California State University, Los Angeles, Dept. of Biological Sciences  
Biology of Human Aging, BIOL 3084-01  
Fall, 2016

MWF, 8:00 – 8:50 am  
Instructor: Michael Chen, Ph.D.  
mchen@calstatela.edu  
Office: BIOS 235  
Office Hours: MW, 10:00 – 11:00 am  
F, 10:00 – 11:30 am

Course Description: This course centers around the major physiological and anatomical changes that occur during aging (~ > 55 years of age) at all levels of biological organization: biochemical, organelle, cellular, tissue, organ, organ system, and organism. Changes during healthy aging will be distinguished from those due to common late-onset diseases. This course is an upper-division science course for General Education Theme F. Human Maturity and Aging Processes and Problems.

Prerequisite: BIOL 155 – Natural History of Animals (or the equivalent).

Textbook: None. The textbook that I have been using for several years is now out of print. Rather, you will have to depend on my course notes, compiled from several different sources, including the textbook that is now out of print:

Class Notes: Chen, M. J. This is a packet of my lecture notes so that you can listen and fill in ancillary material without madly writing down everything. I highly recommended that you get these. Alternatively, I will post these chapters in Moodle. Although I will try to adhere to the following schedule as much as possible, as Instructor, I reserve the right to slightly alter the schedule as necessary.

SCHEDULE

<table>
<thead>
<tr>
<th>Week and Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Wk 1: 8/22, 8/24, 8/26</td>
<td>(1) Introduction, General Principles of Anatomy and Physiology, Demographics, Life Expectancy and Research Methods</td>
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<tr>
<td>Wk 2: 8/29</td>
<td>Molecular and Cellular Theories of Aging; Homeostasis;</td>
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<tr>
<td>Wk 2: 8/31</td>
<td>(2) Integumentary System</td>
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<td>Wk 2: 9/2</td>
<td>(2) Integumentary System (Cont’d); Quiz 1</td>
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<td>Wk 3: 9/5</td>
<td>Labor Day – No Classes Held.</td>
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<td>Wk 3: 9/7, 9/9</td>
<td>(3) Circulatory System; 9/9 – Quiz 2</td>
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<td>Wk 4: 9/12, 9/14</td>
<td>(4) Respiratory System</td>
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<td>Wk 4: 9/16</td>
<td>MIDTERM EXAM 1</td>
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<td>Wk 5: 9/19, 9/21, 9/23</td>
<td>(5) Nervous System</td>
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REFERENCE LIST FOR TERM PAPER DUE on 9/23
FIRST ARTICLE SUMMARY DUE on 9/23

Wk 6: 9/26, 9/28, 9/30  
(6) Sense Organs – Eyes

Wk 7: 10/3, 10/5, 10/7  
(7) Sense Organs – Ears
9/30 - Quiz 3

Wk 8: 10/10, 10/12, 10/14  
(8) Muscle System

Wk 9: 10/17  
Review for MIDERM EXAM 2

Wk 9: 10/19  
MIDTERM EXAM 2 (material since Midterm 1)
SECOND ARTICLE SUMMARY DUE

Wk 9: 10/21, Wk 10: 10/24, 10/26, 10/28  
(9) Skeletal System; 10/14 – Quiz 4

Wk 11: 10/31, 11/2, 11/4  
(10) Digestive System, Diet and Nutrition
11/4 - Quiz 5

Wk 12: 11/7, 11/9  
(11) Urinary System

Wk 12: 11/11  
Veterans Day – No Classes Held.

Wk 13: 11/14, 11/16  
(12) Male Reproductive System

Wk 13: 11/18  
(13) Female Reproductive System
Wk 14: 11/21  
(14) Endocrine System
TERM PAPERS DUE ON 11/21 FOR 20 EXTRA CREDIT POINTS

Wk 14: 11/23  
Finals Study Day – No Classes Held.

Wk 14: 11/25  
Thanksgiving – No Classes Held.

