Biology 8620 CRN: 80083
Molecular Genetics of Eukaryotes
Fall Semester 2018
Credit Hours: 4 hrs

Instructors: Dr. Margo Brinton | Dr. John Houghton
Office: 623 Petit Science Center (404-413-5388) | 520 Petit Science Center (404-413-5390)
Laboratory: 638/640 PSC (404-413-5424) | 657 PSC (404-413-5377)
e-mail: *mbrinton@gsu.edu* | *jhoughton@gsu.edu*

Office Hours: Brinton: Tues 11:00 AM-12:00 Noon Houghton: Tues 3:00 to 4:00 PM
Drs. Brinton or Houghton will be happy to talk with you about any aspect of the class material or class assignments after class, during office hours, or by appointment.

Lecture time: 12:45 pm– 2:30 PM Tues/Thurs
Class Room: Sparks Hall Room 326

Textbook: *Lewin's Genes XII*, Jocelyn Krebs, Elliott Goldstein and Stephen Kilpatrick: Jones & Bartlett Learning, Burlington, MA, 2013 or alternatively, ***Genes XII*** *via* coursemart.com
Reading assignments in the text book are indicated in the lecture schedule. The assigned background information for some of the lectures will be given as web-links, handouts or journal article citations. Lecture slides in reduced size will be provided as hand outs in the class and/or made available as electronic PDFs or PPTs after the class. Exams will be based primarily on lecture material as well as the handouts and literature described in the lectures. Reading assignments (textbook and papers) are to be used to better understand the lecture material and to provide additional examples.

Grading:

Exam I	(Thurs, Sept. 27)	100 points
Exam II	(Tues, Oct. 27)	100 points
Exam III	(Thurs, Dec. 1)	100 points
Critical thinking assignments-(In-class paper discussions and class participation)		100 points
Gene paper		100 points
In-Class Presentation		100 points
Total		**600 points**

Grading scale: 97-100 A+, 90-96 A, 88-89 A-, 86-87 B+, 80-85 B, 78-79 B-, 76-77 C+, 70-75 C, 68-69 C-, 60-67 D, less than 60 F

The **exams** (in-class) may contain a few short answer questions, but the majority will be essay questions. Each exam will cover only the material in those lectures given since the previous exam and so will not be comprehensive. However, conceptual foundations established in each of the lectures need to be well understood since they will provide the necessary foundation for understanding material in subsequent lectures. Students will be evaluated on their ability to successfully integrate material and concepts from different lectures when answering exam questions. Students are expected to write thoughtful, well-organized answers to the exam questions and can include labeled diagrams. Although the ability to integrate general concepts and critical details is most important, students are also expected to understand the relevant technical aspects of the course material.

Critical thinking assignments will be based on original research literature in the field of eukaryotic molecular genetics. The instructors will further explain each of these assignments in class. Students will be expected to participate in **detailed in-class discussions of assigned research papers or complete a take home assignment**. Because you will be graded on your participation in the scheduled in-class discussions, unexcused absences for these discussions will be graded as a zero. If previously arranged with the instructors or due to an emergency, one missed discussion can be made up by writing a summary of the literature article discussed in class.

Each student will also write a **paper on an assigned human disease gene**. Detailed instructions will be handed out when the genes are assigned. **The writing assignments are NOT to be collaborative and should be done individually by each student without discussion with others.** Any information obtained from published articles or websites and included by a student in a writing assignment must be paraphrased (put in your own words) and the source of the information appropriately referenced in the text as well as in a reference list at the end of the paper. Any sentences or phrases that are copied word for word from a published article are considered a direct quote and must be put in quotation marks.

Each student will be required to make one **20-minute in-class presentation on an original research paper** using visual aids (typically PowerPoint slides). Students will first choose a topic within an area of eukaryotic molecular genetics from a list of topics provided by the instructors. Students will then choose a recent research paper (no more than 5 years old) that they wish to present on their assigned topic. At least two weeks prior to their presentation date, each student will give a hard copy of the paper or email a PDF file of the paper they have selected to the instructor indicated for that topic on the topic list. The instructor will either approve the chosen paper or suggest that a different paper be chosen. Students should choose papers that contain mechanistic studies in areas of eukaryotic molecular genetics or eukaryotic cell biology (papers on clinical studies, methods, cancer or virus infections are usually not acceptable). Presentations will be assessed by the instructors using the following criteria:

1) Content. Given the time constraints, it likely will not be possible to make a comprehensive presentation of all of the data in a paper. Therefore, students need to select and then clearly summarize and discuss the most important data and conclusions of the paper. The talk should begin with an introduction that provides appropriate and adequate background information and a context for the work the paper describes (what was known and not known in the field prior to the publication of the paper and what new information was sought by the research described). The goals of the research and the experimental strategies and techniques used and the results obtained should then be briefly described. Important figures should be shown and discussed. Some figures can be only briefly summarized or omitted. The conclusions and their validity and significance should then be discussed. Future directions for this research area can be proposed.

