Is it genetic?
BIOLOGY 321  GENETICS
MWF 11:30-12:50 am in BI212

Dr. Carol Trent
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Office Hours:
To Be Announced

If you need to see me outside of office hours, please contact me via email to set up a specific appointment time.
This class meets three days a week for 80 minutes.

• We will not have a formal break during the 80 minute session – so much genetics so little time……

• Typically, 50 minutes a week will be set aside for an informal discussion of the lecture material and the problem sets.

• These informal sessions may consist of one 50 minute session or two shorter sessions.
REQUIRED TEXT

The 10th edition of
Introduction to Genetic Analysis
by Anthony Griffiths et al.

The 9th edition is OK
BUT class discussions of text
assignments and problems will use the
numbering in the 10th edition
### Lecture Schedule

**Course Website**

http://fire.biol.wwu.edu/trent/trent/Biol321index.html

**The lecture schedule may change without prior notice**

| Week 1 | March 28 & 30 | Introduction to Biol 321  
Mendel & Model organisms; Probability |
|---|---|---|
| **Week 2** | April 2, 4 & 6 | Mendel & Meiosis  
Morgan & Sex-linkage; Intro to pedigrees  
**Fri April 6: QUIZ 1 (25 pts.)** |
| **Week 3** | April 9, 11 & 13 | Evolution of the Y chromosome  
Pedigrees and more probability  
Start complications to Mendelian analysis |
| **Week 4** | April 16, 18 & 20 | Factors affecting the expression of a genetic trait  
**Wed April 18: QUIZ 2 (45 pts.)**  
Additive gene action |
| **Week 5** | April 23, 25 & 27 | Gene Interactions:  
Complementation and genetic heterogeneity  
Epistasis & suppression |
| **Week 6** | April 30 & May 2 & 4 | Molecular genetics: DNA replication and gene structure  
**Wed May 2: Midterm Exam (100 pts.)**  
The molecular basis of mutation |
| **Week 7** | May 7, 9 & 11 | Mutagens & effects of mutation on gene function  
**Wed May 9: QUIZ 3 (25 pts. take-home quiz distributed)**  
Cancer genetics |
| **Week 8** | May 14, 16 & 18 | PCR & Direct detection of mutation  
**Wed May 16: QUIZ 3 due**  
Human Genome structure & DNA fingerprinting  
Genetic linkage and recombination |
| **Week 9** | May 21, 23 & 25 | The generation of a genetic map & Positional cloning  
Multifactorial inheritance and Complex traits  
**Fri May 25: QUIZ 4 (25 pts.)** |
| **Week 10** | May 30 & June 1 | Special topics: Genome-wide Association Studies  
Polymorphisms that confer resistance to HIV/AIDS |
| **Finals Week** | | **Final Exam 100 pts on Tues June 5 at 10:30 am** |
EVALUATION

Midterm and Final Exams: 2 @ 100 pts. ...... 200
Quizzes: 3 X 25 & 1 X 45 pts. .......... 120
Total Points: 320

⇒ Grading Correction = 5 pts (see explanation below)
⇒ Extra Credit Option = up to 8 pts (see explanation below)

AUTOMATIC GRADING CORRECTION

⇒ At the end of the quarter, 5 points will be automatically added to your point total to correct for grading inaccuracies. You will forfeit all 5 points if you request any quiz or exam regrades during the quarter.
⇒ NOTE: Inquiries or concerns about arithmetic errors in point totals or obvious mis-marks will NOT result in forfeiture of the correction points.
No points are allocated specifically for class participation.

BUT: if you have a borderline grade at the end of the quarter, and you attended lectures consistently, were an active class participant and your performance on quizzes and exams has steadily improved, I will “bump” you up to the higher grade.
FORMAL EXTRA CREDIT OPTION

https://spreadsheets.google.com/viewform?formkey=dFJtU3VoWF9MUHJHdDMtOFJ0ekNzTHc6MQ

• You have an opportunity each week to submit via an electronic form a synopsis of a major-media, legitimate science article concerning genetics. This genetics research discovery/story must have been published in the past 6 months in a scientific journal (such as Science or Nature) or a major newspaper.

• Each submission is worth two points. You can submit ONE and only ONE story in a given week – up to 4 submissions in four different weeks. A “week” is defined by Sunday 12:01AM through Saturday 12:00PM. [Total possible points = 8.]

• All submissions must be via the electronic form you will find at the link on the 321 web site. You must write the synopsis of the research discovery/story yourself; if you cut and paste text from the original source this will result in a loss of ALL extra credit. Plagiarism is astonishingly easy to check.

• You will receive a verification of your submission in the form of a dialog box once you click on submit

• Unless otherwise notified (within 1 week of submission), this verification indicates that 2 extra credit points will be added to your total grade.
Goal of this course

to stuff your brain with genetical knowledge
Goals of this course

(i) To develop your analytical skills via problem solving and data analysis

(ii) To introduce you to the science underlying modern genetics (yes, you must learn some facts…)

(iii) To help you become sophisticated and critical consumers of scientific information in general and genetic information in specific.
Goal: To develop your analytical skills via problem solving and data analysis

Over the course of the quarter you will receive several reading and problem assignments
READING ASSIGNMENTS AND PROBLEM SETS

- Each week or so a reading and problem set assignment will be posted on the course web site.
- The problem assignments will be a combination of textbook problems and problems from old quizzes and exams.
- After reviewing lecture notes and reading through the assigned reading in the text, work through the assigned problems.
- **NOTE:** These are study problems to prepare you for quizzes and exams. You are not to hand in the answers.
- The answers to the problems will be available on the course web site, **BUT**, it is critical that you work through the problems yourself before checking the posted answers.
- We will review some of the assigned problems in the informal discussion sessions.
- These informal sessions will be most useful if come prepared to tell me what you are having problems with.
- So, ideally, before you come to the discussion, you have will have reviewed the lecture material and worked (or at least tried to work) most of the assigned problems -- so you know where the trouble spots are.
Assignment Set 1
http://fire.biol.wwu.edu/trent/trent/321AssignmentIndex.html

Also available online: Quizzes and midterm exam from previous quarters
http://fire.biol.wwu.edu/trent/trent/321S10QuizIndex.html
**Goal:** To help you become sophisticated and critical consumers of scientific information in general and genetic information in specific.

**Required Readings Assignments**

*Zebrafish researchers hook gene for human skin color*

*Science 310: 1754 Dec. 16, 2005*

*Model organism and an animal from your aquarium: the zebrafish Brachydanio rerio*

Human rainbow. *A newly discovered gene partly explains the light skin of Europeans, but not East Asians, as compared to Africans. [Lighter pigmented skin is thought to have evolved independently in Europeans and Asians.]*
This article reflects important themes that we will explore in this course:

- The value of studying model organisms
- The molecular basis of allelic variation and how it affects phenotype
- In complex traits, allelic variation in more than one gene underlies phenotypic variation
- Allele frequencies vary with the population under consideration
- The genetic control of many traits is not yet fully understood
- The complicated & confusing business of gene names

Genes are often named for the phenotype produced by a mutation in the gene:

- the golden mutation in zebrafish defined the golden gene
- the equivalent gene in humans, though, was named for the protein it specifies: SLC24A5 = solute carrier family 24, member 5.