

# FLORIDA ATLANTIC UNIVERSITY™

## Graduate Programs—COURSE CHANGE REQUEST<sup>1</sup>

UGPC	APPROVAL
UFS	APPROVAL
SCNS	SUBMITTAL
CONFIRMED _____	
BANNER	POSTED
CATALOG _____	

DEPARTMENT BIOLOGICAL SCIENCES	COLLEGE SCIENCE
COURSE PREFIX AND NUMBER PCB 5245	CURRENT COURSE TITLE ADVANCED MOLECULAR GENETICS OF AGING
CHANGE(S) ARE TO BE EFFECTIVE (LIST TERM) SPRING 2017	____ TERMINATE COURSE (LIST FINAL ACTIVE TERM)
<p>CHANGE TITLE TO:</p> <p>CHANGE PREFIX FROM:                      TO:</p> <p>CHANGE COURSE NO. FROM:                      TO:</p> <p>CHANGE CREDITS<sup>2</sup> FROM:                      TO:</p> <p>CHANGE GRADING FROM:                      TO:</p> <p>CHANGE DESCRIPTION TO:</p>	<p>CHANGE PREREQUISITES/MINIMUM GRADES TO*:</p> <p>EXISTING PREREQUISITES PCB 4023 MINIMUM GRADE OF C</p> <p>NEW PREREQUISITES BSC 1010 Minimum Grade of C- or BSC 1011 Minimum Grade of C-</p> <p>CHANGE COREQUISITES TO*:</p> <p>CHANGE REGISTRATION CONTROLS TO:</p> <p>*Please list both existing and new pre/corequisites, specify AND or OR, and include minimum passing grade.</p>
<p>Faculty contact, email and complete phone number: Kailiang Jia, kjia@fau.edu, (561)799-8054</p>	<p>Attach syllabus for ANY changes to current course information.</p>
<p>Should the requested change(s) cause this course to overlap any other FAU courses, please list them here:</p>	<p>Please consult and list departments<sup>3</sup> that might be affected by the change(s) and attach comments.</p>

<p>Approved by: <i>[Signature]</i></p> <p>Department <i>[Signature]</i> Chair: _____</p> <p>College <i>[Signature]</i> Curriculum Chair: _____</p> <p>College Dean: <i>[Signature]</i></p> <p>UGPC <i>Wm R McDaniel</i> Chair: _____</p> <p>Graduate <i>[Signature]</i> College Level 3 Dean: _____</p> <p>UFS President: _____</p> <p>Provost: _____</p>	<p>Date: _____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<ol style="list-style-type: none"> <li>1. Syllabus must be attached; see guidelines for requirements: <a href="http://www.fau.edu/provost/files/course_syllabus.2011.pdf">www.fau.edu/provost/files/course_syllabus.2011.pdf</a></li> <li>2. Review Provost Memorandum: Definition of a Credit Hour <a href="http://www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf">www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf</a></li> <li>3. Consent from affected departments (attach if applicable)</li> </ol>
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Email this form and syllabus to [UGPC@fau.edu](mailto:UGPC@fau.edu) one week before the University Graduate Programs Committee meeting.



Charles E. Schmidt College of Science  
Department of Biological Sciences  
777 Glades Road  
Boca Raton, FL 33431  
tel: 561.297-3320  
fax: 561.297-2749

## MEMORANDUM

**TO:** College Graduate Program Committee

**Through:** Rodney Murphey, PhD  
Chair  
Department of Biological Sciences

**From:** David Binninger, PhD  
Associate Chair  
Department of Biological Sciences

**DATE:** February 8th, 2016

**SUBJECT:** Prerequisite Course Change Requests

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This note constitutes acknowledgement and consent of the Department of Biological Sciences for requested changes to the prerequisites for the attached course PCB 5245 Advanced Molecular Genetics of Aging.. The entire biology faculty has vetted the requested changes to the prerequisites after discussions with those responsible for teaching the courses. These prerequisites provide a student with a realistic expectation of prior knowledge as they begin each biology course.

