

## Introduction to Genetic Analysis

MCB 3xxx

Spring 2014

**Instructor:** Dr. Ping Zhang, Room 328, Beach Hall, 486-5421, [ping.zhang@uconn.edu](mailto:ping.zhang@uconn.edu)  
Office Hours: Tu 1:30-2:30 PM and by appointment

**TAs:**

**Lab Supervisor** Dr. Gino Intrieri, [gino.intrieri@uconn.edu](mailto:gino.intrieri@uconn.edu)

**Text:** *Advanced Genetic Analysis*, P. Meneely, Oxford University Press, 2009

**Lab Manual:** *Concepts of Genetic Analysis-A Laboratory Manual* (2014),  
Intrieri and Zhang (Available at UCONN COOP)

**Additional course materials will be posted periodically on  
HuskyCT. Students are expected to check regularly.**

**Lecture:** Tuesday and Thursday 8:00 AM – 9:13 AM in BPB131

**Labs:** *All lab sections begin in week of January 27 in TLS 203*

**Course Aims** This course provides a broad understanding in genetic principles. It has a focus on genetic research with major model organisms. The course helps students develop a basic knowledge of theories, tools, and experimental applications of genetic research. It is intended for undergraduate students (juniors and seniors) who have taken introductory genetics and have a general understanding with biochemistry, molecular and cell biology.

**Mid-term** Exam I, Thursday February 20

**Exams:** Exam II, Tuesday, April 8

**Final Exam:** To be announced

Some questions may require quantitative answers, so you may bring a simple calculator to the exams.

|                |                  |     |
|----------------|------------------|-----|
| <b>Grades:</b> | Mid-term Exam I  | 25% |
|                | Mid-term Exam II | 25% |
|                | Final Exam       | 25% |
|                | Labs*            | 25% |

\* Policies on the lab grades, including quizzes and 10 lab reports are described in the lab manual and are detailed on HuskyCT.

**Problem Sets:** Problems sets are given during the laboratory sessions and are graded. Specific instructions of these problem sets are discussed in the laboratory.

## **LECTURE OUTLINE**

### **Unit 1**

#### **Genes and genomes**

|              |           |   |
|--------------|-----------|---|
| 1/21         | Chapter 1 | The logic of genetic analysis                                     |
| 1/23<br>1/27 | Chapter 2 | Model organisms and their genomes:<br>yeast, worm, fly, and mouse |

### **Unit 2**

#### **Genes and mutants**

|                    |               |  |
|--------------------|---------------|--|
| 1/29<br>2/4        | Chapter 3     | Identifying mutants  |
| 2/6<br>2/11        | Chapter 4     | Classifying mutants  |
| 2/13<br>2/18       | Chapter 5     | Connecting a phenotype to a DNA sequence                         |
| <b>2/20</b>        | <b>Exam I</b> |  |
| 2/25<br>2/27       | Chapter 6     | Finding mutant phenotypes for cloned genes<br>(reverse genetics) |
| 3/4<br>3/6<br>3/11 | Chapter 7     | Genome-wide mutant screens                                       |

### **Unit 3**

#### **Gene activity**

|      |           |   |
|------|-----------|---|
| 3/13 | Chapter 8 | Molecular analysis of gene expression: a review |
|------|-----------|---|

|                    |           |   |
|--------------------|-----------|---|
| 3/25               |           | on DNA-RNA-protein-gene function;<br>Southern/Northern/PCR/sequencing/Microarray... |
| 3/27<br>4/1<br>4/3 | Chapter 9 | Analysis of gene activity using mutants   |

|            |                |
|------------|----------------|
| <b>4/8</b> | <b>Exam II</b> |
|------------|----------------|

#### Unit 4

##### Gene interaction

|                      |            |                                 |
|----------------------|------------|---------------------------------|
| 4/10<br>4/15<br>4/17 | Chapter 10 | From one gene to more genes     |
| 4/22<br>4/24         | Chapter 11 | Epistasis and genetic pathways  |
| 4/29<br>5/1          | Chapter 12 | Pathways, networks, and systems |