

# Biodemography of Aging – GERO/BISC 440

## Syllabus - 2022 Spring Semester

### **1. Basic Information**

*Course:* Biodemography of Aging – GERO/BISC 440  
*Place and time:* Mondays 2-4:50pm  
*Faculty:* Dr. Sean P. Curran  
Associate Professor, Gerontology  
Associate Professor, Molecular and Computational Biology  
[scurran@usc.edu](mailto:scurran@usc.edu)

*Office Hours:* Monday 1-2 PM and by appointment  
*Prerequisites:* None  
*Class web page:* <https://blackboard.usc.edu>  
*Units:* 4

*Course text:* “Biology of Aging” by Rodger B. McDonald – ONLY needed for review

### **2. Classroom policy**

This course will discuss current research in the field of healthy aging, the biology of age-related disease and longevity. The material will be discussed in both lecture and student presentations. As such attendance is mandatory. All electronic communication devices (phones, blackberries, and similar) must be turned off, and no instant messenger/chat type programs are allowed in class.

#### **Statement for Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

#### **Statement on Academic Integrity**

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the

recommended sanctions are located in Appendix A:  
<http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

### **3. Course goals and learning objectives**

The main goal of this course is to introduce students to the concepts of molecular and genetic regulation of healthy aging, lifespan, and age-related diseases.

The only pre-requisite for this course is scientific curiosity. Students are not expected to know anything specific about molecular biology or genetics. This class is not meant to teach advanced molecular biology or genetics (such classes are already in existence). The emphasis in this course is on practical implementation of scientific concepts.

#### **Specifically, we will learn:**

- Why the study of lifespan is important and societal views on the biology of aging and age-related diseases
- How genes that modulate lifespan have been identified using model systems.
- Which biological pathways most potently influence lifespan and discuss the molecular mechanisms underlying this regulation.
- Implications of current research on future studies of human lifespan and age-related diseases.
- Most importantly, this class will provide students the means to break down a scientific hypothesis into its fundamental elements and critically analyze the validity of current theories and dogmas in the field.

#### **4. Course plan**

**Suggested readings listed are from “Biology of Aging” course textbook and should be done before the lecture as background material.**

##### **Week 1 - January 10<sup>th</sup>**

**READING: Preface, Chapter 1 and Chapter 2, Pgs. 331-338**

Introduction to the study of Gerontology, syllabus, grading policy, overview of scientific writing expectations for class. Strategies and rubrics for writing powerful and accessible Op-Ed pieces.

Why the study of aging is important to your future.

Introduction to the study of aging and age-related disease

- Human life expectancy
- Demography of aging

##### **Week 2 - January 17<sup>th</sup>**

MLK Day -NO CLASS

##### **Week 3 - January 24<sup>th</sup>**

**READING: Chapter 5**

Review of Basic Molecular Biology, Genetic, and Physiology concepts

Hierarchy of the body

**Multimedia presentation - Movie #1 – Biological vs. Chronological Age**

##### **Week 4 - January 31<sup>st</sup>**

**READING: Chapter 4 (Pgs. 81-94 and 110-116)**

**Op-Ed Paper #1 Due**

Telomeres, DNA Damage, Hayflick limit, cancer

##### **Week 4 - February 7<sup>th</sup>**

Cellular Rejuvenation: Stem cells, protein turnover, the proteasome, immune system