Phone (561) 297-3323 Email: [binninge@fau.edu](mailto:binninge@fau.edu)

## **Advanced Molecular Genetics of Aging**

**Spring Semester, 2017**

### **Course information**

Course Title: Advanced Molecular Genetics of Aging  
Course Number: PCB 5245 (3 credits)  
Course Date: Jan.11 – May 6, Tuesday and Thursday, 10:00am – 11:20am  
Course Location: Boca Campus, Sanson Life Science Building, Rm. 119  
Instructor: Kailiang Jia, M.D., Ph.D.  
Associate Professor  
Department of Biological Sciences  
Sanson Life Science Building, Rm. 261  
Email: [kjia@fau.edu](mailto:kjia@fau.edu), Phone: (561) 297-0512  
Office hours: Tuesday and Thursday, 1:00pm – 4:00pm or by appointment

### **Course description**

This course is open to graduate students. In this course students will learn current theories of aging, molecular pathways modulating aging, major discoveries of aging in different model organisms including yeast, *C. elegans*, *Drosophila* and mouse, and in mammalian system. Additionally, students will learn how to read and criticize research articles.

### **Pre-requisite**

BSC 1010 Minimum Grade of C- or BSC 1011 Minimum Grade of C-

### **Course objectives/student learning outcomes**

Students are expected to: gain current knowledge and research methods of aging and learn how to design experiments to address aging-related scientific questions.

### **Instructional methods**

Lectures, paper discussions and student presentations

### **Required texts/reading**

Research papers and review articles, available in the Content folder at Blackboard.

### **Supplementary/recommended reading**

Molecular Biology of Aging (2008). Edited by Leonard P. Guarente, Linda Partridge and Douglas C. Wallace. Cold Spring Harbor Laboratory Press. Cold Spring Harbor, New York

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Course topical outline (subject to change depending on course needs)

Week 1 (1) Course overview

(2) Theories of aging

Assigned reading: An integrated theory of ageing in the nematode *Caenorhabditis elegans*

Week 2 (1) Longevity pathways in *C. elegans*

Assigned reading: The Plasticity of Aging: Insights from Long-Lived Mutants

(2) Dietary restriction in *C. elegans* – 1

Assigned reading: The genetics of caloric restriction in *Caenorhabditis elegans*

Week 3 (1) Dietary restriction in *C. elegans*-2

Assigned reading: PHA-4/Foxa mediates diet-restriction induced longevity of *C. elegans*

(2) Dietary restriction in *C. elegans* – 3

Assigned reading: (1). Life extension via dietary restriction is independent of the Ins/IGF-1 signalling pathway in *Caenorhabditis elegans* (2). Pyruvate imbalance mediates metabolic reprogramming and mimics lifespan extension by dietary restriction in *Caenorhabditis elegans*

Week 4 (1) Dietary restriction in yeast

Assigned reading: Regulation of Yeast Replicative Life Span by TOR and Sch9 in Response to Nutrients

(2) Dietary restriction in fly

Assigned reading: (1). Extended Life-Span Confined by Cotransporter Gene Mutations in *Drosophila* (2). Regulation of Lifespan in *Drosophila* by Modulation of Genes in the TOR Signaling Pathway

Week 5 (1) Dietary restriction in mouse

Assigned reading: (1). Life-Span Extension in Mice by Prewaning Food Restriction and by Methionine Restriction in Middle Age (2). Rapamycin fed late in life extends lifespan in genetically heterogeneous mice (3). Dietary restriction normalizes glucose metabolism and BDNF levels, slows disease progression, and increases survival in huntingtin mutant mice

(2) Dietary Restriction in mammals

Assigned reading: (1). Caloric Restriction Delays Disease Onset and Mortality in Rhesus Monkeys (2). Impact of caloric restriction on health and survival in rhesus monkeys from the NIA study

Week 6 (1) Mitochondria activity and aging- *C. elegans* (1)

Assigned reading: Mitochondrial Electron Transport Is a Key Determinant of Life Span

in *Caenorhabditis elegans*.

