BIOLOGY 313L - Principles of Genetics

General Information:

Emergency Phone Number: 515-294-052; Laboratory: 1227 Molecular Biology

Laboratory Coordinator:

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Laboratory Faculty in Charge:

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Goals

Catalog description BIOL 313L. Genetics Laboratory. (Cross-listed with GEN). (0-3) Cr. 1. F.S. *Prereq: Credit or enrollment in BIOL 313* Laboratory to accompany 313. Students may receive graduation credit for no more than one of the following: Biol 313 and 313L, Gen 260, Gen 313, Gen 320, and Agron 320.

Learning Goals

The study of genetics requires a solid understanding of Gene Theory, which can be enhanced and extended with hands-on, practical experience designing, implementing and interpreting genetic research experiments. The Biol 313L course is a companion to the Biol 313 lecture course and functions to reinforce and strengthen the understanding of several of the core genetic concepts presented in the lecture course. The student will gain appreciation that scientific research produces new knowledge by formulating hypotheses, testing them using experimental and observational data from the living world, interpreting and evaluating data and determining how to follow up on conclusions.

Core Concepts and Associated Learning Outcomes are:

--The student will be able to describe the following concepts: genotype gives rise to phenotype (structure gives rise to function). Genetic information resides in the nucleotide sequence of DNA that is transcribed into RNA, which is translated into protein that has a specific function. (Central Dogma, Gene Theory) The deciphering of genetic information (moving from gene-gene product) is subject to regulation. Core molecular genetic techniques are based on the biology and biochemistry of their component parts. Techniques have specific purposes and are used to address particular research questions. Proficiency comes from practice.

—The student will also be able to demonstrate the basic skills of molecular

biology such as pipetting, dilutions, cloning and the proper handling of microorganisms. In addition to developing technical skills, student will also be able to design an experiment, carry out the research using the appropriate laboratory techniques and analyze and interpret their data.

--By the end of this course, the student will be able to communicate their findings to peers and the public through through power pitch and poster presentations.

Schedule of Lab Modules Fall 2015

Week of:			Assignment due:
1	Aug 24/25	Introduction & Lab Skills 1	
	Aug 26/27	Laboratory Skills 2 CySI— Introduction/Poster intro	Quiz 1
2	Aug 31/ Sep 1	CySI— Genomic DNA Isolation	Lab Skills Data Sheet
	Sep 2/3	CySI— Polymerase Chain Reaction Online exercise #1: Primer Design	Quiz 2
3	Sep 7/8	NO LABORATORY	
	Sep 9/10	CySI— DNA Purification CySI— Ligation & Cloning Online exercise #2: Cloning	Online exercise #1 Quiz 3
4	Sep 14/15	CySI— Transformation Poster Introduction Online exercise #3: Restriction Mapping	Online exercise #2

Week of:			Assignment due:
	Sep 16/17	CySI—Screening & Selection Poster Workday	Quiz 4
5	Sep 21/22	CySI—Plasmid Isolation & Digestion	Preliminary Data Sheet Online exercises #3
	Sep 23/24	CySI—RFLP & Sequencing	Quiz 5
6	Sep 28/29	Poster & Review Workday Data Analysis	Final Data Sheet, bring rough drafts to work on
	Sep 30/ Oct 1	CYSI—Posters & Presentations	Posters & Presentations Poster peer review data sheets Quiz 6
7	Oct 5/6	Regulation & Proteins A	
	Oct 7/8	Regulation & Proteins B	Quiz 7
8	Oct 12/13	Regulation & Proteins C	
	Oct 14/15	Regulation & Proteins: Data Day	Quiz 8
9	Oct 19/20	Yeast— Part 1 Overview	Regulation & Protein Data Sheet
	Oct 21/22	Yeast—Part 2 Make Your Own Tools Plating Unknowns	Part 1 Data sheet Gene Information Database Entry

10	**Oct 26/27**	**Yeast—Part 2 Analyze Plates Set Up Colony PCR**	
	Oct 28/29	**Yeast—Part 2 Analysis of Colony PCR**	
11	**Nov 2/3**	**Yeast— Part 2 Experimental design**	**Part 2 Data sheet**
	Nov 4/5	**Yeast— Part 2 Facilitators**	**Part 3 Data sheet Discussion Points**
12	**Nov 9/10**	**Yeast— Part 3 Wet Lab 1**	
	Nov 11/12	**Yeast— Part 3 Planning next step Power pitch introduction**	**Database Entry**
13	**Nov 16/17**	**Yeast—Part 3 Wet Lab 2**	
	Nov 18/19	**Yeast— Part 3 Wet Lab 3**	**Quiz 9**
	Nov 23-27	**THANKSGIVING BREAK— NO LABS**	
14	**Nov 30/ Dec 1**	**Yeast— Part 4 Excel Data Processing**	
	Dec 2/3	**Yeast— Part 4 Data Analysis/ Power Pitch Work Day**	**Quiz 10**
15	**Dec 7/8**	**In Class power Pitch**	
	Dec 9/10	**Yeast Panel**	
16	**Dec 14-18**	**FINALS WEEK— NO LAB**	

