

### Course Outline

**COURSE:** BIO 4                      **DIVISION:** 10                      **ALSO LISTED AS:**

**TERM EFFECTIVE:** Spring 2016                      **CURRICULUM APPROVAL DATE:** 09/28/2015

**SHORT TITLE:** GEN ZOOLOGY L/L

**LONG TITLE:** General Zoology

<u>Units</u>	<u>Number of Weeks</u>	<u>Type</u>	<u>Contact Hours/Week</u>	<u>Total Contact Hours</u>
4	18	Lecture:	3	54
		Lab:	3	54
		Other:	0	0
		Total:	6	108

**COURSE DESCRIPTION:**

General Zoology is designed for students exploring a career and majoring in Biology. This course uses the animal model to introduce the principles of evolutionary biology. Zoology explores animal diversity and considers the selection pressures of nature that direct animal form and function. Topics include mechanisms of evolution, animal life cycles, embryological development, comparative morphology and physiology, taxonomy and systematics, molecular and morphological phylogeny, ecological principles, organismal behavior and its place in the natural world. **PREREQUISITE:** Mathematics 240 with a grade of 'C' or better. **ADVISORY:** Chemistry 1A, Biology 1 and eligible for English 250 and English 260.

**PREREQUISITES:**

- Completion of MATH 233, as UG, with a grade of C or better.
- OR
- Completion of MATH 233B, as UG, with a grade of C or better.
- OR
- Completion of MATH 235, as UG, with a grade of C or better.
- OR
- Completion of MATH 240, as UG, with a grade of C or better.
- OR
- Completion of MATH 242, as UG, with a grade of C or better.
- OR
- Completion of MATH 3, as UG, with a grade of C or better.
- OR
- Completion of MATH 5, as UG, with a grade of C or better.
- OR
- Completion of MATH 6, as UG, with a grade of C or better.
- OR

Completion of MATH 12, as UG, with a grade of C or better.

OR

Completion of MATH 14, as UG, with a grade of C or better.

OR

Completion of MATH 8A, as UG, with a grade of C or better.

OR

Completion of MATH 8B, as UG, with a grade of C or better.

OR

Completion of MATH 1A, as UG, with a grade of C or better.

OR

Completion of MATH 1B, as UG, with a grade of C or better.

OR

Completion of MATH 1C, as UG, with a grade of C or better.

OR

Score of 33 on Intermediate Algebra

OR

Score of 13 on Pre-Calculus

OR

Score of 2600 on Accuplacer Math

**COREQUISITES:**

CREDIT STATUS: D - Credit - Degree Applicable

**GRADING MODES**

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

**SCHEDULE TYPES:**

02 - Lecture and/or discussion

03 - Lecture/Laboratory

04 - Laboratory/Studio/Activity

**STUDENT LEARNING OUTCOMES:**

1. Identify characteristics of major animal taxa and their phylogenetic relationships.

Measure: assignments, quiz, exams, discussion

PLO: 3,4,5,6

ILO: 3,7

GE-LO: B2

Year assessed or anticipated year of assessment: 2012-2013

2. Identify and describe the diversity of animal structures and relate them to their functions.

Measure: assignments, quiz, exams, discussion, report

PLO: 3,4,5,6

ILO: 3,7,1

GE-LO: B1, B6

Year assessed or anticipated year of assessment:

3. Compare and contrast the differences in animal development and life cycles across the animal phyla.

Measure: assignments, quiz, exams, discussion, report

PLO: 3,4,5,6

ILO: 1,3,7

GE-LO: B1,B6

Year assessed or anticipated year of assessment: 2012-2013

4. Describe mechanisms of evolutionary change including speciation.

Measure: assignments, quiz, exams, discussion, report

PLO: 3,4,5,6

ILO: 3,7,1

GE-LO: B1, B6

Year assessed or anticipated year of assessment:

5. Discuss the importance of habitat and sustainable ecology.

Measure: assignments, quiz, exams, discussion, presentation, report

PLO: 2,3,5

ILO: 7,3,6,1

GE-LO: B5,B9

Year assessed or anticipated year of assessment:

6. Apply scientific methodology and reasoning through active experimentation and experiences.

Measure: assignments, quiz, exams, discussion, report

PLO: 1,2,3,7

ILO: 2,3,7

GE-LO: B3, B4, B5, B6, B7, B8

Year assessed or anticipated year of assessment:

7. Develop basic laboratory and dissection skills.

Measure: assignments, quiz, lab report

PLO: 7

ILO: 3,6

GE-LO: B4, B8

Year assessed or anticipated year of assessment: 2012-2013

#### PROGRAM LEARNING OUTCOMES:

Is this course part of a program (degree or certificate)? If yes, copy and paste the appropriate Program Learning Outcomes and number them. Enter the PLOs by number in the Student Learning Outcomes below.