Wk 15: 11/28, 11/30  
(15) Immune System and TERM PAPERS DUE on 11/30

Wk 15: 12/2  
(16) Caregiving for the Elderly

Finals Wk: 12/5  
Catch up if I am behind

12/9  
FINAL EXAM (material since Midterm 2)
7:00 – 9:00 am

Course Requirements

Midterm Exam 1 75 points
Midterm Exam 2 75 points
Article Summaries (2) 20 points each
Term Paper 125 points
Reference List 20 points
Final Exam 100 points
Attendance ~60 points at 2 points/class twice/week
Quizzes (6) 10 points each
Total ~555 points

**Final Course Grades**

Final grades will be on a percentage or on a curve, depending on the general overall performance of the class. However, this does not apply to scores hovering at about 280 points or lower. All scores near or lower than 280 points will be considered failing. I reserve the right to assign “+” and “-“ grades as well as full grades. I also reserve the right to change the above course requirements slightly.

**Exams**

The midterm exams and final exam will include multiple choice questions and short answer questions.

**Quizzes**

My use of quizzes is fairly new to this course; the purpose is to get you to learn the material and to attend the entire lecture. Will occur at the end of the specified lecture (see syllabus).

**Attendance**

You will get 2 pts per class attended for two out of the three classes per week. I will hand out a sheet for you to “sign” at the beginning of class. If I see anyone “sign”, and then leave class, I will cancel attendance pts for the entire class for that day. Each class is only 50 minutes; so, I really hope that this does not happen.

**Article Summaries**

Each student must write a 2-3 page typewritten summary of two of the articles (s)he will use in her/his term paper. The idea behind this assignment is to get you to start thinking about your term paper and gather and read material early so that you are not just getting started to think and work on your term paper as the end of the quarter draws nearer. In addition to the science that is discussed in each article, you should pay attention to how scientific papers are written and organized. To this end, late summaries will be penalized 2 points for every day they are late. The first summary is due on September 23 and the second summary is due October 19.

**Term Paper:**

Topics: Alzheimer’s Disease, Diabetes Mellitus, Stroke, Osteoporosis, Hormone Replacement Therapy, or Centenarians

Write a 10-page, double-spaced, scientific review paper of the topic based on a search of the biological and medical literature. Use MEDLINE (PubMed) to do your search; the references listed in this database are all biological or medical. Do not use popular and unreviewed sources, such as internet websites (e.g., Wikipedia), Time, Newsweek, or Prevention magazines or newspapers, or potentially any other periodical that can be found on bookstore newsstands. **These are unacceptable!** You may use the internet, but the literature sources must be from
professional, peer-reviewed journals (the journal, *The Neurobiology of Aging* is probably one of the premier journals in the field of the biological aspects of aging, but other journals that focus on non-neurally related fields are just as good). The internet encyclopedia, *Wikpedia*, is unacceptable, as this is not reviewed. If you have not done this kind of search before, ask the librarians to show you how or ask me. The paper must be typed and double-spaced.

Reference Format: A list of the sources you cite in your paper, in alphabetical order by author surname, should appear at the end of your text. Use the format adopted by the Council of Biological Editors as indicated in the following examples.

**ARTICLE IN A JOURNAL:**

All Authors (surname first followed by initials). 2000. Title of the article in full. *Journal Name* volume # :staring page-ending page.

For example:


**BOOK:**

Jones JJ. 2001. *Book Title* volume (if any). City of publication:Publisher

**CHAPTER IN A BOOK:**


**SOURCE ON THE INTERNET:**

Pritzker, TJ (No date). Title of internet text [Online]. Available: http://www.list complete internet address [date you accessed the site]. Please note: not all internet sites are acceptable sources; some are popular, not scientific sites. Before using an internet site as a source, show it to me for approval.

