I. **OVERVIEW**  
The following information will appear in the 2010 - 2011 catalog

<table>
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<tr>
<th>AP 150</th>
<th>Integrative Anatomy and Physiology</th>
<th>5 Units</th>
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<tbody>
<tr>
<td><strong>Prerequisite:</strong> Satisfactory completion of BIO 116 or BIO 101 or BIO 111.</td>
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An intense one semester study of the general structure and function of the human body with an emphasis on integrative functions of the organ systems. Includes organ, tissue and cellular interrelationships; cellular communication; blood movement and hemostasis; fluid balance; respiration and digestion; and reproduction. Intended for students entering health professions that accept a one semester course.

Field trips are not required. (A-F or P/NP - Student choice) Lecture /Lab /Discussion  
**Transfer:** (CSU, UC) **General Education:** (MJC-GE: A) (CSU-GE: B2, B3) (IGETC: 5B)

II. **LEARNING CONTEXT**  
Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:

A. **COURSE CONTENT**

1. **Required Content:**

   a. Basic biological chemistry  
      i. Chemical concepts  
      ii. Cellular chemistry  

   b. Cellular physiology and anatomy  
      i. Cellular metabolism  
      ii. Protein synthesis  
      iii. Membrane transport  

   c. Tissue of the body  
      i. Epithelial tissues  
      ii. Connective tissues  
      iii. Muscle and nervous tissue  

   d. Organization of the body and skin  
      i. Body regions and planes  
      ii. Organs and organ systems  
      iii. Structure and function of skin
e. Skeletal system
   i. Structure of bone
   ii. Joints and movement

f. Muscular system
   i. Muscle physiology
   ii. Muscle mechanics
   iii. Neuromuscular communication

g. Nervous system – nervous tissue and spinal cord
   i. Neuron physiology
   ii. Synaptic communication
   iii. Spinal reflexes

h. Nervous system – peripheral nerves and brain
   i. Autonomic nervous system
      Brain stem and hypothalamus
   ii. Cerebellum and cerebral cortex

i. Endocrine system
   i. Hormones
   ii. Endocrine communication
   iii. Endocrine control

j. Cardiovascular system – blood
   i. Blood composition
   ii. Hemostasis
   iii. Lymphocytes and immunity

k. Cardiovascular system – heart
   i. Cardiodynamics
   ii. Cardiac muscle physiology
   iii. Control of cardiac rate and force

l. Cardiovascular system – blood vessels
   i. Hemodynamics
ii. Fluid compartments
 iii. Control of vascular constriction

m. Digestive system
 i. Digestion
 ii. Nutrient absorption and use
 iii. Control of digestion

n. Respiratory system – airways and lungs
 i. Behavior of gases
 ii. Ventilatory dynamics
 iii. Gas exchange

o. Urinary system
 i. Renal filtration
 ii. Urine formation
 iii. Control of fluid and electrolytes

p. Reproductive system
 i. Gametogenesis
 ii. Menstrual cycle
 iii. Homeostasis during pregnancy

q. Respiratory, cardiovascular and urinary systems – integration
 i. Cellular respiration and metabolism
 ii. Control of blood gases and pH
 iii. Cardiorespiratory – renal integration

2. **Required Lab Content:**

a. Basic biological chemistry
 i. Simulation of atoms, molecules and electrolytes
 ii. Preparation of solutions
 iii. Measurement of osmolality

b. Cellular physiology and anatomy
i. Identification of cellular structures
ii. Identification of carbohydrates, proteins and lipids
iii. Simulation of membrane transport

c. Tissue of the body
   i. Identification of epithelial tissues
   ii. Identification of connective tissues
   iii. Identification of muscle and nervous tissues

d. Organization of the body and skin
   i. Identification of body regions
   ii. Identification of organs

e. Skeletal system
   i. Identification of bones of the axial skeleton
   ii. Identification of bones of the appendicular skeleton

f. Muscular system
   i. Identification of muscles of the axial body
   ii. Identification of muscles of the appendicular body

g. Nervous system – nervous tissue and spinal cord
   i. Identification of features of neurons
   ii. Identification of features of the spinal cord
   iii. Simulation of spinal reflexes

h. Nervous system – peripheral nerves and brain
   i. Identification of sympathetic and parasympathetic neurons
   ii. Identification of brain stem regions and nuclei
   iii. Identification of cortical regions

i. Endocrine system
   i. Identification of endocrine glands
   ii. Identification of features of the hypothalamus and pituitary
   iii. Simulation of endocrine feedback and control
j. Cardiovascular system – blood
   i. Identification of blood cells
   ii. Simulation of fluid behavior (fluid physics)

k. Cardiovascular system – heart
   i. Dissection of the heart
   ii. Simulation of the cardiac cycle and cardiac output

l. Cardiovascular system – blood vessels
   i. Identification of blood vessels and lymphatic vessels
   ii. Simulation of vascular constriction and blood flow

m. Digestive system
   i. Identification of GI tract and accessory organs
   ii. Identification of digestive epithelia
   iii. Simulation of nutrient absorption

n. Respiratory system – airways and lungs
   i. Identification of features of the airways and lungs
   ii. Identification of respiratory epithelia
   iii. Simulation of ventilation

o. Urinary system
   i. Identification of features of the kidneys
   ii. Identification of nephrons and renal tubules
   iii. Simulation of filtration and reabsorption

p. Reproductive system
   i. Identification of features of the male reproductive tract
   ii. Identification of features of the female reproductive tract

q. Respiratory, cardiovascular and urinary systems – integration
   i. Analysis of blood and urine

