Objective: This course for senior undergraduate and graduate students is designed to give an understanding of the fundamentals of molecular genetics. Molecular genetics is a powerful way of seeing nature that has uncovered many mysteries about how living things function. You will learn how to interpret, present, and discuss data from the primary literature.

Overview: How we perceive and respond to our environment is governed by the nervous system. The task of understanding how this network of specialized cells functions is a daunting one. Over the past 30 years, molecular genetic analysis of neural function in model organisms has greatly expanded our knowledge. By using the primary literature, we will discuss classic experiments that have made important contributions to neuroscience. These fundamental works will serve as a foundation for our discussion of more current papers. Although this course will focus on neurobiology, the molecular genetic approaches and techniques discussed are applicable to many biological questions.

The primary goals of this course are to improve student's comprehension of the primary literature and ability to think critically about research. Each week we will discuss papers covering the topics listed below. The papers will be presented by teams led by a graduate or senior undergraduate students. Each paper will be presented by a team on a rotating basis. The team is required to make a PowerPoint presentation for the paper that includes all the figures of the paper and a background slide or two at the beginning of the presentation. All students are required to read these papers and be prepared for a detailed discussion of the experiments presented within them. Review articles included in the syllabus will not be presented, they are provided to give you additional background. Presentations will be graded by the instructor and will constitute 50% of the final grade. Class participation and attendance will count as 20% of the final grade.

There will be a take home midterm exam and an in-class final exam that will account for the remaining 30% of the final grade. These exams will count equally, 15% of the final grade each. The exams will cover molecular genetic techniques and terminology as well as concepts presented in the paper presentations.

Course codes: 
Undergraduate PCB 4133-U01 O (79994)
Graduate BSC 6936-U01 O (79995)

Course textbook: Decoding the Language of Genetics by David Botstein
Weekly meeting topics and readings:

**Week 1 Aug 21st**

**Molecular genetics: an overview**

*Class 1: Tuesday*
Concepts in Molecular Genetics
Lecture and discussion of readings from Decoding the Language of Genetics

*Class 2: Thursday*
Forward Genetics


**Week 2 August 28th**

**Molecular genetics: an overview**

*Class 3: Tuesday*
Genome Editing


*Class 4: Thursday*
Transgenesis & Binary systems for cell manipulation


**Week 3 September 4th**

**Initial molecular genetic approaches to neuroscience**

*Class 5: Tuesday*
S. Benzer (1971) From the gene to behavior. *JAMA* 218 (7): 1015-22. *(Background article)*
*Background article*

**Class 6: Thursday**


**Week 4 September 11th**
**Ion channels & synaptic transmission**

**Class 7: Tuesday**


**Class 8: Thursday**


**Week 5 September 18th**
**Learning and memory**

**Class 9: Tuesday**


**Class 10: Thursday**


Written take home exam questions given out, exam must be returned to me via email by September 25th (15% of final grade).

**Week 6 September 25th**

**Visual perception**

**Class 11: Tuesday**


**Olfactory receptors**

**Class 12: Thursday**


**Week 7 October 2nd**

**Olfactory receptor expression**

**Class 13: Tuesday**


**Olfactory receptor evolution**

**Class 14: Thursday**


**Week 8 October 9th**

**Olfactory circuits**

*Class 15: Tuesday*


*Class 16: Thursday*


**Week 9 October 16th**

**Gustation**

*Class 17: Tuesday*


**Appetite**

*Class 18: Thursday*


**Week 10 October 23rd**

**Patterning the nervous system**

*Class 19: Tuesday*


*Class 20: Thursday*


**Week 11 October 30th**

**Guest Lectures on Coral genetics and Mosquito genetics**

Content presented in lectures will be asked about in the final exam

**Week 12 November 6th**

**Circadian Rhythm**

*Class 23: Tuesday*


**Social behavior**

*Class 24: Thursday*


**Week 13 November 13**

**Imaging neurons**  
*Class 25: Tuesday*


**Optogenetics**  
*Class 26: Thursday*


**Week 14 November 20**

**Mating behavior**  
*Class 27: Tuesday*


**Fear**  
*Class 28: Thursday*


**Week 15 November 27**

**Addiction & Thirst**  
*Class 29: Tuesday*


Class 30: Thursday

Review Session

Finals week: December 4th

In-class final exam (15% of final grade)

Grading Scale: A 100-94 A- 93-90 B+ 89-87 B 86-84 B- 83-80 C+ 79-77 C 76-74 C- 73-70 D+ 69-67 D 66-64 D- 63-60 F < 60

Academic Misconduct: Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

Full handbook and information can be found at:
http://www.fiu.edu/~oabp/misconductweb/1acmisconductproc.htm

DEFINITION OF ACADEMIC MISCONDUCT: Academic Misconduct is defined as the following intentional acts or omissions committed by any FIU student:

1.01 Cheating: The unauthorized use of books, notes, aids, electronic sources; or assistance from another person with respect to examinations, course assignments, field service reports, class recitations; or the unauthorized possession of examination papers or course materials, whether originally authorized or not. Any student helping another cheat may be found guilty of academic misconduct.

1.02 Plagiarism: The deliberate use and appropriation of another's work without any indication of the source and the representation of such work as the student's own. Any student who fails to give credit for ideas, expressions or materials taken from another source, including internet sources, is guilty of plagiarism. Any student helping another to plagiarize may be found guilty of academic misconduct.

1.08 Academic Dishonesty: In general, by any act or omission not specifically mentioned above and which is outside the customary scope of preparing and
completing academic assignments and/or contrary to the above stated policies concerning academic integrity.

If found cheating, YOU WILL RECEIVE AN “F” FOR THE CLASS, NO EXCEPTIONS.

***Syllabus subject to change***