All references should be cited in the appropriate section of the text by author surname and year of publication, as in the following examples:

“Doe and Smith (1992) found that …” (Your reference list should include an entry for Doe and Smith using the appropriate format above)

OR

“One study on changes in the immune system (Doe and Smith, 1992)…”

If the reference has one or two authors, use the one or both names followed by the year for citations in the text, such as:

“Garcia (2003) found that…”

OR “Garcia and Popoli (2001) found that…”
Similarly, “…blah, blah, blah (Garcia, 2003)” OR “…blah, blah, blah (Garcia and Popoli, 2001)”.

If the reference has more than two authors, use the first author only, followed by *et al.*, such as:

“…blah, blah, blah (Klau *et al.*, 2001).”

If you use an author’s surname in the text, you must have a reference by that person in the reference list or else points will be deducted from your score. In other words, make sure that every citation in the text of the paper appears in the bibliography at the end of the paper and *vice versa*.

Do not use footnotes in the text! And do not cite references by using numbers in the text!

If you want to quote a person *verbatim*, indent and single-space the quoted material and list the author(s), name(s) and the year at the end of the quote. It is better not to quote, but to summarize in your own words. Do not fall into the trap of making your paper simply a series of quotations!

You must have at least 10 references from biological and medical journals. Bring a list of references to class on September 23 for my approval (If you don't, you'll lose 20 points). The references should be to articles published within the past 20 years. Do not base your term paper on only internet websites or on books. And, as I indicated above, do not use the popular press (internet).

**Content:**

If you are writing your term paper on Alzheimer’s Disease, Diabetes Mellitus, Stroke, or Osteoporosis, make sure your paper covers the following topics in this order:

- What percent of people in each age group are estimated to develop the disease?
- What criteria are used to diagnose the condition? Is the disease progressive with age and how fast do the changes occur? What are the gross biological changes that occur? What are the molecular and cellular changes that occur? What are the risk factors for the disease? What are the treatments and how effective are they?

If you are writing your paper on Hormone Replacement Therapy (HRT), make sure your paper covers the following topics in this order:

- What percent of people in each age group are estimated to use HRT? What criteria are used to determine if HRT is appropriate for that person? What are the risk factors for using HRT? What are the biological changes that cause the need for HRT? How fast do these changes occur? What does HRT do to the body besides just replacing the hormone? - That is, what are the biological changes that occur upon HRT? Which molecules, organelles, cells, or tissues are changing? How effective is HRT?

If you are writing your paper on Centenarians, make sure your paper covers the following topics in this order:

- How are the genetics of Centenarians different from those of others? What physiological traits do Centenarians have that are different from those of others? What do
Centenarians do in their lives that may account for their longevity? Given their genetics, does it matter what Centenarians do in their lifestyles that may influence their longevity?

Write the paper in a scientific style. Each paragraph should have a topic sentence and all paragraphs should have more than one sentence. Use the articles you are reading for your article summaries as models. Be concise. Do not use personal experiences or life histories and accounts in this paper. And do not write in the first person.

Grammar, spelling, typing, and use of the correct format will be considered in assigning points. If you are not clear about the format or whether an article is acceptable, ask me before turning in the paper.

As I indicated in the Lecture Schedule, term papers are due on 11/30, but can receive 20 points extra credit if turned in on 11/21. Conversely, term papers handed in after 11/30 will be penalized 5 pts per weekday it is late.

Please turn in your papers directly to me in class. Do not leave them in the departmental office or in envelopes under doors. If your paper is lost because you gave it to someone other than myself, you will get zero credit for the assignment.

**I don’t accept assignments via e-mail, except under dire circumstances.**

American Disabilities Act

Reasonable accommodation will be provided to any student who is registered with the Office of Students with Disabilities and requests needed accommodation.

Student Learning Outcomes: The following Student Learning Outcomes were instituted by the Dept. of Biological Sciences for students majoring in Biological Sciences. However, for non-Biological Sciences majors, many of the following also apply, depending on his/her own major field of study. SLO #1 would most apply to students enrolling in BIOS 384N.

