

# Biodemography of Aging – GERO/BISC 440

## Syllabus - 2017 Spring Semester

### **1. Basic Information**

*Course:* Biodemography of Aging – GERO/BISC 440  
*Place and time:* GERO 224, Monday 12-2:50pm  
*Faculty:* Dr. Sean P. Curran  
Associate Professor, Gerontology  
Associate Professor, Molecular and Computational Biology  
*Office:* GERO 306E  
*Telephone:* 213-740-5354  
*Email:* spcurran@usc.edu  
*Office Hours:* Immediately following lecture  
*Prerequisites:* none  
*Class web page:* <https://blackboard.usc.edu>  
*Units:* 4

Course text: “Biology of Aging” by Rodger B. McDonald

Teaching Assistants:  
An Yen - chiaanye@usc.edu  
Amy Hammerquist - hammerqu@usc.edu

### **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 of January 9<sup>th</sup>**

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

#### **Week of January 16<sup>th</sup>**

MLK Day -NO CLASS

#### **Week of January 23<sup>rd</sup>**

**READING: Preface, Chapter 1 and Chapter 2**

- 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 of January 30<sup>th</sup>**

**READING: Chapter 5**

Review of Basic Molecular Biology, Genetic, and Physiology concepts  
Multimedia presentation - Movie #1

#### **Week of February 6<sup>th</sup>**

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

**Op-Ed Paper #1 (on Movie #1) Due**

Telomeres, DNA Damage, Hayflick limit, cancer

#### **Week of February 13<sup>th</sup>**

Cellular Rejuvenation: Stem cells, protein turnover, the proteasome, immune system  
Multimedia presentation - Movie #2

#### **Week of February 20<sup>th</sup>**

Presidents Day – NO CLASS

#### **Week of February 27<sup>th</sup>**

**READING: Chapter 5 Chapter 10 (pgs. 305-321)**

**Op-Ed Paper #2 (on Movie #2) Due**

Dietary Restriction, Fasting, and nutrient signaling pathways

#### **Week of March 6<sup>th</sup>**

**Midterm Exam**

#### **Week of March 13<sup>th</sup>**

Spring Recess – NO CLASS

### **Week of March 20<sup>th</sup>**

Discussion of recent research findings appropriate for group presentations and paper topics.

Multimedia presentation - Movie #3

### **Week of March 27<sup>th</sup>**

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

**Op-Ed Paper #3 (on Movie #3) Due**

Mitochondria and ROS

### **Week of April 3<sup>rd</sup>**

Development growth, reproduction pathways

Multimedia presentation - Movie #4

### **Week of April 10<sup>th</sup>**

**READING: Chapter 8 and 9**

**Op-Ed Paper #4 (on Movie #4) Due**

Progeria, Aging and disease

### **Week of April 17<sup>th</sup>**

**READING: Chapter 3**

**5-Page paper due**

Identifying and challenging Aging Theories

Past, Current and Future Theories

### **Extra Credit - Wednesday April 19<sup>th</sup> - USC What's Hot in Aging Research (9:30-4:30pm)**

*Attendance at What's Hot in Aging at the Davis School of Gerontology (FREE REGISTRATION FOR ENROLLED STUDENTS). Must attend/watch any 3 talks (~20min each) at anytime during the day. The event goes from 9am-4:30pm. Event is usually recorded for later viewing. You will need to write a 1-page paper discussing the talks you observed. What did you like, what would you have liked to see? What is the next step in the research topic?*

### **Week of April 24<sup>th</sup>**

**Group presentations on scientific papers**

**Extra Credit Op-Ed Paper #5 on What's Hot in Aging**

### **Final Exam**

**Tuesday April 25<sup>th</sup> - Exam will be posted on Blackboard**

**Take home due on the scheduled Final Exam Day/Time**

**Friday May 5<sup>th</sup> - Final Exam Due at 1pm!!!**

**Must be uploaded onto Blackboard before 1pm. NO EXCEPTIONS!!!**

## 5. Assessment

Grades are based on five scores: 1) Participation. 2) 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. 3) midterm exam. 4) group presentation consisting of a 30 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 5) final exam.

Assessment Procedure	Percent
Op-Eds (25 points each, 4 summaries = 100 points total)	20%
Midterm Exam (150 points)	30%
Group Presentation of scientific papers (40 points presentation and 10 points participation in class discussions, 50 points written summary, 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 two scientific references (not including lecture material). What is the topic? Why is it important? What is your opinion or hypothesis? What is the evidence to support your opinion? What is the evidence against your opinion and why are you right? You **MUST** take a stance on 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. All USC students are responsible for reading and following the Student Conduct Code, which appears in the Scampus and at <http://www.usc.edu/dept/publications/SCAMPUS/governance>.

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.