**Advanced Genetics**

**PCB 4066; Section 001; CRN TBD**

**1 credit hour**

**Departments of Biological Sciences and Psychology, College of Science &**

**Harriet L. Wilkes Honors College**

**Florida Atlantic University**

**Semester:** Summer 2018

**Class meetings**: Wednesdays, 1:00 to 2:00 pm

**Location**: SR 283, Jupiter Campus

**Instructor**: Drs. Bolton and Dawson-Scully

 Office: MC 19/RE, Room 109

 Email: mclean.bolton@mpfi.org, ken.dawson-scully@fau.edu

 Phone: 516-799-8514

**Office Hours**: Tuesdays and Thursdays, 12:00 to 1:00 pm

**Course Description**: Detailed study of molecular control of genetic processes including gene expression, development, and optogentics; and a review of historical and current genetic research methods.

**Prerequisite:** Permission of instructor

**Required Text**: In addition to the below textbook, handouts and selected articles will be provided through Canvas.

***Genetics: A Conceptual Approach*, Fifth Edition**

Benjamin A. Pierce

W.H. Freeman and Co., ISBN-13: 978-1464109461

**Course Objectives**: To provide students with an advanced understanding of the mechanisms involved in the control of gene expression, how intracellular and environmental factors act on these mechanisms to influence patterns of gene expression, and way sin which these factors combine to define and direct complex processes such as development and disease.

**Note of Honors Distinction**: This course is a Max Planck Honors Program (MPHP) course. Max Planck Honors Program courses have been designed as part of a unique collaborative effort between the Schmidt College of Science, the Wilkes Honors College, and the Max Planck Florida Institute for Neuroscience. They offer its students an exclusive and enriching opportunity to develop neuoroscientific knowledge, formulate questions, and communicate their research via oral and written deliveries while learning and engaging with a community of cutting-edge research scholars and Nobel laureates.

**FAU MPHP Advanced Genetics - Schedule for Summer 2018**

**Session Topic Reading**

**1** Introduction and expectations The Syllabus

**2** Protein Structure Handout

**3** DNA and Chromosome Molecular Structure *Genetics* 300 - 308

**4** Protein – Nucleic Acid Interactions Handout

**5 Memorial Day—No Class**

**6** Molecular Details of Transcription *Genetics* chapter 13

**7** Molecular Details of Transcription Continued *Genetics* chapter 13

**8 Exam 1**

**9** RNA Molecules *Genetics* chapter 14

**10** mRNA Processing *Genetics* chapter 17

**11** Bacterial Control of Gene Expression *Genetics* chapter 17

**12** Eucaryotic Control of Gene Expression *Genetics* chapter 17

**13 Exam 2**

**14** Recombinant DNA and Cloning *Genetics* 536 – 553

**15** Recombinant DNA and Cloning Continued *Genetics* 536 – 553

**16** Identifying and Isolating Gene Sequences *Genetics* 555 - 567

**17** Identifying Proteins and Analyzing Their Function *Genetics* 568 - 571

**18** Applying Molecular Genetic Techniques *Genetics* 568 - 571

**19** Genomics *Genetics* 580 – 595

**20 Exam 3**

**21** Epigenetics *Genetics* 603 - 605

**22** Epigenetics Handouts

**23** Differentiation and Development *Genetics* 619 – 626

**24** Optogenetics Handouts

**25 Exam 4**

**Participation**: Students will be expected to have completed assigned readings before class and come prepared to discuss them in depth. Articles and handouts will be posted on Canvas.

**Grading Policies**: There will be four unit examinations, each worth 100 points. Exams will be designed to test understanding of fundamental concepts, and how they relate to mechanisms that carry out universal genetic processes.

 **Grading Scale**

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Percentage** | **Grade** | **Percentage** |
| A | ≥93 | C | 73-76 |
| A- | 90-92 | C- | 70-72 |
| B+ | 87-89 | D+ | 67-69 |
| B | 83-86 | D | 63-66 |
| B- | 80-82 | D- | 60-62 |
| C+ | 77-79 | F | ≤59 |

**Incompletes**: As per University policy, 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. For this class, if a student is unable to complete the required coursework because of a serious illnesses, hospitalization, military service, or death of a family member, the student can request a grade of Incomplete. The awarding of an “I” (Incomplete) will be granted only in exceptional cases; the decision will be made either solely by the instructor or in consultation with the Associate Dean.

**Withdrawal from Class**: It is the responsibility of the student to withdraw from this class, should that status be desired.

**Attendance**: Students are expected to attend all classes and participate in discussions. If a student misses a class, the student is responsible for all material covered during that class and any changes to the course schedule. If a student must miss a class, it is suggested that the student arrange to obtain class notes and announcements from another student.

**FAU Attendance Policy**: Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student’s responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student’s final course grade as a direct result of such absence.

**Electronic Devices**: University policy states that “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.” In this class, any use of cell phones or other communication devices is not allowed during active class times. (A ringing or vibrating device is included in the definition of “use of an electronic device”, as is checking email or accessing the web.) If a student uses a communication device during active class time, the student will be required to leave for the remainder for the class period.

**Code of Academic Integrity**: Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty 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: <https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf>.

**Accommodations for Disabilities:** In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) — in Boca Raton, SU 133 (561-297-3880); in Davie, LA 131 (954-236-1222); or in Jupiter, SR 111F (561-799-8585) — and follow all SAS procedures.

**Religious Accommodation:** In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs with regard to admissions, registration, class attendance, and the scheduling of examinations and work assignments.

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. The instructor will provide a reasonable opportunity to make up such excused absences.