2) Organization and Clarity. The quality of the verbal presentation, the quality, organization and clarity of the power point slides or overheads and how well the visual aids are integrated into the presentation will be evaluated.

3) Responses to questions. It is important for students to allow about 2 to 3 minutes at the end of their presentation for questions. Students asking questions will receive credit toward their in class discussions grade.

Ethical considerations: Unless otherwise stated, all examination answers that are submitted for evaluation are considered to be the sole property and ideas of each individual student. Any student(s) caught copying or cheating will automatically receive zero credit for that particular submission, and possibly be subject to further disciplinary action. All students should be aware of the academic honesty policy (*http:/www2.gsu.edu/~wwwfhb/fhb.html*).

Accommodation of Disabilities: Students who wish to request accommodation for a disability may do so by registering with the Office of Disability Services. Students may only be accommodated upon issuance by the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

Campus carry law: For information on the campus carry law, go to: http://safety.gsu.edu/campus-carry

Course Assessments: Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation.

** Please note that this syllabus provides a plan for the course, however, deviations may be necessary.

TENTATIVE LECTURE SCHEDULE
BIO 8620, FALL 2014

DATE	TOPIC	READING ASSIGNMENTS
Background Information		
H&B-Aug. 21	Organizational Meeting The Genetic Material, DNA structure/function; What is a gene? The interrupted gene;	**Chapters** 1.1 - 1.7; 1.9 - 1.10; 2.1 - 2.6; 2.8 – 2.11; 4
Genome content, Genetic Modification/Rearrangements		
H-Aug. 23	Chromosomes, Nucleosomes, and Chromatin	**Chapter** 7 and 8; 12.1-12
H-Aug. 28	The Replicon and DNA Replication	**Chapters** 10.4-10.6; 10.8-10.11; 11.1 - 11.2, 11.9 - 11.12; 11.14 -11.15; 12.11-12.12;
H-Aug. 30	Mutations and DNA Repair	**Chapter** 1.12 – 1.15**;** 2.8**;** 14
H-Sept. 4	Mitosis, Meiosis, Linkage mapping (Review) DNA recombination	**Chapters** 13 & rest of 14 and handouts
H-Sept. 6	Transposons and retrotransposons	**Chapter** 15
H-Sept. 11	Genome Content; Genome Sequences Gene Numbers; Clusters and Repeats Genome Evolution	**Chapters** 6, 7**,** 8.1- 8.2, 8.4, 8.8-8.10
B Sept. 13	Human genome sequencing Human Gene Mapping; Phenotype to Genotype	Assigned articles and handouts
B-Sept. 18	**IN CLASS PAPER DISCUSSION I** **Gene Paper Assignment**	Assigned article
H&B-Sept. 20	**STUDENT PRESENTATIONS I**	
Sept. 25	**EXAM I**	
Regulation of Gene Expression		
B-Sept. 27	Basal RNA polymerase initiation complexes	**Chapter** 18.1 - 18.8; 19.15 - 19.17
B-Oct. 2	Transcription regulatory elements in gene promoters	**Chapter** 26.7; 18.9 - 18.12
B-Oct. 4	Transcriptional activation and regulation	**Chapter** 26.1 - 26.6

DATE	TOPIC	READING ASSIGNMENTS
B-Oct. 9	Chromatin structure and gene regulation	**Chapter** 26.9 - 26.13
	Oct 10- LAST DAY TO WITHDRAW AND RECEIVE A "W"	
B-Oct. 11	Other gene regulation mechanisms	Handouts
H&B-Oct. 16	**STUDENT PRESENTATIONS II**	
H-Oct. 18	Epigenetic inheritance	**Chapters** 27 & 28
H-Oct. 23	**IN CLASS PAPER DISCUSSION II**	Assigned article
Oct. 25	**EXAM II**	
B-Oct. 30	Nuclear Splicing	**Chapter** 19.1-19.11; 23.9; 21.1-21.6; 21.9
B-Nov. 1	Post-transcriptional regulatory mechanisms **Gene paper due**	**Chapter** 19.12 -19.13; 21.10; 22.12 and Assigned articles
B-Nov. 6	Regulatory RNA- siRNA, miRNA	**Chapter** 30.3 - 30.4 and Assigned articles
B-Nov. 8	Regulatory RNA- piwi RNA, lnc RNA, etc.	**Chapter** 29.3 and Assigned articles
H&B Nov. 13	**STUDENT PRESENTATIONS III**	
B-Nov. 15	Gene therapy	Assigned articles and handouts
Nov. 19-23	**Thanksgiving vacation**- No classes	
B-Nov. 27	**IN CLASS PAPER DISCUSSION III**	
Nov. 29	**EXAM III**	