1. Use raw experimental data to conduct statistical analysis, and present conclusions in a graphical and narrative form.
2. Find, select and evaluate various types of scientific information including primary research articles, mass media sources and world-wide web information.
3. Effectively communicate scientific concepts in both written and oral formats.
4. Identify the evolutionary processes that lead to adaptation and biological diversity.
5. Describe the relationship between life forms and their environment and ecosystems.

6. Explain the basic structures and fundamental processes of life at molecular, cellular and organismal levels.

7. Demonstrate the correct operating procedures in the use of common lab equipment such as compound microscopes, spectrophotometer, pH meter, electrophoresis gel apparatus, micropipettes, and centrifuges.

## **CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS**

Curriculum Approval Date: 09/28/2015

### **WEEK 1**

3 lec

#### **CONTENT**

- Introduction, properties of life, macromolecules in organisms, origins of life, theories

**STUDENT PERFORMANCE-** the student will be able to:

- Describe the properties of life
- Define natural selection
- List the 4 types of macromolecules in organisms and give examples
- Describe the origins of life, and the first organisms on earth
- Define prokaryotic and eukaryotic organisms, and compare the two
- Define the cell theory, and the evolutionary theory
- Explain the essential elements of life, major hypotheses for life's history, mechanisms for the diversification of life, and macroevolution.
- Explain fundamental prokaryotic replication, metabolism, and cellular structure in relationship to evolution of diversity.

3 lab

#### **HOMEWORK:**

- read properties of life, natural selection, take quiz on cell properties and the molecules of life study lecture notes

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**CONTENT**

-lab safety and emergency procedures

**STUDENT PERFORMANCE-** the student will be able to:

- Describe safety procedures in the lab

### **2 WEEK**

3 lec

#### **CONTENT:**

- cell structure and function, eukaryotic and prokaryotic cells, cell cycle, mitosis, meiosis, life cycles, homeostasis and mechanisms of evolution

- Describe the three general types of life cycle- zygotic, gametic and sporic
- Describe how organisms maintain homeostasis: water and ion balance, gas exchange, energy and nutrient acquisition, temperature regulation.
- Describe mechanisms of evolutionary change including micro-evolutionary forces that determine patterns of genetic diversity within species.

**STUDENT PERFORMANCE-** the student will be able to:

- Characterize cell structure and function in eukaryotes
- Identify eukaryotic organelles and list their functions
- Describe how cells divide, identifying and describing the stages of the eukaryotic cell cycle
- Describe meiosis, listing the various stages-
- Describe the different types of life cycles

- Describe examples of homeostasis
- Describe the mechanisms of evolutionary change

HOMEWORK:

- read cell structure and function of eukaryotes, read cell cycle, mitosis and meiosis
- provide evidence for evolution

3 lab -----

CONTENT

- microscopes

STUDENT PERFORMANCE- the student will be able to

- Demonstrate the correct handling and usage of a compound microscope and dissecting microscope
- Identify the various structures and organelles of the eukaryotic cell as seen through the microscope
- Complete lab report

WEEK 3

3 lec

CONTENT:

- classification and phylogeny

STUDENT PERFORMANCE- the student will be able to:

- Define systematics and taxonomy
- Describe the role Carolus Linnaeus had in the classification system
- Identify the different taxa in modern systematics
- Define the term species
- Describe how to construct an evolutionary tree
- Describe how cladograms are used in the classification system, listing and describing the different types of cladograms
- List and describe the 3 domains of life and the major kingdoms

HOMEWORK:

- read systematics, taxonomy and construct an evolutionary tree and study lecture notes

3 lab -----

CONTENT:

- Evaluate the ecological relationships of organisms at the population, community, and ecosystem level.

STUDENT PERFORMANCE- the student will be able to:

- Describe the ecological relationships of organisms at the population, community, and ecosystem level.
- Complete lab report

WEEK 4

3 lec

CONTENT:

- protozoans

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution
- Describe the characteristics of the protozoan
- Give examples of species that are protozoans
  - Describe the different ways in which protozoa reproduce
  - Describe three different types of symbiotic relationships
  - Describe the ecology

HOMEWORK

- read Ch. 11 and study lecture notes

3 lab -----

## CONTENT

- protozoans

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of various protozoans

- Complete lab report

## WEEK 5

3 lec

### CONTENT:

- Phyla Placozoa, Mesozoa, and Porifera

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe the meaning of the term metazoan, and list the three categories of metazoans
- List the different phyla that belong to the three different categories of metazoans
- Describe features of the Phylum Placozoa
- Describe features of the Phylum Mesozoa
- Describe features of the Phylum Porifera
- Describe the structures possessed by organisms of Phylum Porifera, and name their function
- List the types of canal systems of Phylum Porifera
- Describe the feeding habits of Phylum Porifera
- Describe the ecology

