Course Cover
- **Division**: Math, Science and Health
- **Department**: Life Sciences
- ** Discipline**: Biology
- **Course Number**: 101
- **Org Number**: 12100
- **Full Course Title**: Concepts of Biology
- **Transcript Title**: Concepts of Biology

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog, Time Schedule, Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:
- **Course description**
  - **Rationale**: Revise course description to differentiate it from BIO 161 & 162.
- **Proposed Start Semester**: Fall 2013

Course Description:
Basic principles and concepts of biology are surveyed in lecture and laboratory. Emphasis is placed on biological processes as well as practical applications including (but not limited to) major units on chemistry, cells, genetics, cellular energy, kingdoms, reproduction, ecology, evolution and laboratory skills. This course serves as an introduction to biology for non-science students and may be used as a prerequisite for other biology courses.

Course Credit Hours
- **Variable hours**: No
- **Credits**: 4
  - **Lecture Hours**: Instructor: 45 Student: 45
  - **Lab**: Instructor: 45 Student: 45
  - **Clinical**: Instructor: 0 Student: 0

Total Contact Hours: **Instructor**: 90 **Student**: 90
- **Repeatable for Credit**: NO
- **Grading Methods**: Letter Grades Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing
- College-level Reading & Writing

College-Level Math

Requisites
- **Prerequisite**: Academic Reading and Writing Levels of 6

General Education
- **MACRAO**
  - MACRAO Science & Math
  - MACRAO Lab Science Course
General Education Area 4 - Natural Science
Assoc in Applied Sci - Area 4
Assoc in Science - Area 4
Assoc in Arts - Area 4

Request Course Transfer
Proposed For:

Student Learning Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
   Assessment 1
   Assessment Tool: Five core questions per test will be used throughout all sections and an item analyses will be done on these questions for objectives 1-54.
   Assessment Date: Winter 2014
   Assessment Cycle: Every Three Years
   Course section(s)/ other population: all
   Number students to be assessed: 50-100% (randomly selected)
   How the assessment will be scored: item analysis of selected unit test questions.
   Standard of success to be used for this assessment: 75% of answers are correct for each outcome.
   Who will score and analyze the data: department faculty.

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.
   Assessment 1
   Assessment Tool: Five core questions per test will be used throughout all sections and an item analyses will be done on these questions for objectives 1-54.
   Assessment Date: Winter 2014
   Assessment Cycle: Every Three Years
   Course section(s)/ other population: all
   Number students to be assessed: 50-100% (randomly selected)
   How the assessment will be scored: item analysis of selected unit test questions.
   Standard of success to be used for this assessment: 75% of answers correct for each outcome.
   Who will score and analyze the data: department faculty.

3. Recognize proper use of laboratory equipment.
   Assessment 1
   Assessment Tool: Lab exam questions.
   Assessment Date: Winter 2014
   Assessment Cycle: Every Three Years
   Course section(s)/ other population: all
   Number students to be assessed: 50-100% (randomly selected)
   How the assessment will be scored: item analysis of selected questions.
   Standard of success to be used for this assessment: 75% of questions correct.
   Who will score and analyze the data: department faculty.

Course Objectives

1. Identify each of the characteristics that distinguish living from non-living things.
   Matched Outcomes
   1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

2. Identify the function of the scientific method; each of the steps of the scientific method and the reason for doing a control experiment.
Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

3. Recognize the structure of an atom and the characteristics and functions of each part.

Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

4. Recognize the definitions of terms that relate to atoms.

Matched Outcomes
5. Identify the six most significant biological elements, their chemical symbols and atomic numbers.

Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

6. Identify the characteristics of ionic and covalent bonding and where they occur.

Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

7. Recognize the differences between molecular (chemical) and structural formulas and how they are written.

Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

8. Recognize the characteristics and structure of water and how they relate to polarity and hydrogen bonds.

Matched Outcomes
9. Identify the process of ionization and how it relates to pH measurement and the difference between acids and bases.

