about basic research and model systems, but we will also watch popular media to critique and form our perspectives.

My goal is for everyone in the class to earn an A!

I care about equitable education, so these are my pledges to students:

1. You will never lose points for being human. If you get sick, have a family emergency, car crash, etc. and miss a deadline. You will not lose points. Mental health is health, so if you are late on an assignment because you are over-extended, that is okay, too.
2. I will not grade you based on spelling or grammar. I am not an English professor, so that is none of my business. Please note that you can lose points if the spelling and grammar make what you are saying completely unclear or wrong.
3. I will give you the benefit of the doubt.

Your Feedback is Important! (Student Course Evaluations)

Gerontology collects evaluations from students in the middle of the semester during the fall and spring semesters. Learning Experience Evaluations are also sent out at the end of the semester. Please take the time to participate in this, as it is beneficial to hear from students. It is also great when you just directly message me about it, too.

Gerontology Inclusion Statement

The USC Leonard Davis School of Gerontology is committed to creating an inclusive classroom environment that values the diversity of all its members. The School is committed to providing a purposefully inclusive community where all members and visitors are free from all intolerant behavior (including but not limited to harassment, verbal or written abuse, threats, ridicule, or intimidation). We encourage all members within our community to embrace and learn from the diversity within our classroom, school, and university.

Course Description

Consideration of the biological and social-cultural factors that govern the evolution of life spans and the life of humans and selected animal models.

Prerequisite(s): [BISC 120](#) or [BISC 121](#)

Recommended Preparation: Some stats or at least the willingness to learn 😊

Learning Objectives

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

1. Demonstrate why the study of lifespan is important and societal views on the biology of aging and age-related diseases
2. Explain how genes that modulate lifespan have been identified using model systems.
3. Evaluate which biological pathways influence lifespan most and discuss the molecular mechanisms underlying this regulation.

4. Theorize and defend implications of current research on future studies of human lifespan and age-related diseases.

Most importantly, this class will allow students to break down a scientific hypothesis into its fundamental elements and critically analyze the validity of current theories and dogmas in the field.

The learning experience in this course will develop the following core competencies in Gerontology as described by the Academy for Gerontology in Higher Education (AGHE).*

- “Frameworks for understanding aging: Utilize gerontological frameworks to examine human development and aging.
- Biological aspects of aging: Utilize gerontological frameworks to examine human development and aging.
- Research and Critical Thinking: Distinguish factors related to aging outcomes, both intrinsic and contextual, through critical thinking and empirical research.
- Attitudes and Perspectives: Develop a gerontological perspective through knowledge and self-reflection.
- Ethics and Professional Standards: Adhere to ethical principles to guide work with and on behalf of older persons.”

* *The Gerontological Society of America*. (n.d.). Retrieved August 22, 2022, from https://www.geron.org/images/gsa/AGHE/gerontology_competencies.pdf

Textbook and Materials

The good news is that there is no required textbook for the course! However, much of what we will learn is covered in “Biology of Aging” by Rodger B. McDonald so having this text available during the course will be helpful. There will be reading posted for each class meeting on Brightspace. The reading assignments are listed in the schedule at the end of this syllabus.

Technology Requirements

Brightspace: Get access now if you don't already have it. [Get Brightspace help here.](#)

- Used for course communication (e.g., announcements)
- Discussion Boards
- Reading material
- Assignment downloads
- General Course Content

Zoom: We will use zoom as needed. [Get USC Zoom help here.](#)

Presentation software: Prezi, PowerPoint, Keynote, Google Slides, etc.

Microsoft Excel or Google Spreadsheets.

Word processing, image capture (camera phone), and pdf reading technologies.

- Note that depending on your own choices for assignment formats, you may need more technology than this.

- Check out the [software](#) you can get access to as USC student.

Course Communication

Please contact me through email (mastro@usc.edu). I am the best at checking and responding to emails. I will get back to you in 24 hours. If I do not get back to you in this time frame, please resend the message as soon as you can because messages can get lost, and I may not have gotten your message. I will communicate about the course primarily through Brightspace announcements and email, so please ensure you can check these messages.

