BIO 303-2 GENERAL GENETICS SPRING 2020
College of Arts & Sciences Syllabus

COURSE INFORMATION

Credit Hours: 4 cr.

Course Description: This course is designed to provide students with a comprehensive background in genetics including classical/Mendelian genetics, bacterial and phage/viral genetics, the chromosomal and molecular basis of heredity, and population genetics. Lecture and laboratory.

Course Prerequisites: Undergraduate level BIO 150 Minimum Grade of C and Undergraduate level BIO 201 Minimum Grade of C and Undergraduate level BIO 202 Minimum Grade of C

Meeting Times/Locations: Monday/Wednesday, 5:40 – 8:30 pm in BBH-347

FACULTY INFORMATION

Instructor: Dr. Elyse Bolterstein **Office Location:** BBH-352A

E-mail: e-bolterstein@neiu.edu **Phone extension:** (773) 442-5742

Office Hours: 11 am -12 pm Mondays/Wednesday, 1-3 pm Tuesdays, and by appointment

E-mail is the easiest and fastest way to contact me. Please plan ahead and allow time for a reply. On regular business days I can usually reply within 24 hours. On weekends and holidays I may need to reply on the next business day. **You must use your NEIU e-mail for all e-mail communication. Include a subject or it may go to junk mail.**

REQUIRED COURSE MATERIALS

Klug, W.S. *et al.* Essentials of Genetics, 9th edition*. 2015. Pearson. Boston, MA. ISBN: 0134047799
*You may also use the 8th edition

Chemistry – Spiral Side Bound 100 set. Hayden McNeil (ISBN 978-1-4292-2454-3) or another laboratory notebook capable of making duplicate copies. *Note*: You can use a notebook from a previous class if it is less than half full.

A Non-graphing calculator (You may not use a graphing calculator or cell phone calculator on quizzes/exams.)

A USB flash drive for working on Virtual Genetics Lab

Hofmann, A.H. 2013. Writing in the Biological Sciences: A Comprehensive Resource for Scientific Communication. Oxford University Press. New York, NY. ISBN: 978-0-19-024560-3

RECCOMMENDED COURSE MATERIALS

Gonick, L. and Wheelis, M. The Cartoon Guide to Genetics – Updated Edition. 1991. Harper Collins. New York, NY. ISBN: 9780062730992

COURSE OBJECTIVES / STUDENT LEARNING OUTCOMES

- Explain key theoretical aspects of classical and contemporary genetics
- Discuss the mechanisms of heredity by explaining transmission and expression of simple and complex traits and using this to predict the outcomes of specific genetic crosses.
- Discuss the basics of Molecular Genetics, including DNA structure, replication and gene expression.
- Describe factors that affect gene distribution in populations and interpret data in gene pool changes.
- Apply techniques and statistical analyses used in modern genetics research.
- Develop critical thinking and analytical skills by interpreting experimental data and communicating scientific research results.

STUDENT TASKS / ASSIGNMENTS / REQUIREMENTS

All assignments will be due at the beginning of class unless otherwise stated. *For full credit, assignments must be turned in by the designated time and date.* If an assignment is turned in within 24 hours after a due date, 10% of points will be deducted. An additional 10% of points will be deducted for every additional calendar day that an assignment is turned in late, but **assignments submitted more than 5 days late will not be accepted. *No late assignments will be accepted after the final exam.*

**All grades will be posted on Desire 2 Learn (D2L). It is your responsibility to be sure your grades are in order. Any grade discrepancies can be changed within 7 days of the D2L post date. After 7 days the score will stand as listed in D2L.

Preparation for class: You will be expected to read the required reading assignments (see the course outline) before coming to class. If you are having trouble understanding the textbook, please talk with me about techniques for reading scientific textbooks. *For lab, you are responsible for carefully reading the assigned handouts.*

Small writing assignments: Developing good writing skills is essential for any career! You will have many opportunities to practice your writing in class in the form of reflections, class summaries, and drafts of larger assignments. Small writing assignments will be graded on a scale of 0-2 based on effort and completeness. Some assignments will be in-class and some will be homework; you must be present in class to receive credit.

