BIOLOGY 302 - MOLECULAR and **GENERAL GENETICS**
SYLLABUS, SUMMER, 2015

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Prerequisite: You must complete BIOL100/H or BIOL141/H; and BIOL142/H; and MATH150 or 151 or 155, or have equivalent AP credit or MATH placement into MATH 151. You must complete or concurrently enrolled in CHEM102/H or CHEM124. All with a C or better

Text: Genetic Analysis: An Integrated Approach, Sanders and Bowman

Class Meeting Time: Mon (11:00 – 12:00); Tue, Wed, Thu (9:15 – 12:00), BS120; **May 26 – July 6**

Lecture Schedule: Tue, Wed, Thu (9:15 – 12:00), BS120

Exam Schedule: An exam will be given each Monday (11:00 – 12:00) in BS120 starting June 3. The material covered on each exam and the exam format will be announced in class. The use of cell phones in any manner during exams is prohibited and will result in zero on the exam and report to the UMBC Academic Conduct Committee.

Each exam counts equally towards your grade and is mandatory. **The exams will be worth 90% of your grade**, so each exam will be worth 15%.

If you are unable to take a scheduled exam due to a permissible reason, e.g., illness, official university sanctioned activities, nuclear war, etc., you must notify either me or the Biology Department Office (410-455-2261) prior to the exam. Depending on the circumstances, a make-up exam may be scheduled, but only for those with an appropriate reason for missing the exam. **Illnesses will require a physician's note.** The format of the make-up exam will either be an essay exam, short answer, or a term paper, at the discretion of the instructor. **Vacation is not considered an acceptable reason. Plan on being present until July 6th.**

Homework: Homework problems have been assigned on Blackboard. These are open book. There are seven homework assignments. You must complete the first before you continue into the six weekly homework assignments, each of which is due by the following Sunday at midnight. **Homework will be worth 10% of your grade.**

Laptops: Laptops are a convenience to many of us. However, their use in lecture has been shown to actually decrease performance over pen and paper note-taking. This is true even when the student actually uses the laptop to take notes rather than to IM/Facebook/Tweet/Email/Game, which happens all too often. I discourage their use during lecture, but won't forbid it unless I find abuse and/or other students complain.

Discussion Periods: An optional (but strongly recommended) and informal discussion section will be available to students immediately following the Thursday lecture, **12:00 - 12:50**, in BS120.

Policy on Academic Misconduct: Any confirmed case of cheating on an exam will be dealt with through UMBC's Academic Conduct Committee as described in the Policy for Academic Misconduct in Undergraduate Courses. Any and all instances of academic misconduct will be reported to the committee. Penalties include, but are not limited to, a grade of "F" in the class.

LECTURE TOPICS, SUGGESTED READINGS & PROBLEM SETS

Topics	Bowman: Genetic Analysis	Some Useful Problems
Introduction	Ch. 1	Ch. 1: 5 – 7, 10 – 14, 16, 17, 20
The Genetic Material		
Structure	Ch. 7 through sec. 7.2 (& Ch. 1 sec. 1.2)	Ch. 7: 1 – 4, 7, 11, 13, 16, 17
Replication	Sec 7.3	Ch. 7: 20, 21, 32
Chromosome Structure	Ch. 11	Ch. 11: 1 – 3, 5, 8, 20 – 22
Cell Division	Ch. 3 through sec. 3.2	Ch. 3: 1, 2, 5, 8, 11
Monohybrid Crosses:		
Mendel's Experiments	Ch. 2 through sec. 2.2, 2.6	Ch. 2: 2, 4, 9, 10 – 12, 21
Deviations from Mendel	Ch. 4 through sec. 4.2	Ch. 4: 1, 6, 13 – 16, 20
Sex Linkage	Ch. 3 sec. 3.3	Ch. 3: 12, 13, 19, 23, 25, 30
Sex Determination and Dosage Compensation	Ch. 3 sec. 3.4 – 3.6, Ch. 8 pp. 292 – 293, & Ch. 11 pp. 376 – 377	Ch. 3: 10, 16, 17, 18, 26, 31 Ch. 8: 3b, 13
Probability and Chi-square	Ch. 2 sec. 2.4 – 2.5	Ch. 2: 5, 7, 13, 19, 22, 31, 32, 34, 39, 42
Dihybrid Crosses:		
Unlinked Genes	Ch. 2 sec. 2.3	Ch. 2: 3, 6, 16 – 18, 23, 25, 26, 28, 30
Gene Interactions	Ch. 4 sec. 4.3 – end	Ch. 4: 2, 5, 7, 10, 18, 24, 25, 31
Linked Genes and Mapping	Ch. 5 through 5.4	Ch. 5: 1, 7, 10, 13, 16, 23, 25
Gene Action (overview)		
Replication	Ch. 7 sec. 7.4, & fig 6.6	Ch. 7: 9, 12, 14, 19, 23, 24 – 26
Transcription	Ch. 8 through sec. 8.3	Ch. 8: 1, 4 – 6, 9, 10, 12, 20 – 23, 25
Processing	Ch. 8 sec. 8.4	Ch. 8: 2, 8, 11, 13, 24
Translation	Ch. 9	Ch. 9: 1, 4, 5, 7 – 10, 15 – 18, 24, 28 – 31
Mutation & repair	Ch. 12	Ch. 12: 4, 6 – 8, 10, 11, 13 – 19, 31, 32
Transposable Elements	Ch. 13 sec. 13.5 - end	Ch. 13: 6, 7, 8, 28, 30
Bacterial Genetics	Ch. 6	Ch. 6: 1, 2, 4, 6, 8 – 11, 15, 16, 18, 22, 25, 26
Gene Regulation		
Prokaryotic	Ch. 14 through 14.5	Ch. 14: 2 – 4, 6 – 12, 15 – 19, 22 – 25
Eukaryotic	Ch. 15 sec. 15.1, 15.3, Ch. 8 pp. 283 – 286, 282 – 293 Ch. 3 pp. 71 – 73	Ch. 15: 1, 2, 6, 8 – 13, 15 Ch. 8: 13
Genetics and Cancer	Pages: 247 – 248, 379, 407	
Recombinant DNA Technology	Ch. 7 sec. 7.5, Ch. 16 through 16.4	Ch. 7: 27 – 29, 31; Ch. 16: 1, 4, 5, 9, 12, 13, 15, 16
Applications of Recombinant DNA Technology	Ch. 10, Ch. 17, & Ch. 16 pp. 551 – 556	Ch. 10: 4, 7, 8, 9, 11, 13, 15 – 19, 24, 28, 30, 31; Ch. 17: 2, 5 – 7
Euploidy & Aneuploidy	Ch. 13 through 13.2	Ch. 13: 3, 9, 10, 15, 16, 18, 22, 32

These are only suggested minimum reading assignments. Other readings may be useful as well, as may be a variety of online resources. Topics often jump around in the book, it is perfectly ok to read the chapters start to finish, instead of inside out – the section numbers are there only to assist you. These problems will not be collected, but *will* help you learn the material and succeed on the exam. PowerPoint slides are NOT a study guide, but are only a lecture tool. All covered and included material is important.