Course Grading

Assignment	# of Points	# of Assignments	Total Points
Quizzes	**10**	**10**	**100**
PPP points	**50**	**1**	**50**
Data Worksheets	**20**	**2**	**40**
CYSI Module			**40**
-Online Exercises	**10**		**10**
-Preliminary Data	**10**		**10**
-Final Data	**10**		**20**
-Poster Presentation	**20**		**30**
-Group poster	**30**		**20**
-Poster peer evaluations	**20**		
		CySI Total	**130**
Yeast Module			
-Data Sheet 1	**5**		
-Data Sheet 2	**5**		
-Data Sheet 3	**5**		
-Facilitator Discussion	**5**		
-Google Doc Entry 1	**3**		
-Google Doc Entry 2	**2**		
-Google Doc Discussion	**5**		
-Peer Review	**5**		
-Power Pitch	**10**		
		Yeast Total	**45**
		Total	**365**

Quizzes

There are 10 quizzes on Blackboard. The quiz will cover any reading that is assigned for that week's tasks and background material in the lab manual as well

as from online lectures. Some quizzes may also cover material from previous weeks. We will drop one lowest scoring or missed online quiz

Each quiz consists of ten multiple-choice questions. Once you start a quiz, you will have **10 minutes** to complete it. Once you begin the quiz it cannot be stopped. They will be available for you to take from **Thursday 6:30 PM until Friday 8:00 PM.** The quiz schedule is indicated in your manual.

Data Worksheets

Each of the exercises require that you hand in the results of your experiments using a Data Worksheet which will be graded out of twenty points. Some of the data worksheets have extra credit points available.

PPP Points

Points from your TA based on:

- **Preparation** for the lab
- **Performance** in the lab
- **Participation** in the lab

Laboratory Policies

1. Attendance at **ALL** lab sessions & completion of **ALL** data sheets is required failure to do so will result in failure of class or grade.

2. If a student misses a laboratory session because of a serious illness or other emergency it can be made up **ONLY** if the lab instructor is notified **PRIOR** to the absence.

3. You MUST get a Make-up Lab Excuse slip from the instructor before going to another section.

4. Please contact the Dean of Students office and your advisor for official notification of absences from class due to family or health emergencies. **www.dso.iastate.edu** They will then contact the instructors directly for you.

5. If you miss your laboratory session or do not hand in an assignment you will have 30% taken off that assignment when handed in immediately. Then, the assignment will be graded.

6. If you contact the laboratory staff prior to missing to make arrangements,

there will not be a point deduction for missing lab.

Late Assignments
30% of the points will be deducted for each day the assignment is late.

Academic Dishonesty
The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. We strongly encourage students to work in small groups to discuss experimental protocols and results. In a few instances, the data obtained by each group will be shared with other groups. However, quizzes, data sheets, reports and posters **MUST** be an individual effort. We trust that any work you submit will be your own original effort and written in your OWN words. Ideas, data, words, and phrases taken from another source must be properly noted. Failure to do so results in plagiarism. See fore more details: http://www.dso.iastate.edu/ja/academic/ students.html

Disability Accommodation
Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Dead Week
This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook .

Harassment and Discrimination
Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation
If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information
If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

Safety

You must follow the following rules at all times.

1. There is NO SMOKING, EATING, OR DRINKING allowed in the laboratory room.

2. Gloves and safety glasses are provided when needed. Gloves should be worn when handling chloroform, ethidium bromide, and other toxics reagents. Safety glasses should be worn when using UV light or the electroporation apparatus. Closed toe shoes MUST be worn at all times.

3. Ethanol is extremely flammable. You will use 70% ethanol to wipe off your benches. Do not have any open flames while using ethanol.

4. Do not pipet any liquids, even water, by mouth. Use the pipetmen for small volumes and the disposable pipets with bulbs for larger volumes.

5. Know the locations of fire extinguishers, alarms, and other safety equipment. These will be point- ed out during the first laboratory period.

6. Do not enter the prep room (Rm 1247).

7. Clean up your lab benches before leaving each class period. Make sure that you discard used reagents, tubes, tips, and other supplies in the appropriately marked containers.

8. Wash your hands before leaving the laboratory.

9. Dispose of petri dishes and liquid cultures in labeled containers. Put all cultures of *E. coli* in orange autoclave bags so that they can be safely discarded.