Quizzes: Most weeks of the semester, you will complete an online quiz on D2L. These quizzes will review material from previous classes and allow you to answer pre-lab questions. *D2L quizzes must be submitted by the start of class on the due date. There are no late submissions/make-ups for these quizzes.* Throughout the semester, there will be 10 quizzes (see course outline on page 6). Each one is worth up to 10 points, but your lowest score will be dropped. *To do well on the quizzes, you will need to review previously covered material and read assigned lab material.*

Exams: Exams will be given at the beginning of a lecture period and you will have the entire class period to complete the exam. Questions may be a mix of multiple-choice, vocabulary, short answer, and essays. Many questions will be comprehensive, meaning that you must understand how different topics relate to one another. To correctly answer these questions you must understand the underlying concepts; memorization of definitions will not suffice. Non-graphing calculators may be used on all exams.

Lab Data Sheets: All records, procedures, and data collected during the lab will be written in your lab notebook. This may also include post-lab questions, so read each exercise completely so that you don't miss these questions and lose points. Carbon copies will be collected either at the end of each lab period or at the beginning of the next class period.

Virtual Genetics Lab (VGL): Students will be given one VGL take-home exercise to be completed using the VGL software. Reports and program files should be submitted to D2L by the due date (see schedule on page 6).

Group Poster, Presentations, and Virtual Poster Session: There will be two sets group experiments where students will test survival of flies that have mutations in DNA repair genes. Each set of experiments will be shared with the class via a 7-10-minute presentation. Following the second set of experiments, students will create a poster using PowerPoint to showcase their experiment and data. Poster and presentations will be shared with students at other universities as part of a virtual poster session. Students will also participate in peer review of drafts and group evaluations as part of this assignment.

GRADING:

Item	Points
2 Mid-Term Exams (100 points each)	200
Comprehensive Final Exam	120
Quizzes (10 at 10 points each, lowest will be dropped)	90
Post Labs and Data Sheets (10 at 10 points each)	100
Virtual Genetics Lab Take Home	25
Fly Lab I Presentation	25
Fly Lab II Group Poster and Presentation	60
Small writing assignments	30
Total	**650**

Total Points	Letter Grade
585 – 650	A
520 – 584	B
455 – 519	C
390 – 454	D
< 390	Failing

Final grades and extra credit: Your grade at the end of the class will be based solely on the assignments and exams turned in up to and including the final. *No extra projects, extra credit, re-submissions, retakes or rounding-up will be given to raise a grade no matter how close you are to the next letter grade.*

COURSE POLICIES AND STATEMENTS

Absence Policy: Attendance may not be taken in every lecture, but you are expected to be present, punctual, and paying attention. Attendance is mandatory on days that we will be doing lab exercises. If you miss a lab, you will forfeit any points you would have received for lab that day. Punctuality on lab days is extremely important so that you don't miss any instruction and have enough time to complete the lab. *If you are more than 20 minutes late, you will be considered absent and your instructor reserves the right to ask you to leave the lab.*

Make-ups: Generally, it is impossible to make-up a lab, due to the intensive preparation required to set up a lab. *If you know in advance that you must miss a lab, please let me know. We may (NO guarantee) be able to find an alternate time for you to conduct the lab.* If you are absent, it is your responsibility to turn in your homework on time or incur late point deductions.

Make-up exams will only be allowed in cases when the student has documentation (e.g. doctor's note) of an illness or other emergency. In the event of such an emergency, you must contact me before the start of the exam. Absences that are not excused include (but are not limited to) car problems, public transportation issues, wedding/baby shower, sick without documentation, taking sister/friend/grandma to the dentist/doctor/mechanic, and going out of town/trips.