Matched Outcomes
10. Identify the chemical formulas of common functional groups and the molecules that contain them.

Matched Outcomes
2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.

11. Recognize the processes of dehydration synthesis (condensation) and hydrolysis.

Matched Outcomes
2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.

12. Identify the functions and structures of the different types of carbohydrates, lipids, proteins and nucleic acids.

Matched Outcomes
2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.

13. Recognize the four levels of protein structure and how this affects function.

Matched Outcomes
2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.

14. Identify the three components of the cell theory.

Matched Outcomes
1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
15. Identify the differences and similarities between prokaryotic and eukaryotic cells and between plant and animal cells.
   **Matched Outcomes**
16. Recognize the structures and their functions of prokaryotic and eukaryotic cells.
   **Matched Outcomes**
17. Identify the structures and functions of the cell (plasma) membrane.
   **Matched Outcomes**
18. Identify the methods and mechanisms of all types of movement of materials in or out of cells.
   **Matched Outcomes**
19. Identify each stage of the cell cycle and recognize all of the processes and functions of each stage.
   **Matched Outcomes**
20. Identify the processes and functions of meiosis I and meiosis II.
   **Matched Outcomes**
21. Identify the differences between the overall processes of mitosis and meiosis.
   **Matched Outcomes**
22. Identify the basic structure of chromosomes and all the steps in the process of DNA synthesis.
   **Matched Outcomes**
23. Recognize the definitions of the following terms: homologous chromosomes, haploid (1n), diploid (2n), alleles, crossing over, genetic recombination, independent assortment, spermatogenesis, oogenesis, zygote, somatic cells, gametes, sexual and asexual reproduction.
   **Matched Outcomes**
24. Recognize the definitions of the following terms: gene, locus, dominant, recessive, genotype, phenotype, heterozygous, homozygous, incomplete dominance, codominance, epistasis, pleiotropy, and polygenic traits.
   **Matched Outcomes**
25. Recognize Punnett squares for monohybrid or dihybrid crosses of complete dominance, incomplete dominance or codominance.
   **Matched Outcomes**
26. Identify the differences between sex chromosomes and autosomes; the genetic determination of gender in humans and the genotypes of normal human females and males.
   **Matched Outcomes**
27. Identify sex-linked diseases and other selected genetic diseases and Punnett squares regarding sex-linked characteristics.
   **Matched Outcomes**
28. Identify the following chromosomal aberrations: deletions, duplications, inversions, translocations, nondisjunctions leading to polyploidy and Down's syndrome.
   **Matched Outcomes**
29. Identify all of the components and the steps involved in the process of protein synthesis.
   **Matched Outcomes**
30. Recognize the definitions of the following terms: energy, work, kinetic energy, potential energy, metabolism, oxidation and reduction.
   **Matched Outcomes**
31. Identify the first and second Laws of Thermodynamics.
   **Matched Outcomes**
32. Identify the structure, characteristics and functions of protein enzymes.
   **Matched Outcomes**
33. Identify all of the components, processes and end products of photosynthesis, and why photosynthesis is important for life on earth.
   **Matched Outcomes**
34. Identify all of the components, processes and end products of anaerobic (fermentation) and aerobic (cellular) respiration.
   **Matched Outcomes**
35. Recognize the sequence of taxons in classifying organisms, the binomial system of nomenclature, the names of the three domains and the five kingdoms, and the classification of humans.

**Matched Outcomes**

36. Recognize the structures, functions and reproduction of viruses and the characteristics of bacteriophages, retroviruses, viroids and prions.

**Matched Outcomes**

37. I identify the different kinds of Protists, their characteristics, functions, negative and positive effects.

**Matched Outcomes**

38. I identify the different types of Fungi and their characteristics.

**Matched Outcomes**

39. I identify the major groups of the plant kingdom and their characteristics and the description of the phrase "alteration of generations."

