

## SOCR 330 PRINCIPLES OF GENETICS FALL 2018

**PREREQUISITE:** one semester of college biology.

**COURSE GOALS** SOCR 330 will introduce you to genetics through general coverage of the three main branches of the subject: transmission genetics, molecular genetics, and population genetics. After completing this course you:

- a) Will have a good understanding of the basic principles of genetics
- b) Will appreciate the application of genetics to other disciplines and the role of genetics in everyday life.
- c) Will be well prepared for any more advanced genetics courses that you might take.

**WHAT I EXPECT BEFORE YOU START** I do not assume you have much previous knowledge of genetics. I do expect you to have basic knowledge of the following: enzyme structure and function, the idea of a metabolic pathway, prokaryote and eukaryote cell structure and function (including cell organelles), the DNA molecule, structure and functions of proteins, the species concept and simple plant and animal classification, evolutionary theory.

**PROFESSOR** Dr. Sarah Ward, Department of Soil and Crop Sciences.

**OFFICE** Plant Sciences C119. E-mail to [sarah.ward@colostate.edu](mailto:sarah.ward@colostate.edu) will get a response within 24 hours Monday through Friday. **PLEASE INCLUDE SOCR 330 IN THE SUBJECT LINE OF YOUR E-MAIL** (or your message will be dumped by my spam filter). Please call my office phone ONLY if it's really urgent (491-2102).

**OFFICE HOURS** See Canvas for my office hours.

**COURSE TUTOR** Nicole Lathrop is the SOCR 330 course tutor for Fall 2018. See Canvas for her contact information and office hours.

**CLASS MEETS** 10 – 10.50 a.m. MWF Clark A102. I post topics that will be covered each class session in the Canvas calendar.

**TEXTBOOK** Essentials of Genetics 9e (Klug and Cummings 2015) is **recommended but not required**. There is an older 2012 edition (8e) that is less current in areas such as epigenetics, but it does include some topics not in the newer 9e (e.g. conservation genetics). You can choose which edition you want to pay for. I will post readings for both editions, but 8e is adequate for this class (and much cheaper if you buy used on Amazon!) Don't get a text older than 8e - it will be out of date.

**GRADING** Grades will be based on a cumulative total of 300 points from 3 exams @ 100 points each. There is no curve.

### GRADE CALCULATION

270 points and above (90%) = A  
240 to 269 points (80%) = B  
210 to 239 points (70%) = C  
180 to 209 points (60%) = D  
179 points or less = F

**EXTRA CREDIT ASSIGNMENTS** Optional extra credit assignments will be available on Canvas. The extra points earned are weighted the same as exam points – they will be added to your cumulative total and count towards your final grade. Assignments **MUST** be turned in by the due date to receive extra credit.

**EXAMS** Exam dates are in the Course Outline and posted on the course calendar. The 3 in-class exams are **NOT** cumulative - each exam will deal only with the material covered since the previous exam. The Final Exam **IS** cumulative and will cover material from the entire course. **YOU TAKE ONLY 3 EXAMS**, so if you take all 3 in-class exams you do **NOT** take the final. If you decide not to take one of the in-class exams you can take the final to make up the missing exam grade but **you may not take the final to replace the grade from an exam previously taken**. All exams - including the final - are weighted equally (100 points each).

**MAKE-UP EXAMINATIONS WILL ONLY BE GIVEN FOR THE FOLLOWING:**

- a) Incapacitating illness (with official written notification from a medical professional).
- b) Official university activity (for which I require a letter from the faculty member in charge certifying your involvement **at least one week prior to your absence**).

***I WILL NOT ALLOW ANYONE TO TAKE AN EXAM EARLY, OR PROVIDE MAKEUP EXAMS TO ACCOMMODATE YOUR TRAVEL PLANS, YOUR EXAM SCHEDULES FOR OTHER CLASSES ETC. ETC. SO PLEASE DO NOT ASK.***

**PREVIOUS EXAMS** My Fall 2017 exams for SOCR 330 (with answer keys) are available on Canvas as a review aid. I also post checklists of review topics for each exam - use them!

**RETURN OF GRADED PAPERS** Graded exams and extra credit assignments will be returned to you in class and answer keys posted on Canvas. If you have a query concerning grading check the answer key **FIRST**. If you are still unsure how a question was graded, write your query on the back of the exam or assignment and give it to me **WITHIN 7 DAYS** of the date the graded paper was returned to you.