Class Format

This class is designed to be as stress-free and interactive as possible. We have one class meeting a week. During each lecture period, we will have one hour of traditional lecture, a short break, an interactive assignment, and a group (you can also do it alone) to enhance your understanding of the class. I believe in the power of “yet” so there are always opportunities to try again or show a deeper understanding of the material than you did before. We will approach learning in many ways. This class aims to learn about the biological, environmental, and social causes of aging in contexts that matter. Yes, we will talk about basic research and model systems, but we will also watch popular media to critique and form our perspectives.

Student Hours and Meetings

I will be available before and after class for short conversations. If you want to have more in-depth discussions then email me three suggested times to meet and whether you want it to be in person or online. We will pick one of those times. You can also schedule a meeting through this link:

<https://calendar.app.google/EaQpwXV6f4XVU2Da8>

Grading and Late Assignments

This class uses mastery-based grading, which means that I will offer many formative assignments that help you learn. If you decide to do these assignments, you will receive a score for them, and they will count toward your final grade. However, if you do not complete them, they will not count toward your grade at all.

Late work is accepted without penalty when a student provides notice and a reason. Life happens, and I would prefer you to have the learning benefit of doing the work and getting those points than not. Exams must be completed during the exam window unless previously determined accommodations are made. Assignments will be turned in online. There are many different types of assessment in this course to facilitate learning. Regrade requests must be submitted within a week of receiving the score.

Assignments will be graded within one week of their turn-in. Please check the assignment descriptions for rubrics and expectations.

Table 1: Point breakdown of assignment types and percentage of grade

Assessment Tool	Notes	% of Grade
In-Class Work (optional)	One for each class meeting	10%
Weekly Discussions (optional)	One for each class meeting	10%
Op-Eds (1 page papers)	5 of them will be equally weighted, with the lowest one will be dropped	20%
Midterm 1	one of these	20%
Midterm 2	one of these	20%
Final (Public Campaign Project) (group work or independent)	one of these	20%
Total		100%

Table 2 - Percentage grade to letter grade conversion.

Grade	Range
A	93.0% or higher
A-	90.0%-92.99%
B+	87.0%-89.99%
B	83.0%-86.99%
B-	80.0%-82.99%
C+	77.0%-79.99%
C	73.0%-76.99%
C-	70.0%-72.99%
D+	67.0%-69.99%
D	63.0%-66.99%
D-	60.0%-62.99%
F	59.9% or lower

Grade Appeals and Disputed Grades

The Policy of the University is as follows, “A grade once reported to the Office of Academic Records, and Registrar may not be changed except by request of the faculty member to the Committee on Academic Policies and Procedures on a Correction of Grade form. Changes should be requested only on the basis of an actual error in assigning the original grade, not on the basis of a request by the student or special consideration for an individual student. Students are not permitted to complete course work after the semester has ended.”

Incompletes

As defined in the Academic Policies of USC, “If an IN is assigned as the student’s grade, the instructor will fill out the Assignment of an Incomplete (IN) and Requirements for Completion form, which will specify to the student and to the department the work remaining to be done, the procedures for its completion, the grade in the course to date and the weight to be assigned to the work remaining to be done when computing the final grade. A student may complete the IN by completing only the portion of required work not finished as a result of documented illness or emergency occurring after the twelfth week of the semester. Previously graded work may not be repeated for credit.” However, please note that the Registrar’s recommended definition of emergency is “An unforeseeable situation or event beyond the student’s control that prevents her from taking the final examination or final summative experience.”

Citing and Power of Paraphrasing

There is great power in paraphrasing. Paraphrasing will allow you to absorb and digest information and demonstrate to others that you are now very knowledgeable about a subject yourself. It is easy to quote a source verbatim, put it in quotes and then cite it, but this does not give you credibility as a new “expert” on the topic. Showing knowledge and understanding of a topic requires that you read your source, digest the information, and then deliver it in your own words. If you quote large blocks of information from your source, you will lose points in this course. Please also cite using in-line citations (author, year). Generally speaking, in scientific writing (and as a good practice for any sort of technical writing) when you say a fact, you need to provide an in-line citation of where you found that information. The only exception to this rule is for “common knowledge” in the field. Common knowledge is any fact that nearly all people in your audience widely known and accept, or can be easily observed (e.g., the sky is blue – just walk outside and look up).

Assignment Descriptions

In-Class Work/ Participation

The format of the class will be interactive. The class is three hours. Half of the time will be spent on lectures, and the other half will be spent on interactive learning. Participation will be tracked by turning in classwork assignments online. The class work will incorporate short group quizzes that use questions identical or similar to those on the exams.