### HOMEWORK:

- read Phylum Porifera and study lecture notes

3 lab -----

### CONTENT:

- Phylum Porifera

STUDENT PERFORMANCE- the student will be able to:

- List and describe the functions of various structures of organisms in Phylum Porifera
- Perform dissection
- Complete lab report

## WEEK 6

3 lec

### CONTENT:

- Radiate animals

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe characteristics of the Phylum Cnidaria
- Define radial symmetry
- Describe what is meant by the term diploblastic
- Describe how Cnidaria capture and digest food
- Describe the functions of structures found in Phylum Cnidaria
- List the different classes of Cnidaria, and list features of each class
- Describe the ecology

- exam

#### HOMEWORK:

- Read Phylum Cnidaria and study lecture notes

3 lab -----

#### CONTENT:

- Phylum Cnidaria

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of various organisms in Phylum Cnidaria
- Perform dissection
- Complete lab report

#### WEEK 7

3 lec

#### CONTENT:

- diploblastic organisms and the platyhelminths

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Define the term "acoelomate, bilateral animals and describe features of such animals
- List the phyla that are acoelomate, bilateral animals
- Describe the term diploblastic
- Describe the process of nutrition and digestion that occurs in platyhelminths
- Describe the organ systems present and absent in platyhelminths
- Describe the different classes of platyhelminths and compare to phyla covered to date
- Describe the ecology

#### HOMEWORK:

- read Acoelomates, Phylum Platyhelminths, study lecture notes

3 lab -----

#### CONTENT:

- Phylum Platyhelminthes

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of various organisms in Phylum Platyhelminthes
- Perform dissection
- Complete lab report

#### WEEK 8

3 lec

#### CONTENT:

- Phylum Nematoda

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe characteristics of pseudocoelomate animals
- name the phyla that are pseudocoelomates
- Describe characteristics of, and structures found in Phylum Nematoda and Rotifera
- Describe the ecology

- quiz

HOMEWORK:

- read pseudocoelomates and phylum Nematoda and study lecture notes

3 lab -----

CONTENT:

- Phylum Nematoda

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of various organisms in Phylum Nematoda
- Perform dissection
- Complete lab report

WEEK 9

3 lec

CONTENT

-Phylum Mollusca

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe characteristics of molluscs
- Describe the structures of molluscs and list their functions
- Describe the different classes of molluscs
- List specific organisms that belong to the different classes of molluscs
- Describe the ecology

HOMEWORK:

- Read Phylum Molluscs , study lecture notes

3 lab -----

CONTENT

- lab practicum exam

STUDENT PERFORMANCE

- the student will write a Lab Practicum exam

WEEK 10

3 lec

CONTENT:

- Phylum Annelida

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- List features common to annelids, and compare to that of the previously described phyla
- Describe the different organ systems present and absent in annelids
- Describe the different classes of annelids
- Describe the ecology
- exam

HOMEWORK

- Read Phyla Annelids, study lecture notes

3 lab -----

CONTENT

- Phylum Annelida

STUDENT PERFORMANCE- the student will be able to:



- List and describe the structures and their functions of various organisms in Phylum Annelida
- Perform dissection
- Complete lab report

#### WEEK 11

3 lec

#### CONTENT:

- Subphylum Chelicerata, aquatic mandibulates

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe general features of arthropods
- List the different classes of arthropods and describe their difference
- Describe Subphylum Chelicerata, listing different structures found in these types of animals, and name the function of the structures
- Describe the aquatic mandibulates
- Describe specific organisms that are aquatic mandibulates
- Describe the ecology

#### HOMEWORK:

- Read Subphylum Chelicerata, study lecture notes

3 lab -----

#### CONTENT:

- Phylum Mollusca

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of Phylum Mollusca
- Perform dissection
- Complete lab report

#### WEEK 12

3 lec

#### CONTENT:

- Subphylum Uniramia

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe features of the terrestrial mandibulates
- Describe organisms that belong to the different classes of Subphylum Uniramia, naming their features and describing their function. Describe the different organ systems that are present, and list those that are absent
- Compare features of Uniramians to that of previously described phyla
- Name beneficial and harmful insects and elaborate on their effects on the lives of humans
- Describe the ecology
- quiz

#### HOMEWORK:

- Read Phylum Uniramians, study lecture notes

3 lab -----

#### CONTENT:

- Phylum Arthropoda

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of Phylum Arthropoda

- Perform dissection

- Complete lab report

WEEK 13

3 lec

CONTENT

- Phylum Echinodermata

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.

- Describe features of the Phylum Echinodermata

- Describe the different classes of echinoderms, and compare them

- Give examples of organisms that belong to each class

- Describe the different organ systems that are present in echinoderms, and list those that are absent

- Describe the ecology

HOMEWORK:

- read Phylum Echinodermata, study lecture notes

3 lab -----

CONTENT

- Phylum Echinodermata

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of various organisms in Phylum Echinodermata

- Perform dissection

- Complete lab report

WEEK 14

3 lec

CONTENT:

- Deuterostomes, urochordates and cephalochordates

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.

