## **Biol 322: Molecular Biology, Fall 2013**

Time: 10:00-11:15 a.m. TR Room: Newton 209 Credit Hours: 3

Instructor: Dr. Janice A. Lovett, 349 ISC, lovett@geneseo.edu, 245-5413

Office Hours: 4 – 5:00 p.m. Monday, 11:30 a.m. – 12:30 p.m. Tuesday, and 9:30 – 10:20 a.m. Friday or by

appointment

The course will deal with the current knowledge concerning what is a gene? It's structure, expression, regulation, and replication. Both eukaryotic and prokaryotic material will be covered as well as the techniques that have been developed recently in the study of molecular biology.

## Learning Outcomes:

- A. Students should have a reasonably detailed understanding of prokaryotic and eukaryotic gene expression; transcription, translation, replication and their control.
- B. Students should recognize the similarities and differences between prokaryotic and eukaryotic molecular biology.
- C. Students will become familiar with reading and understanding primary literature in molecular biology.
- D. Students will learn the techniques used in molecular biology.
- E. Students will learn the relationship between structure and function of the molecules involved.

Text: B. E. Tropp, Molecular Biology, 4th edition, 2012. Jones & Bartlett Learning.

R. F. Weaver, Molecular Biology, 4th edition, 2012. McGraw-Hill

Evaluation: There will be three exams each covering the material since the previous exam. Each exam will be worth 90 points. Questions relating to research articles pertinent to the lecture topic will be due on the dates indicated. These will be worth 30 points (10% of your grade). Material from these papers may be used as the basis for exam questions.

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## Schedule:

Week 1	Aug. 27-29	Introduction, Weak bonds, Macromolecular structure, DNA/RNA properties Watson, Ch. 3 & 5; Tropp, Ch. 1, 2 & 4, Weaver, Ch. 2
Week 2	2 Sept. 3-5	Prokaryotic polymerases and promoters. The interaction of polymerases and promoters. Tropp, Ch. 15.1-15.2, Weaver, Ch. 6 p. 121 - 146
Week 3	Sept. 10	Elongation and termination in prokaryotic transcription. Tropp, Ch. 15.3-15.4, Weaver, Ch. 6, p.146 - 162
	Sept. 12	Controlling transcription by affecting the RNAP's interaction with the promoter, <i>lacI</i> , <i>trpR</i> , <i>CAP</i> Tropp, Ch. 16.1-16.4 & 16.6 p. 691-692, Weaver, Ch. 7, p. 167 – 187.
Week 4	Sept. 17	Controlling initiation by modifying the RNAP itself; alternate $\sigma$ s Tropp, Ch. 15 p. 643-645, Weaver, Ch. 8, p. 196 - 203; article questions due
	Sept. 19	Controlling elongation by formation of intrinsic terminators, riboswitches or antitermination. Tropp, Ch. 16.6 p. 692-696 & p.698; Watson, Riboswitches, Weaver, Ch. 7, p. 187 - 192
Week 5	Sept. 24 Sept. 26	Integrating control, λ. Tropp, Ch. 16.7, Weaver, Ch. 8, p. 203 - 218 DNA-protein interaction. Weaver, Ch. 9.
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Week 16	Dec. 12	Final Exam, Thursday, 8-11 a.m.
Week 15	Dec. 3 Dec. 5	DNA replication more detail. Tropp, Ch. 9-10, Weaver, Ch. 21 DNA replication more detail. Tropp, Ch. 9-10, Weaver, Ch. 21
	Nov. 28	questions due Thanksgiving Break, no class
Week 14	Nov. 26	DNA replication basics. Tropp, Ch. 9-10, Weaver, Ch. 20.1- 20.2; article
	Nov. 21	ribosome and tRNA structure/function. Tropp, Ch. 22.1-22.3, 23.1, Weaver, Ch. 19
Week 13	Nov. 19	Elongation translocation and termination. Tropp, Ch. 23.4-23.7, Weaver, Ch. 18.3 – 18.4
	Nov. 14	and in Eukaryotes. Binding the next tRNA. Tropp, Ch.23.3-23.4, Weaver, Ch. 17.2 – 17.3
Week 12	Nov. 12	Translation Initiation in prokaryotes Tropp, Ch. 23.1-23.2, Weaver, Ch. 17.1; article questions due
	Nov. 7	miRNA, piRNA, etc. Tropp, Ch.21.3-21.7, Weaver, Ch. 16.8 – end
Week 11	Nov. 5 Nov. 6	Exam 2 (Material from Sept. 26-Oct. 29) Last day to withdraw
	Oct. 31	RNAi, Tropp, Ch. 21.1-21.2, Weaver, Ch. 16.6 – 16.7
Week 10	Oct. 29	capping, splicing, polyadenylation and the role of the CTD. Tropp, Ch. 19, Weaver, Ch. 15, 16.1, 16.2
	Oct. 24	Co- and Post-transcriptional processes; Tropp, Ch. 19, Weaver, Ch. 14; article questions due
Week 9	Oct. 22	Chromatin structure and regulation, histone modification. Tropp, Ch. 18.10, Weaver, Ch. 13
	Oct. 17	Nonbasal TFs; structure and function of activators. Tropp, Ch. 18.1-8.9, Weaver, Ch. 12
Week 8	Oct. 15	Fall Break, no class.
	Oct. 10	RNAPII elongation. Interaction of TFs, promoters and RNAPI and III transcription. Tropp, Ch. 17.6, Chap. 20.2 & 20.5, Weaver, Ch. 11, p. 296 - 308
Week 7	Oct. 8	Interaction of TFIIs, the promoter and RNAPII. Tropp, Ch. 17.5, Weaver, Ch. 11, p. 273 - 296
week b	Oct. 1 Oct. 3	Eukaryotic polymerases and their promoters. Tropp, Ch. 17.1-17.4 & Ch. 20.2 897-904 and 20.5 p. 919-922, Weaver, Ch. 10; article questions due
Week 6	Oct. 1	Exam 1 (Material from Aug. 27-Sept. 24)

## **Accommodations:**

"SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional or cognitive disabilities. Students should contact the Director in the Office of Disabilities Services (Tabitha Buggie-Hunt, 106A Erwin) and their faculty to discuss needed accommodations as early as possible in the semester."