*** If you must miss a class due to a religious holiday, you must notify your instructor by **Fri, January 10****

Academic Integrity Policy: By enrolling in this course, you are bound by the NEIU Student Code of Conduct: http://www.neiu.edu/university-life/student-rights-and-responsibilities/student-code-conduct. *Cheating and plagiarism can result in getting zero for the assignment /exam, failing the entire course or being referred to the Chair of the Department of Biology and/or the Office of Student Rights & Responsibilities depending upon the individual case*. The instructor reserves the right to use any means necessary to detect cheating and/or plagiarism including, but not limited to, electronic means.

You will be working closely together in class discussions and in the laboratory, where group efforts are a must. However, when individual efforts are called for (assignments, exams, quizzes, writing in your lab notebook, etc.) – they must be accomplished alone. *Plagiarism includes copying the wording and/or paragraph structure written by someone else (e.g. lab partner, former student, book, lab handout, article, web page).* If you are unsure about the originality of your work, I am happy to have a conversation with you before you turn it in.

ADA Statement: Northeastern Illinois University (NEIU) complies with the Americans with Disabilities Act (ADA) in making reasonable accommodations for qualified students with disabilities. To request accommodations, students with special needs should make arrangements with the Student Disability Services (SDS) office, located on the main campus in room D104. Contact SDS via (773) 442-4595 or http://www.neiu.edu/university-life/student-disability-services.

Campus Safety: Web links to Campus Safety: Emergency Procedures and Safety Information can be found on NEIU*port* on the MyNEIU tab or as follows: http://homepages.neiu.edu/~neiutemp/Emergency_Procedures/MainCampus/.

Desire2Learn (D2L): *It is your responsibility to regularly check Desire2Learn as well as your NEIU e-mail address.* I will frequently post handouts, changes to the course schedule, etc. on D2L.

> You can access D2L at https://neiu.desire2learn.com/ or by logging into NEIUport (https://neiuport.neiu.edu/cp/home/displaylogin) and selecting the D2L icon in the upper right. In both cases, login using the same NetID and password that you use for NEIUport.

Withdrawing from the course: *Students who wish to withdraw from the course must do so themselves through NEIUport or the Registration Office.* Students who simply stop coming to class but do not withdraw will receive a grade for the class that is based on (1) whatever work they did before they stopped attending and (2) the 0's they receive for all work not done after they stopped attending.

March 27, 2020 is the last day to drop a class and receive a "W" (withdrawn) grade.
(No refund/credit of tuition and fees)

Classroom/Lab behavior: In accordance with the University's Classroom Disruption Policy, students disrupting class will be issued a verbal warning. Students who continue to disrupt the class will be required to leave the classroom. Any further disruption can result in the involvement of Public Safety and/or the expulsion from the class. The University's Classroom Disruption Policy can be found on p. 36-37 of the Student Handbook (http://www.neiu.edu/university-life/sites/neiu.edu.university-life/files/documents/2015/06/2015-2016%20Student%20Handbook.pdf)

Course communication: The University expects that all communications between instructors and students is conducted exclusively through NEIU e-mail; communication via personal e-mail accounts (e.g., @gmail.com, @yahoo.com, etc.) will not occur. You must regularly check your NEIU e-mail account (or set the account to forward mail to an account that you do check regularly).

E-mail guidelines: When contacting an instructor by e-mail, you want to represent yourself in a professional manner. In addition to *using your NEIU e-mail address,* you should:

1. Check the syllabus/class handouts to see if your question can be answered. There's a lot of good info here!
2. Use the subject line to tell me what your email is about (e.g. question about in-class Mendelian genetics problem).
3. Include a greeting and address your instructor as Dr. or Professor (e.g. Hi Dr. B,).
4. Use complete sentences with proper spelling, grammar, and punctuation. Avoid abbreviations, slang, "text speak", and excessive exclamation points.
5. Keep your message concise to help make it clear what information you are asking for. Read over your email before you send it to make sure it reads as you wanted it to.