B. ENROLLMENT RESTRICTIONS

1. Prerequisites
Satisfactory completion of BIO 116 or BIO 101 or BIO 111.

2. **Requisite Skills**
   
   *Before entering the course, the student will be able to:*
   
   a. Explain the fundamental principles and generalizations of biology.
   b. Use the scientific method in problem solving.
   c. Describe chemical and physical reactions as they relate to biology.
   d. Prepare a fresh mount from laboratory material for microscopic observation.
   e. Apply biological principles to new situations.
   f. Make a scientific drawing and correctly label the drawing including the appropriate scale of the object drawn.
   g. Interpret data from a scientific experiment and formulate conclusions.
   h. Use the laboratory to formulate ideas relating to a scientific experiment.
   i. Explain a laboratory experiment including recording of data, calculating and developing conclusions.
   j. Diagram the principles of genetics and the various common types of inheritance.
   k. Describe the important energy forming and releasing processes of organisms.
   l. Compare and contrast the structure and function of cells and organelles.

C. **HOURS AND UNITS**

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<thead>
<tr>
<th>INST METHOD</th>
<th>TERM HOURS</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Lect</td>
<td>54</td>
<td>3.00</td>
</tr>
<tr>
<td>Lab</td>
<td>54</td>
<td>1.00</td>
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<tr>
<td>Disc</td>
<td>18</td>
<td>1.00</td>
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D. **METHODS OF INSTRUCTION (TYPICAL)**

*Instructors of the course might conduct the course using the following method:*

1. Lecture and lab demonstrations will be used to explore specific objectives.

2. Hands-on use of microscopes, anatomical models and cadaver specimens will be used to experience anatomical structures.

3. Hands-on experience with physiological instruments such as spirometers and electrocardiographs, and computer simulations will be used to experience physiological processes.

4. Students will compare and evaluate similarities and differences in anatomical structure.

5. Students will evaluate processes and theories that predict physiological outcomes.

6. Students will solve problems in anatomy and physiology and will be required to delineate the steps involved in the solution.

7. Students will generate models (flow charts) of physiological processes to explain homeostatic processes.
E. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS
   Time spent on coursework in addition to hours of instruction (lecture hours)
   1. Read text and study guide weekly.
   2. Answer practice essay questions weekly.
   3. Draw or find pictures of anatomical structures found in lab weekly.

2. EVIDENCE OF CRITICAL THINKING
   Assignments require the appropriate level of critical thinking
   Examples of exam questions:
   1. Explain how nervous signals lead to the release of calcium ions from the sarcoplasmic reticulum.
   2. Explain how calcium ions allow actin and myosin to interact.

F. TEXTS AND OTHER READINGS (TYPICAL)


2. Other: Gloves for dissections

III. DESIRED LEARNING

A. COURSE GOAL
   As a result of satisfactory completion of this course, the student should be prepared to:
   identify gross and microscopic anatomical structures of cells and organs of the human body and relate them to their function as preparation for prerequisite and requisite coursework for allied health professions.

B. STUDENT LEARNING GOALS
   Mastery of the following learning goals will enable the student to achieve the overall course goal.

1. Required Learning Goals
   Upon satisfactory completion of this course, the student will be able to:
   a. describe the major chemical components of cells and body fluids.
   b. describe the general function and microscopic structure of cells, including metabolism, protein synthesis, and membrane transport, and cellular communication and signal recognition.
   c. identify and describe the microscopic structure and function of specific tissues represented in each organ system.
   d. identify and describe the gross structure and general function of the body and skin.
   e. identify and describe the gross function of:
      1. skeletal system
      2. muscular system
      3. nervous tissue and spinal cord
      4. peripheral nerves and brain
   f. identify and describe the gross structure and function of:
      1. endocrine system
      2. blood
3. heart
4. blood vessels
5. digestive system

g. identify and describe the gross structure and function of the airways and lungs.
h. identify and describe the gross structure and function of the urinary system.
i. identify and describe the gross structure and function of the reproductive system.
j. describe and evaluate the role of the respiratory, cardiovascular and urinary system in respiration, metabolism fluid and electrolyte balance and pH balance.

2. Lab Learning Goals
Upon satisfactory completion of the lab portion of this course, the student will be able to:

a. Identify and name the major structures of the brain stem including the cranial nerves and correlate these with function.
(Will include more lab goals when we do the official review. Attempting to add Bio. 116 as a prerequisite at the same time introducing the new Bio. 116)

IV. METHODS OF ASSESSMENT (TYPICAL)

A. FORMATIVE ASSESSMENT

1. Written examinations using matching, multiple choice and essay questions based on the objectives for the anatomy and physiology.

2. Completion of problem sets focusing on the use of physiological processes.

3. Laboratory practicum exams focusing on identification of anatomical structures.

B. SUMMATIVE ASSESSMENT

1. Cumulative final examination