

PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
DEGREE CREDIT COURSE

 x Transfer course x A.A. degree applicable course
(check all that apply)

COURSE NUMBER AND TITLE: Biology 200 Foundations of Biology I

UNIT VALUE: 5 units

MINIMUM NUMBER OF SEMESTER HOURS: 144 hours

BASIC SKILLS REQUIREMENTS: Appropriate language and computational skills

ENTRANCE REQUIREMENTS

PREREQUISITE: Completion of, or concurrent enrollment in, Chemistry 110

COREQUISITE: None

RECOMMENDED PREPARATION: None

SCOPE OF COURSE:

Molecular and cellular biology. Transmission, molecular, and population genetics. Aspects of reproduction of prokaryotes and eukaryotes. Principles of evolution and systematics. Recommended for biology majors.

SPECIFIC COURSE OBJECTIVES:

Upon completion of this course, the successful student will:

1. exercise proper safety in all laboratory situations;
2. properly use laboratory equipment including the compound microscope and the spectrophotometer;
3. be able to explain the fundamental concepts of cell biology, genetics, reproduction evolution, and systematics
4. *successfully complete an independent research project and present the outcome in a formal scientific paper and orally in a seminar;*
5. participate in out of class activities designed to foster professionalism including attending professional meetings and analyzing research publications.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

I. Introduction

- A. Course Overview
- B. Major Themes in Biology
- C. The Process of Science

II. Cell Biology I

- A. Chemistry for Biology Learning Modules
 1. Overview of Chemistry for Biology
 2. Atoms and Radiation
 3. Chemical Bonding
 4. Carbohydrates and Lipids
 5. Nucleic Proteins and Acids
- B. Cell Structure and Function
 1. Prokaryotic Cells and Eukaryotic Cells
 2. Nucleus
 3. Chromosome
 4. Nucleolus
 5. Ribosome
 6. Endoplasmic Reticulum
 7. Golgi Body
 8. Secretory Vesicle
 9. Lysosome
 10. Microbody
 11. Vacuole
 12. Mitochondrion
 13. Plastid
 14. Cytoskeleton, Centriole, and Cilium/Flagellum
- C. Membrane Transport
 1. Membrane Structure and Function
 2. Dialysis
 3. Osmosis
 4. Facilitated Diffusion
 5. Active Transport
 6. Endocytosis and Exocytosis

III. Cell Biology II

- A. Introduction to Metabolism
 1. Enzymes
 2. Energy Relationship
 3. A close look at metabolism
 4. The Structure and Synthesis of ATP
- B. Cellular Respiration
 1. Overview of Cellular Respiration
 2. Glycolysis and Fermentation
 3. Pyruvic Acid Oxidation
 4. Krebs (Citric Acid) Cycle
 5. Electron Transport Chain
 6. Relationships Between Catabolism and Anabolism

- C. Photosynthesis
 - 1. Overview of Photosynthesis
 - 2. Light-Dependent Reactions
 - 3. Light-Independent Reactions
 - 4. Photorespiration
 - 5. C₃ Plants, C₄ Plants, and CAM Plants

IV. Genetics I

- A. Cell Reproduction
 - 1. Bacterial Reproduction (Binary Fission)
 - 2. Eukaryotic Chromosomes
 - 3. Mitosis
 - 4. Comparison of Mitosis and Meiosis
 - 5. Gametogenesis, Sporogenesis, and Life cycle patterns
- B. Mendel and Genetic Crosses
 - 1. Gregor Mendel
 - 2. Genetic Terminology
 - 3. Genetic crosses
 - 4. Probability and Statistics
 - 5. Pedigree analysis
- C. Variations in Gene Expression
 - 1. Degree of dominance
 - 2. Multiple Alleles
 - 3. Polygenic Inheritance
 - 4. Pleiotropy
 - 5. Epistasis
 - 6. Penetrance and Expressivity
- D. Linkage and chromosome mapping
- E. Sex and Inheritance
 - 1. Methods of Sex Determination
 - 2. Sex Differentiation in Humans
 - 3. Sex-Linked Inheritance
 - 4. Sex-Influenced Traits and Sex-Limited Traits
- F. Chromosome Abnormalities
 - 1. Abnormal chromosome structure
 - 2. Abnormal chromosome number

V. Genetics II

- A. The Structure of Nucleic Acids
 - 1. The Central Dogma
 - 2. Comparison of DNA and RNA
- B. DNA Replication
 - 1. Semiconservative Replication
 - 2. Origins of Replication
 - 3. Priming
 - 4. Continuous and Discontinuous Replication
- C. Gene Expression: Transcription and Translation
 - 1. Transcription: RNA Synthesis
 - 2. RNA Processing
 - 3. Translation: Polypeptide Synthesis
 - 4. Gene Mutations and DNA Repair

- D. Control of Gene Expression
 - 1. Control of Gene Expression in Prokaryotes
 - 2. Control of Gene Expression in Eukaryotes
- E. Bacterial and Viral Genetics
 - 1. Bacterial Transformation
 - 2. Bacterial Conjugation
 - 3. Viruses and Transduction
- F. Recombinant DNA Technology
 - 1. Techniques
 - 2. Applications
- VI. Evolution and Systematics
 - A. Lamarckism, Darwinism and the Modern synthesis
 - B. The Genetic makeup of a population and agents that change it
 - C. Speciation
 - D. Classification
 - E. Evidence used to infer phylogeny
 - F. The origin of Life

REQUIRED READING:

Purves, W.K., G. H. Orians, H.C. Heller, D. Sandava. Life, The Science of Biology, 5th ed., New York, NY: W.H. Freeman and Company. 1998.

Helms, D.R., C.W. Helms, R.J. Kosinski, J.R. Cummings. Biology in the Laboratory, 3rd ed., New York, NY: W.H. Freeman and Company. 1998.

SUGGESTED READING:

Selected journal articles identified by the instructor as they appear in periodicals like Scientific American, Nature, and Science.

REQUIRED WRITING:

A laboratory writing is required for each laboratory. Each major exam includes a written component consisting of a number of questions designed to capsule and integrate the most important concepts studied. Other writing assignments may include short essays on specific topics and a scientific research paper.

OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

Completing laboratory write-ups, preparing for laboratory quizzes, solving genetics problems, completing an individual research project and scientific paper, textbook readings and other assignments.

INSTRUCTIONAL METHODOLOGY:

Lectures, laboratory investigations, handouts, videocassettes, 16mm and 8mm films, 35mm slides, models, overhead transparencies and demonstrations.

Check all that apply:

- lecture
- laboratory
- lecture-laboratory combination
- directed study

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes _____ No x

If yes, check all that apply.

- _____ Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- _____ Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- _____ Two-Way Video Conferencing (Two-way interactive video and audio)
- _____ One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- _____ Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

GRADING POLICY AND STANDARDS (include methods of determining whether the stated objectives have been met by students):

Suggested emphasis based on points earned:

60% lecture exams and assignments
 40% laboratory quizzes and assignments

 100%

IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes ___ No x Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

CONTACT PERSON: Daniel Sourbeer, x 2775

SIGNATURES:

SIGNATURES ON FILE

October 6, 2000
\\NEW-Bio200.course outline of record-10.6.00
9/00