



North Central State College
MASTER SYLLABUS
2019-2020

- A. Academic Division: Health Sciences
- B. Discipline: Bioscience Technology
- C. Course Number and Title: BIOS 2530 Genetics
- D. Course Coordinator: Jason Tucker, M.S.
Assistant Dean: Melinda Roepke, MSN, RN

Instructor Information:

- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address: Click here to enter text.

- E. Credit Hours: 4
Lecture: 3
Laboratory: 3
- F. Prerequisites: BIOS 2410
Co-requisite: BIOS2590c
- G. Syllabus Effective Date: Fall, 2019
- H. Textbook(s) Title:

Essentials of Genetics

- Authors: Klug, Cummings, Spencer, Palladino, & Killian
- Copyright Year: 2020
- Edition: 10th
- ISBN: 9780134898414

- I. Workbook(s) and/or Lab Manual:

Title: Genetics Laboratory Investigations

- Authors: Thomas L Mertens, Robert L. Hammersmith
- Copyright Year: 2015
- Edition: 14th
- ISBN: 9780321814173

- J. Course Description: During this course we will discuss the principles of genetics with application to the study of biological function at the level of molecules, cells, and multicellular organisms, including humans. The topics include: structure and function of genes, chromosomes and genomes, biological variation resulting from recombination, mutation, and selection, population genetics, use of genetic methods to analyze protein function, gene regulation and inherited disease.

K. College-Wide Learning Outcomes:

| College-Wide Learning Outcome | Assessments - - How it is met & When it is met |
|--|--|
| Communication – Written | |
| Communication – Speech | |
| Intercultural Knowledge and Competence | |
| Critical Thinking | Homework assignments and Lab reports require assimilating data and drawing conclusions-Weekly. Critical Thinking VALUE Rubric: On Gene Expression, Regulation, and Development Lab Report (Week 6-9) |
| Information Literacy | |
| Quantitative Literacy | Lab reports require simple statistics, and graphing Throughout the semester. Quantitative Literacy VALUE Rubric |

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

| Outcomes | Assessments – How it is met & When it is met |
|---|---|
| 1. Describe and differentiate between the steps of Mitosis and Meiosis. | Lab Reports-Week 1-2; First interim exam-Week 6; Final exam |
| 2. Describe sex determination and the role of sex chromosomes. | Lab Report-Week 3; First interim exam-Week 6; Final exam |
| 3. Synthesize the structure, replication and variation of DNA. | Lab Reports-Week 4-5; First interim exam-Week 6; Final exam |
| 4. Describe gene expression, regulation and development. | Lab reports week 6-9; Second interim exam-week 12; Final exam |
| 5. Illustrate the role of the cell cycle as it applies to cancer. | Second interim exam-week 12; Final exam |
| 6. Demonstrate how recombinant DNA technology can be used to study current genetic topics. | Lab reports week 10-12; Second interim exam-week 12; Final exam |
| 7. Integrate and relate knowledge of modern genetics to real life situations | Lab reports week 13-15; Final exam |
| 8. Apply current research literature, information related to genetic issues in the mass media | Research paper on topics related to materials covered in class-Week10-12. |

M. Topical Timeline (Subject to Change):

| Week | Topical Timeline |
|------------|--|
| 1, 2 and 3 | <p>Genes, Chromosomes, and Heredity</p> <ul style="list-style-type: none"> • Introduction to Genetics • Mitosis and Meiosis • Mendelian Genetics • Sex Determination and Sex Chromosomes • Chromosome Mutations: Variation in Number and Arrangement |

| Week | Topical Timeline |
|---------------|---|
| 4 and 5 | DNA: Structure, Replication, and Variation <ul style="list-style-type: none"> • DNA Structure and Analysis • DNA Replication and Recombination • DNA Organization in Chromosomes |
| 6, 7, 8 and 9 | Gene Expression, Regulation, and Development <ul style="list-style-type: none"> • The Genetic Code and Transcription, Translation and Proteins • Gene Mutation, DNA Repair, and Transposition • Developmental Genetics • Cancer and Regulation of the Cell Cycle |
| 10, 11 and 12 | Genomics <ul style="list-style-type: none"> • Recombinant DNA Technology • Genomics, Bioinformatics, and Proteomics • Applications and Ethics of Genetic Engineering and Biotechnology • Population and Evolutionary Genetics |
| 13, 14 and 15 | Special Topics in Modern Genetics <ul style="list-style-type: none"> • Population and Evolutionary Genetics • Epigenetics • DNA Forensics • Genomics and Personalized Medicine • Genetically Modified Foods • Gene Therapy |

Lab (Will correspond roughly to Lecture Material Presentation Time Schedule)

1. Cell Reproduction: Mitosis.
2. Meiosis in Animals: Oogenesis and Spermatogenesis.
3. Sex Chromosomes and Gene Transmission.
4. The Sex Check: A Study of Sex Chromatin in Human Cells.
5. Linkage and Crossing Over.
6. The Genetic Material: Isolation of DNA.
7. Restriction Endonuclease Digestion and Gel Electrophoresis of DNA.
8. Amplification of DNA Polymorphisms by Polymerase Chain Reaction (PCR) and DNA Fingerprinting.
9. Transformation of *E. coli*.
10. Gene Action: Synthesis of Galactosidase in *Escherichia coli*.
11. Bacterial Mutagenesis.
12. Gene Recombination in Phage.
13. Polygenic Inheritance: Fingerprint Ridge Count.
14. Population Genetics: The Hardy-Weinberg Principle.
15. Population Genetics: The Effects of Selection and Genetic Drift.

N. Course Assignments:

Research Paper (Week 10-12)
 Lab Reports (Weekly)
 Interim exams (Week 6 and 12)
 Final Exam (Week 16)

O. Recommended Grading Scale:

| NUMERIC | GRADE | POINTS | DEFINITION |
|---------|-------|--------|---------------|
| 93–100 | A | 4.00 | Superior |
| 90–92 | A- | 3.67 | Superior |
| 87–89 | B+ | 3.33 | Above Average |
| 83–86 | B | 3.00 | Above Average |
| 80–82 | B- | 2.67 | Above Average |
| 77–79 | C+ | 2.33 | Average |
| 73–76 | C | 2.00 | Average |
| 70–72 | C- | 1.67 | Below Average |
| 67–69 | D+ | 1.33 | Below Average |
| 63–66 | D | 1.00 | Below Average |
| 60–62 | D- | 0.67 | Poor |
| 00–59 | F | 0.00 | Failure |

P. Grading and Testing Guidelines:

Click here to enter text.

Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

Click here to enter text.

S. Classroom Expectations:

Click here to enter text.

T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the [syllabus supplement](#) located at <https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf>

The information can also be found Choose an item.