Discussion Boards

These discussion boards allow students to discuss topics and prompts related to the course material each week. Any free response questions on an exam are taken from these discussion boards.

Op-Ed (10 points each)

This is an area of the class where you can express your thoughts. You will write a paper (approximately 1 page, single-spaced 10-point font Arial). You will express your opinion and interpretation of a movie presented in class. There is no correct answer here, but you must support your findings with literature and in-text citations (APA or other academic style standard). Please note that you can submit an oral “pod-cast” format or another alternative format that you are excited about. Just make sure you hit the points on the rubric below.

Total of 10 points

- 1 point for taking a clear position on the topic.
- 1 point for at least two scientifically valid references.
- 1 point supporting facts with in-text citations.
- 4 points for addressing specific questions or prompts in the paper as specified.
- 1 points for continuity of argument and overall craftsmanship
- 1 point for considering conflicting data or points of view
- 1 point for having a conclusion that loops back to the beginning.

Note: I will not grade you on spelling and grammar unless it is insufficient to the extent the content cannot be understood

Public Awareness Campaign (Working in Small Student groups 3-4) – *You present this for the class's final (it can be performed live, online or pre-recorded based on what works for your group).*

In this class we will have learned much about biology and the interaction of genes, physiology, and environment to create our aging experience. In this assignment, you will apply this knowledge and perspective to build your epidemiological skills. You will find a primary research article or articles related to the course topics. You will use this article to focus on a topic you need to educate the public about. Examples could be chemical exposures, negative impacts of stress, diet, and exercise. There are four deliverables for this assignment. Then, you will present the information in the paper, describe what that means, what you want the public to know about it, and when this is important.

1. (40 points) A presentation that you would give to donors or directors to get funding to make this public awareness campaign a reality.
2. (40 points) A summary and analysis of the primary research article the campaign is based on. Each student writes their own.
3. (20 points) Peer review of another group's project

Rubric Presentation (point 1)

(10 points) Define the Issue: current knowledge with details (e.g., model systems used, key points, change that is needed. You will frame this using the information learned in class as well as other sources. You must cite your sources of information on the slide you are using that information.

(10 points) Describe and interpret the focus paper.

(10 points) Describe what you want the public to take away from this article.

(5) Public speaking skills: clear voice, well-practiced, no excessive reading from slides or cards, professionalism, and correct timing.

(5) Appropriate Visuals: The visuals are logical to complement, enhance, or convey the information presented

Rubric for the individual paper (point 2)

(5 points) Summarize why this work was done.

(15 points) Summarize the key findings of the paper. Be specific.

(10 points) Summarize how this fits into what we have been learning about this semester.

(5 points) Provide your analysis of the paper. What was convincing and what was not?

(5 points) Use current and legitimate resources to back up your thoughts.

Complete Peer Review (point 3)

1. Did the students fulfill the requirements for the presentation? Explain. (5 points)
2. How does this campaign relate to what we have discussed in class? (11 points)
 - a. Are you convinced of the campaign, why or why not? Be specific use examples from what we have learned.
3. Give at least two constructive comments for improvement. (2 points)
4. Give at least two strengths of the project as a whole. (2 points)

Exams

These will be classic multiple-choice and free-response exams. The exams will be done independently with open notes & books and the internet. Please refrain from using other people or AI as these are not going to show what you know and may not lead you to the correct answers. These exams are designed to give you the benefits of a classic test-taking performative experience. I know that classic exam formats have a reputation for being stressful, but this one is designed to be empowering. The in-class-work will prepare you for the exam (the classwork questions are on the exam). Since I believe in the power of **yet**, you can earn points back on the exam if you do not do as well as you wanted. Again, no stress here!

Attendance and Participation

While your physical presence in the room is not required, much of your experience in this course will be shaped by active participation in class. If you need to miss a class, please let me know so I can ensure

you have an equivalent learning experience. We will have Zoom available and recording for students who cannot join for many reasons - because life happens.