**Matched Outcomes**

40. Recognize the life cycles of the mosses, ferns, gymnosperms and the terms gametophyte and sporophyte.

**Matched Outcomes**

41. Recognize the structures of plants and their functions.

**Matched Outcomes**

42. I identify the following: structures and functions of a flower, the process of double fertilization, the process of pollination, seed dispersal, plant hormones, seed and fruit development.

**Matched Outcomes**

43. Recognize the characteristics of animals, the main types of body symmetry, the types of digestive systems, the types of body support systems, and the terms cephalization, coelom formation and segmentation.

**Matched Outcomes**

44. I identify the members and features of the following animal phyla: Porifera, Cnideria, Platyhelminthes, Nematoda, Rotifera, Mollusca, Annelida, Arthropoda, Echinodermata, and Chordata (including the Chordate classes and the orders of the class Mammalia).

**Matched Outcomes**

45. I identify the structures and functions of both the human male and the human female reproductive systems including the functions of hormones on each system.

**Matched Outcomes**

46. Recognize the process of fertilization in humans including the formation of egg and sperm.

**Matched Outcomes**

47. I identify the stages of development of a human embryo and the different germ layers that result from gastrulation and what each will eventually become.

**Matched Outcomes**

48. Recognize the causes and characteristics of the various STD's.

**Matched Outcomes**

49. Recognize the definitions of the following terms: biosphere, lithosphere, hydrosphere, atmosphere, ecosystem, biotic, abiotic, trophic levels, food web, primary producers, autotrophs, primary consumers, heterotrophs, secondary consumers, tertiary consumers, decomposers, detritivores, community, population, habitat, and niche.

**Matched Outcomes**

50. I identify examples of predator adaptations, plant defenses, animal defenses, warning coloration, camouflage, Batesian mimicry and Mullerian mimicry.

**Matched Outcomes**

51. I identify the different types of species interactions, including competition, predator-prey, and symbiosis (commensalisms, mutualism, parasitism).

**Matched Outcomes**

52. Recognize the two main observations that led Darwin to the concept of natural selection.

**Matched Outcomes**

53. I identify the processes involved in the study of microevolution and the biological species concept.
**Matched Outcomes**
54. Recognize the importance of the Theory of Evolution in the study of biology and the different techniques that scientists use to provide evidence that evolution occurs.

**Matched Outcomes**
55. Identify each part and its function for the dissection microscope and the compound light microscope.

**Matched Outcomes**
3. Recognize proper use of laboratory equipment.

**Matched Outcomes**
56. Demonstrate proper usage of both microscopes to locate specific organisms on slides.

**Matched Outcomes**
3. Recognize proper use of laboratory equipment.

**Matched Outcomes**
57. Demonstrate the correct technique in handling prepared slides and in making wet-mount slides of living organisms and in using the compound light microscope to measure objects being observed.

**Matched Outcomes**
3. Recognize proper use of laboratory equipment.

**Matched Outcomes**
58. Demonstrate the proper care of the microscopes.

**Matched Outcomes**
3. Recognize proper use of laboratory equipment.

**Matched Outcomes**
59. Perform the steps of the scientific method in the Scientific Method Lab.

**Matched Outcomes**
3. Recognize proper use of laboratory equipment.

---

**New Resources for Course**

**Course Textbooks/Resources**

- **Textbooks**

- **Manuals**

- **Periodicals**

- **Software**

---

**Equipment/Facilities**

---

**Reviewer**

<table>
<thead>
<tr>
<th>Faculty Preparer:</th>
<th>Action</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anne Heise</td>
<td>Faculty Preparer</td>
<td>Mar 21, 2013</td>
</tr>
</tbody>
</table>

**Department Chair/Area Director:**

| Anne Heise | Recommend Approval | Mar 21, 2013 |

**Dean:**

| Martha Showalter | Recommend Approval | Mar 22, 2013 |

**Vice President for Instruction:**

| Bill Abernethy   | Approve | Apr 11, 2013 |

---