Learning Support Center: The Learning Support Center (LSC) provides peer-directed academic tutoring in several areas. Academic support is provided to students who are seeking assistance with understanding course concepts and preparing assignments, along with developing an improved learning system for college which includes motivation, academic engagement, brain-based habits for college learning, and learning strategies for note taking, textbook reading, and test taking. Additionally, the LSC provides all NEIU students an area for learning groups and an opportunity to learn with other students. Appointments are strongly encouraged, and students are welcome to drop in to discuss their individual academic support needs. For more information, visit the LSC website at www.neiu.edu/lsc or, to schedule an appointment with a tutor, call 773-442-4568.

Finding sources: To complete some assignments, you will have to find references using the NEIU library and its online databases. To learn more about these resources, consult http://libguides.neiu.edu/biology.

TENTATIVE COURSE SCHEDULE

Note that this schedule or lecture material may change depending on our progress. I will post revisions to D2L as necessary. *Labs are italicized. You must be present to participate and earn points.*

Date	Topic	Assigned reading
Jan 6	Introduction, History of Genetics, Mitosis & Meiosis	Klug (1, 2)
Jan 8	Mitosis & Meiosis, DNA and chromosome structure **Quiz 1**	Klug (2, 9, 10)
Jan 13	Mendelian Genetics	Klug (3)
Jan 15	*Lab safety, notebook keeping, intro to virtual genetics lab** **Quiz 2**	VGL handout
Jan 20	**MLK Day – no class**	
Jan 22	Modification of Mendelian Ratios **Quiz 3**	Klug (4)
Jan 27	Sex determination, **VGL drafts due in class**	Klug (5)
Jan 29	*Fly lab part I: intro to flies, mendelian ratios, and chi square analysis** **Quiz 4**	Handout
Feb 3	**Exam I: Chapters 1-5, 9, 10**	
Feb 5	*Fly lab part I: analysis of mutagen sensitivity**, **VGL take-home due**	Handout
Feb 10	DNA Replication, Mutations, Repair & Transposable Elements	Klug (11, 14)
Feb 12	**Lincoln's Birthday – no class, Quiz 5**	Handout
Feb 17	Chromosome Mutations *Fly lab part II: design group experiments**	Klug (6)
Feb 19	***Presentation: fly labs part I*** *Fly lab part II: set up group experiments*	
Feb 24	Linkage and Chromosome Mapping *Fly lab part II: mock-treat flies in group experiments**	Klug (7)
Feb 26	Quantitative genetics **Quiz 6**	Klug (21)
Mar 2	*Sordaria tetrad analysis**	Handout
Mar 5	**Exam II: Chapters 6, 7, 11, 14, 21**	
Mar 9	*Fly lab part II: collect and analyze data*	
Mar 11	*Fly lab part II: collect and analyze data*, poster workshop*	
Mar 16-20	**Spring Break**	
Mar 23	Transcription and Translation	Klug (12, 13)
Mar 25#	*Transformation I* **Quiz 7** **Draft posters due in class**	Handout
Mar 30	Gene Expression	Klug (15)
Apr 1	*Transformation II** **Quiz 8**	Handout
Apr 6	**Group poster presentations and Virtual Poster Session**	
Apr 8	*PCR lab part I: Isolate DNA and set up PCR reactions*	Handout
Apr 13	Cancer genetics, Virtual Poster Session	Case study
Apr 15	*PCR lab part II: Prepare and run agarose gels** **Quiz 9**	Handout
Apr 20	Population Genetics, Virtual Poster Session	Klug (22)
Apr 22	*Sampling and selection** **Quiz 10**	Handout
Apr 27	Exam review	
Apr 29	**Final Exam: 6:00 – 7:50 pm**	

***Data sheets including post-lab questions must be turned in for credit**

 # Last day to drop class with a "W" is March 27