**Multimedia presentation - Movie #2 – Rejuvenation/Cancer/Immortality**

##### **Week 5 - February 14<sup>th</sup>**

**READING: Chapter 8 (Pgs. 208-215), Chapter 9 (283-291) Chapter 10 (pgs. 305-321)**

**Op-Ed Paper #2 Due**

Dietary Restriction, Fasting, and nutrient signaling pathways

##### **Week 6 - February 21<sup>st</sup>**

Presidents' Day – NO CLASS

##### **Week 7 - February 28<sup>th</sup>**

**Sign up for group presentations**

Review for exam – sample paper breakdown and presentation

**Multimedia presentation - Movie #3**

**Week 8 - March 7<sup>th</sup>**

**Midterm Exam – In class (2-4pm, no exceptions)**

**Week 9 - March 14<sup>th</sup>**

**SPRING RECESS – NO CLASS**

**Week 10 - March 21<sup>st</sup>**

**READING: Chapter 4 (Pgs. 95-110)**

Mitochondria and ROS

**Op-Ed Paper #3 Due**

**Week 11 - March 28<sup>th</sup>**

**READING: Chapter 9 (Pgs. 261-271)**

Alzheimer's Disease

**Multimedia presentation - Movie #4 – Alzheimer's Disease**

**Week 12 - April 4<sup>th</sup>**

**READING: Chapter 4 (Pgs. 89-95, 110-114)**

Cellular Senescence

**Op-Ed Paper #4 Due**

**Week 13 - April 11<sup>th</sup>**

**READING: Chapter 8 and 9**

Progeria, Aging and disease

**Multimedia presentation - Movie #5 – Progeria**

**Week 14 - April 18<sup>th</sup>**

**READING: Chapter 3**

Identifying and challenging Aging Theories

Past, Current and Future Theories

**Op-Ed Paper #5 Due**

**Week 15 - April 25<sup>th</sup>**

**Group presentations on scientific papers**

**5-Page paper due**

**Final Exam**

Monday May 2<sup>nd</sup> - Final Exam will be posted on Blackboard

Take home examination that is due on the scheduled Final Exam Day/Time

**Monday May 9<sup>th</sup> – Final Exam Due at 4pm!!!**

**Must be uploaded onto Blackboard before 4pm. NO EXCEPTIONS!!!**

**5. Assessment**

Grades are based on four scores: 1) There will be four multimedia presentations that relate to the scientific material presented. Students will write a one-page Op-Ed relating the course material to the presentation. 2) midterm exam. 3) group presentation consisting of a 15-20-minute talk including slides where the students describe and lead a discussion of a current research paper in the field and provide a written summary of that paper 4) final exam.

Assessment Procedure	Percent
Op-Eds (20 points each, five (5) assignments = 100 points total)	20%
Midterm Exam (150 points)	30%
Group Presentation of scientific papers (50 points), 5-page written summary (50 points), = 100 points total	20%
Final Exam (150 points)	30%
Total = 500 points	100%

***Extra credit will be made available throughout the semester. Students are encouraged to take advantage of these opportunities.***

*5.1. Criteria for grading:*

1. Participation is assessed by attendance (mandatory) and participation in class discussions.
2. Written summaries are 1-page in length and should discuss ***your opinion*** of an issue from the presentation as it relates to the course material. There are no “right” answers but you must support your opinion with at least **two scientific references** (**not** including lecture material).

To receive full credit you must:

(4 points) Clearly define your opinion, hypothesis, and position. This includes a brief introduction to the topic and statement/support as to why it is important?

(12 points) Clearly provide the evidence to support your opinion and explain HOW this supports your position - Need two pieces of evidence from source material [movie, art, documentary, song, etc.] (4 points total) and two scientific and peer reviewed articles of supporting material (2 x 4 points = 8 points). You **MUST** take a stance on the topic and explain how the evidence provided supports your opinion/position.

(4 points) – Summarize and state the current state of the field and what the future holds or what is needed to advance the topic.

3. The midterm and final will be open book exams with short answer responses.

4. The final presentation will be graded according to clarity of the presentation. The written summary should be organized in a similar manner to the 1-page summaries with regard to content. They should be more heavily referenced and thorough discuss your interpretation of the paper you are presenting.

Students who are not able to meet deadlines due to medical or other emergency must notify the instructor immediately.

*5.2. Course grade:* Letter grades will follow a standard scale but at the discretion of the instructor, may be weighted based on the average of the course. 90% and above leading to A, 80-90% leading to B, etc. Pluses and minuses are assigned by dividing each range in corresponding halves (A, A-) or thirds (B+, B, B-, C+, ...).

### **6. Policy against Cheating**

We follow a zero tolerance policy: any student engaging in cheating will fail the course and will be reported to the USC Student Judicial Affairs and Community Standards. All USC students are responsible for reading and following the Student Conduct Code.

<https://sjacs.usc.edu/students/academic-integrity/>

This policy does not apply to discussion or exchange of ideas. On the contrary, such interactions represent an important way to thoroughly understanding complex questions in molecular genetics.

Students must write their own papers. All written assignments will be turned in through blackboard and analyzed for plagiarism.

### **7. Disability Policy Statement:**

Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. The phone number for DSP is (213) 740-0776.

### **8. Resources**

*8.1. Web page:* A class website will be setup on Blackboard containing information about the course: syllabus, laboratory handouts, grades, miscellaneous information about weekly class activities, and an email directory of all people in the class. Use it as much as you find it useful. The web page can be accessed through the main stem <https://Blackboard.usc.edu>.

*8.2 Office Hours:* Office hours will be held weekly. Time and location for my office hours are at the beginning of the syllabus. I am always available by email to help you as much as you need.