- Describe features common to deuterostomes, naming and describing the different phyla that belong to such group

- Describe the ecology

HOMEWORK:

- read Deuterostomes take quiz

3 lab -----

CONTENT

- Urochordates and Cephalochordates

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures found in various organisms that are urochordates and cephalochordates. Describe the functions of such structures. Compare these 2 groups to the phyla previously described.

Describe the different organ systems that are present, and list those that are absent

- Perform dissection
- Complete lab report

WEEK 15

3 lec

CONTENT

- Phylum Chordata

STUDENT PERFORMANCE- the student will be able to:

- Describe the mechanisms of evolution.
- Describe features of Phylum Chordata. Compare these features to that of the previously described phyla

List and describe the functions of structures found in organisms that belong to Phylum chordata.

- Describe the different organ systems that are present, and list those that are absent
- Describe the ecology

HOMEWORK:

- Read Phylum Chordata study lecture notes

3 lab-----

CONTENT

- sharks, fresh water fish and amphibian

STUDENT PERFORMANCE- the student will be able to:

- List and describe the structures and their functions of sharks, fresh water fish
- List and describe the structures and their function of amphibians
- Perform dissection
- Complete lab report

WEEK 16 3 lec

CONTENT:

- Subphylum Vertebrata
- Reptiles, birds and mammals

STUDENT PERFORMANCE- the student will be able to:

- Describe features of Subphylum Vertebrata, and compare to that of previously described phyla. Describe the different organ systems that are present.
- Describe the different categories of vertebrates
- Describe the ecology
- quiz

HOMEWORK:

- read organ systems and complete organ system quiz

3 lab -----

CONTENT:

- Mammals and lab practicum review

STUDENT PERFORMANCE:

- classify chordates mammals
- presentation of selected animals and or service learning projects

WEEK 17 3 lec

CONTENT:

- Subphylum Vertebrata

STUDENT PERFORMANCE- the student will be able to:

- Describe features of Subphylum Vertebrata, and compare to that of previously described phyla. Describe the different organ systems that are present.

- Describe the different categories of vertebrates

- Describe the ecology

- quiz

**HOMEWORK:**

- read organ systems and complete organ system quiz

3 lab -----

**CONTENT:**

- lab practicum exam

**STUDENT PERFORMANCE:**

- the student will write a Lab practicum exam

**WEEK 18**

Final Exam 2hrs

**METHODS OF INSTRUCTION:**

Lecture presentation and Laboratory exposure to practical application. Use of computer, internet, video, document camera, board notes, 'outdoor classroom' projects, Service Learning, discussion, and presentations from biological professionals. A variety of assessment techniques that include midterm and final examinations, research report, projects, homework problems, laboratory reports, laboratory practica.

**METHODS OF EVALUATION:**

Category 1 - The types of writing assignments required:

Percent range of total grade: 10 % to 20 %

Written Homework

Lab Reports

Essay Exams

Term or Other Papers

Category 2 -The problem-solving assignments required:

Percent range of total grade: 35 % to 40 %

Homework Problems

Field Work

Lab Reports

Quizzes

Exams

Other: service learning

Category 3 -The types of skill demonstrations required:

Percent range of total grade: 10 % to 20 %

Class Performance/s

Field Work

Category 4 - The types of objective examinations used in the course:

Percent range of total grade: 30 % to 45 %

Multiple Choice

True/False

Matching Items

Completion

Other: Essay

**REPRESENTATIVE TEXTBOOKS:**

Required:

Stephen A. Miller, and John P. Harley. Zoology 9th edition. US: McGraw-Hill, 2013. Or other appropriate college level text.

ISBN: 978-0073524174 (if available)

Reading level of text, Grade: 16            Verified by: DYoung

Other textbooks or materials to be purchased by the student:

1. Stephen A. Miller, 2013. General Zoology Laboratory Manual 7th edition McGraw-Hill.
2. Quad rule- Composition Notebook for lab notes

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

GAV B2, effective 201270

GAV B3, effective 201270

CSU GE:

CSU B2, effective 201270

CSU B3, effective 201270

IGETC:

IGETC 5B, effective 201270

IGETC 5C, effective 201270

CSU TRANSFER:

Transferable CSU, effective 201270

UC TRANSFER:

Transferable UC, effective 201270

**SUPPLEMENTAL DATA:**

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN: BIOL4

CAN Sequence: BIOL SEQ A

CSU Crosswalk Course Department: BIO

CSU Crosswalk Course Number: 4

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: E

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000275735

Sports/Physical Education Course: N

Taxonomy of Program: 040700