Religious Accommodations

University of Southern California policy permits students to be excused from class for the observance of religious holy days. This policy also covers scheduled final examinations which conflict with students' observance of a holy day. Students must make arrangements in advance to complete class work which will be missed, or to reschedule an examination, due to holy days observance. For more information, please visit the Office of Religious Life for the full policy: <https://orsl.usc.edu/life/calendar/absences/>

Academic Integrity

The USC Leonard Davis School of Gerontology expects all students to display the utmost integrity when submitting work in classes. Students must avoid plagiarism or cheating, which are serious offenses under USC's principles of academic integrity. Plagiarism includes both submitting work authored by another person without proper acknowledgement of the source and reusing any portion of your own previously submitted work without the permission of the instructor. Cheating can include unauthorized collaboration on any assignment unless it is expressly permitted by the instructor. **When instructed by your professor**, you may work together on assignments, but you must each write your own answers individually as part of the honor policy. If you have any questions about how to properly cite your sources, or whether your conduct is permitted, please contact your instructor before submitting your work. For more information about USC's Student Community Expectations, you can review the USC Student Handbook at [USC_StudentCode_August2022.pdf](#).

USC Statement on Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity. Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in

acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity, see the [student handbook](#) or the [Office of Academic Integrity's website](#) and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Student Resources

Student Financial Aid and Satisfactory Academic Progress:

To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the [Financial Aid Office webpage](#) for [undergraduate-](#) and [graduate-level](#) SAP eligibility requirements and the appeals process.

[*Counseling and Mental Health*](#) – (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[*988 Suicide and Crisis Lifeline*](#) – 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Support Systems: [*Counseling and Mental Health*](#) - (213) 740-9355 – 24/7 on call Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[*Relationship and Sexual Violence Prevention Services \(RSVP\)*](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-2500

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenues to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) -

UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health-promoting habits and routines that enhance quality of life and academic performance.

Statement for Students with Disabilities

USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Schedule with Assigned Reading and Due Dates

Week	Date	Topic	Reading/ Classwork
1	Thursday, January 16, 2025	Introduction to the Course	Reading: Syllabus Classwork: syllabus quiz
2	Thursday, January 23, 2025	Basic Concepts of the Biology of Aging	Reading: Chapter 1 Classwork: lecture material
3	Thursday, January 30, 2025	Measuring Biological Age Op-Ed 1 Movie Viewing: Limitless Episode 6	Reading: Chapter 2 Classwork: Op-Ed viewing and outline
4	Thursday, February 6, 2025	Aging Theories	Reading: Chapter 3 Classwork: Week 3 & Week 4 lecture material
Op-Ed 1 due on Friday, February 7, 2025			
5	Thursday, February 13, 2025	Telomeres, Senescence, Mitochondria and ROS	Reading: Chapter 4 Classwork: lecture material
6	Thursday, February 20, 2025	Mind-Body Connection to Aging Op-Ed 2 Movie Viewing: Live to 100 Episode 2	Reading: Classwork: Op-Ed viewing and outline

7	Thursday, February 27, 2025	Cellular Rejuvenation: Stem cells, protein turnover, the proteasome, immune system	Chapter 5 (first two sections) Classwork: Week 12 and 13 lecture material
Op-Ed 2 due on Friday, February 28, 2025			
8	Thursday, March 6, 2025	Midterm 1 (Weeks 2-7)	
9	Thursday, March 13, 2025	Dietary Restriction, Fasting, and nutrient signaling pathways Op-Ed 3 Viewing: Limitless Episode 3	Reading: Chapter 10 Classwork: Op-Ed viewing and outline
10	Thursday, March 20, 2025	Spring Recess	
Op-Ed 3 due on Friday, March 21, 2025			
11	Thursday, March 27, 2025	DNA Damage and Cancer	Classwork: lecture material
12	Thursday, April 3, 2025	Progeria, Aging and disease Op-Ed 4 Movie Viewing: Life According to Sam	Reading: Chapter 8 Classwork: Op-Ed viewing and outline
13	Thursday, April 10, 2025	Alzheimer's Disease	Reading: Chapter 9 Classwork: Week 12 and 13 lecture material
Op-Ed 4 due on Friday, April 11, 2025			
14	Thursday, April 17, 2025	Blue Zones Op-Ed 5 Movie Viewing: Live to 100	Classwork: Op-Ed viewing and outline
15	Thursday, April 24, 2025	Midterm 2 (weeks 9-15)	
16	Thursday, May 1, 2025	Public Campaign Work Day	
Op-Ed 5 due on Friday, May 2, 2025			
Finals	Thursday day May, 13 th 2-4pm	Public Campaign Presentation Party (You have already put in the work, it is time to show it off.)	