

**Rutgers Graduate School of Biomedical Sciences New Brunswick/Piscataway
Spring (3 credits)**

Course Title: Biomedical Aspects of Aging

Codes: Rutgers 16:761:610 or MSBS 5140S

Course Director: Dr. Federico Sesti
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Course Location: Room V14 in the Research Tower Building, 675 Hoes Ln W, Bush Campus

Course Schedule: Tuesday and Thursday 10-11:30 am

Credits: 3

Course overview

Aging is an important aspect of human civilizations especially in light of the pressure that growing elderly populations are putting on modern societies. This course covers an important topic and also fills a gap, since there is no course dedicated to aging in the curriculum, despite the relevance of this process to human societies as whole and to disciplines such as biology and medicine. The new course explores aging at a 360-degree perspective. It goes from a brief introduction of the social and economical aspects of aging, to its biology and etiology and to its associated pathologies (i.e. neurodegenerative disease) including clinical and psychological management.

Course structure

This course will meet two times a week during the spring semester. The course will use a combination of lectures, group discussions and case studies. The course explores 5 major topics (blocks). Each block is reinforced by a case study in which the students, in turn, will prepare and discuss a disease related to the topic. The five broad topics are:

Topic 1: Aging in human culture

Economics of aging
Sociology of aging

Topic 2: Cellular and organismal senescence

Genetics of aging
Metabolism of aging 1: caloric restriction
Metabolism of aging 2: insulin IGF-1-like pathway

Topic 3: Molecular basis for aging

Telomere shortening
Free radical theory
DNA damage
Reproductive cell cycle
Stem cells theory of aging

Topic 4: The aging brain

Changes in the aging brain 1: chemical
Changes in the aging brain 2: neurophysiological
Changes in the aging brain 3: molecular

Topic 5: Neurodegenerative disease

Psychology of aging
Pathology 1: Huntington disease
Pathology 2: Multiple sclerosis
Clinical case 1: Clinical management: Alzheimer
Clinical case 2: Psychological management: Parkinson

Each broad topic will be covered in approximately two weeks. Faculty members will give formal lectures. Studies in some topics, reading and discussing case studies will complement each block. Masters students will be required to lead the discussions. No textbook is required. Students use the PowerPoints of the lectures, as reference material. Suggested textbook for further studies: Shamin Ahmad, "Aging: exploring a complex phenomenon" CRC press, ISBN 9781138196971 - CAT# K31227.

Learning objectives

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

- Understand the challenges that an aging population poses to the society and the economy.
- Understand the impact of aging on the metabolism. This includes recognizing major effects of starvation and the role that caloric restriction has in prolonging lifespan.
- Understand the major mechanisms of aging including telomere shortening, increased free radicals, DNA methylation etc.
- Understand the role of biomarkers of aging.
- Recognize the most common techniques used in research and clinic to measure anatomical effects of aging with particular emphasis on the brain.
- Recognize changes in cognitive performance and executive function in aging patients.

- Understand the major clinical features of neurodegenerative diseases.
- Describe the role of depression in neurodegenerative disease and its management.

Assessment and grading: A, B+, B, C+, C and F

There will be a mid-term examination and a final examination. The goal of the mid-term examination is to provide a self-evaluation and help the students to familiarize with the format of the final examination. It will not be used for grading purposes. The exams can cover material presented in both formal lectures and case studies/discussion papers. The final examination will count for 75% of the total grade. Class participation will count the remaining 25% of the final grade. A sign-up sheet will be circulated at the beginning of each class.

Excused absences because of illness or family emergency may be granted only by the MS/MBS Program Director.

In the event of illness or emergency, students should contact the MS/MBS Program Director as soon as possible. If an excuse is granted, the Program Director will notify the course director. Make-up examinations will be given only to students whose absence from an examination is judged by the Program Director to be for valid cause. Otherwise the exam score will be recorded as zero.

Planned absences that conflict with an exam (Medical School Interviews, religious observations, etc.) must be scheduled at least one week prior to the exam and are granted at the course director's discretion.

Make-up exams will be made available to students granted an excused absence.

Course Evaluation: This course will be evaluated by online survey as administered by the MBS/MSBS program.

Academic Integrity: Each student is expected to be familiar with the academic integrity policies in the GSBS Student Handbooks:

- _Piscataway/New Brunswick

http://rwjms.rutgers.edu/gsbs/current/student_handbook.html

All work that carries your name on it is considered yours unless specifically stated otherwise by properly citing the research and ideas of others. **Failure to read and understand the policy is not an acceptable excuse for violating the policy.**