**SPECIAL ACCOMMODATIONS** If you have been diagnosed with a disability of any kind that might require special accommodation - including the use of alternate testing facilities – please see me as early as possible in the semester so we can discuss your needs. I cannot accommodate requests for alternate testing until you do this.

**LECTURE OUTLINES** will be posted on Canvas for you to download and bring to class as a foundation for your own notes. If you do not bring these outlines to class you will find it hard to keep up. Full-color lecture materials will be posted as we complete each topic, but **BE AWARE THAT THESE POWERPOINT FILES ARE NOT A COMPLETE SET OF NOTES**. ***You need to attend class and take your own notes as well.***

**CLASS ETIQUETTE** If you come to class, I expect you to behave in a way that does not distract me or your fellow students (who – like you - have paid tuition to be here). This means that you do not read the newspaper, talk, text, interrupt the lecture with your cell phone etc. If you are obnoxious I will require you to leave. Laptop use during class is permitted **ONLY** if you are taking notes. If you need to make an audio recording of the lecture please ask me first. No unauthorized video recording by any student is allowed in

CSU classrooms.

**CODE OF CONDUCT** This course will adhere to the CSU Academic Integrity Policy and Student Code of Conduct, which states:

***Any student found to have committed or to have attempted to commit the following misconduct is subject to disciplinary sanction.***

***1. Academic misconduct including but not limited to: cheating, plagiarism, unauthorized possession or disposition of academic materials, falsification, or facilitation of acts of misconduct. Plagiarism includes the copying of language, structure, images, ideas, or thoughts of others and is related only to work submitted for credit.***

The complete Code of Conduct can be found at

<http://www.conflictresolution.colostate.edu/conduct-code.aspx#conduct>.

### **SOCR 330 FALL 2018 - COURSE OUTLINE**

Unit 1: What is genetics and how did it become a science? Karyotypes, cell division and how Sutton and Boveri connected Mendel's particles with chromosomes

Unit 2: Phenotypes and genotypes: Mendelian monohybrid and dihybrid crosses and testcrosses

Unit 3: How to tell when Mendel's rules don't apply: simple probability and chi-square

Unit 4: When genes disobey Mendel Part 1: linkage, crossing-over and gene mapping

Unit 5: When genes disobey Mendel Part 2: variable penetrance and expressivity, lethal alleles, pleiotropy and codominance

Unit 6: When genes disobey Mendel Part 3: sex-linked and sex-influenced traits, multiple alleles and epistasis

Unit 7: Genetics gets even weirder: cytoplasmic inheritance, genomic imprinting and epigenetics

Unit 8: When multiple genes control a trait: quantitative inheritance and heritability

Unit 9: DNA as the genetic molecule: its structure and chemistry; packing DNA into the cell; DNA replication; DNA sequencing and analysis. What is in a genome?

Unit 10: Genes and the genetic code: how to identify a gene and read its message. Why and how genes (mostly) code for proteins

Unit 11: Transcription: copying the gene to mRNA

Unit 12: Translation: using mRNA to lay the foundations of a protein

Unit 13: Turning genes on and off in prokaryotes: the lac operon

Unit 14: Turning genes and off in eukaryotes: gene regulation

Unit 15: Genetics of a group: alleles in gene pools and how the Hardy-Weinberg formula connects them to populations

Unit 16: Why real populations disobey Hardy-Weinberg: inbreeding, mutation, selection, migration, drift

Unit 17: Genetic diversity in populations and why it matters: conservation genetics

Unit 18: Altering the DNA sequence: mutations and DNA repair, gene editing. DNA that jumps: transposons

Unit 19: Megamutations aka chromosomal change: polyploidy, aneuploidy, deletions, duplications, translocations

Unit 20: Genes and cancer: how altering DNA can make cells behave badly

**EXAM 1: WEDNESDAY SEPTEMBER 19**

**EXAM 2: WEDNESDAY OCTOBER 24**

**EXAM 3: FRIDAY DECEMBER 7**

**CUMULATIVE FINAL (*only for students who have not taken 3 in-class exams*) TUESDAY DECEMBER 11 11.50 a.m. - 1.50 p.m.**