DEPARTMENT OF BIOLOGICAL SCIENCES
UNDERGRADUATE STUDENT LEARNING OUTCOMES

M/S/P by Assessment Committee: February 11, 2008

1. The student will acquire the following attitudes:
   1.1. Learning about both living micro and macro systems is relevant and essential for understanding life.
   1.2. All areas of science are integrated and interconnected.
   1.3. Scientific ethical conduct and ethical implications of scientific issues in society are important.

2. The student will be able to demonstrate that he/she is skilled at:
   2.1. Applying the processes and methods of scientific inquiry, including the search and retrieval of scientific information, the formulation of scientific hypotheses, the design and conduct of experiments, and the analysis and interpretation of data;
   2.2. Understanding and critically evaluating the scientific work of others;
   2.3. Communicating scientific information effectively using oral presentations and written
2.4. Performing laboratory techniques that are appropriate to the major, with an understanding of the principles of laboratory safety;
2.5. Working collaboratively on group projects.

3. The biology student will be able to demonstrate knowledge of the following:
3.1. Molecular and cellular structure and function;
3.2. Basic principles of anatomy, physiology, and development;
3.3. Taxonomy and phylogenetic and evolutionary relationships of major groups of organisms;
3.4. Ecological interactions among organisms and their relationships with their environments;
3.5. Careers and professions available in the biological sciences.

4. The microbiology student will be able to demonstrate knowledge of the following:
4.1. Microbiological techniques and handling of biohazardous materials;
4.2. Microbial diversity, evolution of microorganisms and transmissible agents;
4.3. Microbial physiology and genetics including cellular structure and function;
4.4. Interactions of microorganisms with multicellular organisms and the environment;
4.5. Applications of microbiology and career opportunities in the field.

**Attitude**

Your class attendance is very important, as it is well known that there is a good relationship between good attendance and the final grade. **Besides, you get credit for full attendance!** However, the rule is simple: if you attend lecture, you get credit; if you don’t attend lecture, you get no credit. The reason is for missing class is not important, because then there is the issue of what constitutes a valid excuse and then it becomes a judgment call. Occasionally, there are times when you might be forced to miss a class. If this is the case, it is your responsibility to get from a classmate all the information you missed. Please do not contact me and ask what you may have missed – this is tantamount to having me repeat the lecture, etc. all over again. I strongly urge you to make some friends in the class and obtain from them any class material you might have been forced to miss.

Your responsibility is to the lectures. Please ensure that if you have with you a cellular phone, pager, or some other fancy electronic communication devise, that it does not sound off. I find it very disruptive to the class and to me. I like to start on time and I find it distracting and disruptive for people to arrive late and just as annoying for people to wander in and out of class at any time. It is unfair and distracting to the other students in the class and to everyone’s train of thought. Students are asked to refrain from making inappropriate or offensive comments, sleeping, talking/whispering/giggling with peers, or passing notes. You are all adults and are no longer in high school. A mature attitude is, therefore, expected of you.

If you have to miss an exam or turn in your term paper late (by more than 1 week), I will require official documentation for the reason if you want a make-up exam or need more time for an assignment. Around exam time, there are usually an inordinate number of deaths in students’ families, illnesses, emergencies that require traveling, etc. If this happens, I will need a copy of the funeral announcement, death certificate, physician’s note, plane ticket, etc. Also, emergencies of this nature could lead to “RD” (report delayed) or an “I” (Incomplete) at the end of the quarter. However, parties, weddings, friends’ weddings, etc. or other more frivolous events will not
excuse you; if you choose to forgo an exam or assignment in favour of such frivolous pursuits, then you’ll just have to live with the grade that you earn.

**Academic Honesty**

Students are expected to abide by the University’s Academic Honesty Policy, which can be found at http://www.calstatela.edu/univ/stuaffrs/Academic_Honesty.htm. Students who violate this policy will be subject to disciplinary action, and may receive a failing grade in the course for a single violation.