(2) Mitochondria activity and aging-*C. elegans* (2)

Assigned reading: (1). A mutation in succinate dehydrogenase cytochrome b causes oxidative stress and aging in nematodes (2). Extension of Life-Span with Superoxide Dismutase/Catalase Mimetics

**Week 7** (1) Mitochondria activity and aging-fly

Assigned reading: High-quality life extension by the enzyme peptide methionine sulfoxide reductase

(2) Mitochondria activity and aging – mouse

Assigned reading: Mitochondrial DNA Mutations, Oxidative Stress, and Apoptosis in Mammalian Aging

**Week 8** (1) class review

(2) **Mid-term Exam**

**Week 9** **Spring Break (no class)**

**Week 10** (1) Discovery of the role of IGF signaling pathway in aging Assigned reading: (1) Interacting genes in nematode dauer larva formation (2). A *C. elegans* mutant that lives twice as long as wild type (3) *daf-2*, an Insulin Receptor-Like Gene That Regulates Longevity and Diapause in *Caenorhabditis elegans*

(2) Target genes of IGF signaling in *C. elegans*

Assigned reading: (1). *daf 16* integrates developmental and environmental inputs to mediate aging in the nematode *Caenorhabditis elegans* (2). DAF-16 Target Genes That Control *C. elegans* Life-Span and Metabolism

**Week 11** (1) IGF signaling in fly

Assigned reading: Extension of Life-Span by Loss of CHICO, a *Drosophila* Insulin Receptor Substrate Protein

(2) IGF signaling in mouse

Assigned reading: Extended Longevity in Mice Lacking the Insulin Receptor in Adipose Tissue

**Week 12** (1) NAD-dependent deacetylase (SIRT) in yeast

Assigned reading: Requirement of NAD and SIR2 for Life-Span Extension by Calorie Restriction in *Saccharomyces cerevisiae*

(2) SIRT in *C. elegans*

Assigned reading: Increased dosage of a sir-2 gene extends lifespan in *Caenorhabditis elegans*

Week 13 (1) SIRT in fly

Assigned reading: (1). Sir2 mediates longevity in the fly through a pathway related to calorie restriction (2). Absence of effects of Sir2 overexpression on lifespan in *C. elegans* and *Drosophila*

(2) SIRT in mouse

Assigned reading: (1). The sirtuin SIRT6 regulates lifespan in male mice (2). Role of sirtuins in lifespan regulation is linked to methylation of nicotinamide.

Week 14 (1) Autophagy and aging

Assigned reading: (1). Longevity pathways converge on autophagy genes to regulate life span in *Caenorhabditis elegans* (2). n-6 Polyunsaturated fatty acids extend life span through the activation of autophagy

(2) Telomere and aging

Assigned reading: (1). Long lifespan in worms with long telomeric DNA (2). Telomere length in early life predicts lifespan (3). Telomere length correlates with life span of dog breeds.

Week 15 (1) Aging research in humans

Assigned reading: Positional Cloning of the Werner's Syndrome Gene

(2) class review

Week 16 (1) An inter-disciplinary theory of aging

(2) **Final Exam**

Week 17 **Final Exam Week (no class)**

#### Assessment

Two written exams	70%
Four Quizzes	20%
Attendance	10%

#### Assignment of Grades

Percentage	Grade
93- 100%	A
90- 92%	A-
87- 89%	B+
83- 86%	B
80- 82%	B-
77- 79%	C+
73- 76%	C
70- 72%	C-
67- 69%	D+

63 – 66%	D
60 – 62%	D-
59% or less	F

#### Policy on absences, makeup tests, late work, and incompletes

Absences for which a medical or comt excuse is provided (professional letterhead required) will be recorded but not figured in the attendance grade. Likewise, one absence for which advance notice is given by phone or in person will not be figured in the attendance grade. Any significant tardy or early departure from class will be figured as one absence. Three absences will result in grade F. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade.

Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work.

#### Classroom etiquette policy

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

#### Disability policy statement

*In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office of Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses- Boca Raton, Davie, and Jupiter, however, disability services are available for students on all campuses.*

#### Religious Accommodations

Students who wish to be excused from course work, class activities or examinations must notify the instructor in advance of their intention to participate in religious observation and request an excused absence.



### **Code of Academic Integrity Statement**

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at [http://www.fau.edu/ctV4.001\\_Code\\_of\\_Academic\\_Integrity.pdf](http://www.fau.edu/ctV4.001_Code_of_Academic_Integrity.pdf)