

M: Course Objectives / Learning Outcomes:

Upon completion of Biology 1104, the student will be able to:

1. Describe the functional inter-relationships of cell structures
2. Describe the characteristics of water and its role in biological systems
3. Describe the role of acids, bases, and buffers in biological systems in the human body
4. Describe the structure and function of biological molecules in living systems, including
 - carbohydrates
 - lipids
 - proteins
 - nucleic acids
5. Describe the process of DNA replication
6. Describe recombinant DNA
7. Demonstrate an understanding of the process of protein synthesis
8. Explain how mutations in DNA affect protein synthesis
9. Describe the structure and function of the cell membrane
10. Explain why cells divide when they reach a particular surface area-to-volume ratio
11. Describe the roles of enzymes in biochemical reactions
12. Describe the functional inter-relationships of the structures of the digestive system
13. Describe the components, pH, and digestive actions of salivary, gastric, pancreatic, and intestinal juices
14. Describe the inter-relationships of the structures of the heart
15. Describe the relationship between heart rate and blood pressure
16. Describe the functional inter-relationships of the vessels of the circulatory system
17. Describe the components of blood
18. Describe the inter-relationships of the structures of the lymphatic system
19. Describe the functional inter-relationships of the structures of the respiratory system
20. Describe the processes of breathing
21. Describe internal and external respiration
22. Describe the transmission of nerve impulses
23. Describe the functional inter-relationships of the divisions of the nervous system
24. Describe the functional inter-relationships of the structures of the urinary system
25. Describe the functional inter-relationships of the structures of the male reproductive system
26. Describe the functional inter-relationships of the structures of the female reproductive system

N: Course Content:

The major topics in the course include the following:

1. Cell structure
 - functional inter-relationships of cell structures
 - how cell compartmentalization assists in the production and distribution of molecules
2. Cell compounds and biological molecules
 - characteristics of water and its role in biological systems
 - importance of pH and the role of acids, bases, and buffers in biological systems
 - structure and function of biological molecules in living systems: carbohydrates, lipids, proteins, and nucleic acids
 - dehydration synthesis and hydrolysis
 - types of carbohydrates, lipids, proteins, and nucleic acids
 - empirical formula of a carbohydrate
3. DNA replication
 - purpose of DNA replication
 - site of DNA replication in the cell
 - semi-conservative DNA replication
 - recombinant DNA

4. Protein synthesis
 - process of protein synthesis
 - how mutations in DNA affect protein synthesis
 - mutations causing genetic disorders
5. Cell membrane transport
 - structure and function of the cell membrane
 - factors affecting rate of diffusion
 - transport processes
 - why cells divide when they reach a particular surface area-to-volume ratio
6. Enzymes
 - roles of enzymes and coenzymes in biochemical reactions
 - balanced chemical equation for cellular respiration
 - effects on enzyme activity
 - thyroxin and its source gland
7. Digestive system
 - structures of the digestive system and their inter-relationships
 - components, pH, and digestive actions of salivary, gastric, pancreatic, and intestinal juices
8. Circulatory system
 - structures of the circulatory system and their inter-relationships
 - structure of the heart
 - relationship between heart rate and blood pressure
 - structures and functions of blood vessels
 - pulmonary and system circulation
 - components of blood
 - fetal circulation
 - roles of antigens and antibodies
 - structures and functions of the lymphatic system
9. Respiratory system
 - structures of the respiratory system and their inter-relationships
 - processes of breathing
 - internal and external respiration
 - role of various substances in stimulating breathing
10. Nervous system
 - transmission of nerve impulses
 - components of a synapse
 - impulse transmission across synapses
 - structure and function of a reflex arc
 - divisions of the nervous system and their inter-relationships
 - functions of parts of the brain
 - autonomic and somatic nervous systems; sympathetic and parasympathetic divisions
11. Urinary system
 - structures of the urinary system and their inter-relationships
 - components of the nephron
 - urine production
 - kidneys and blood pH
 - homeostasis of water and sodium levels in the blood
12. Reproductive system
 - functional structures of the male and female reproductive systems
 - components of seminal fluid
 - ovarian and uterine cycles
 - production, regulation, and functions of male and female hormones

O: Methods of Instruction:

This course involves four hours per week of classroom instruction and two hours per week of tutorial/laboratory activity.

P: Textbooks and Materials to be Purchased by Students:

Tortora, G.J. and Derrickson, B. *Principles of Anatomy and Physiology* (Current Edition). New York: John Wiley and Sons, Inc.

Q: Means of Assessment:

TYPE OF EVALUATION	POINTS
Class Tests and Assignments	20-25 %
Lab Reports	10-15 %
Comprehensive Examinations - midterm	30-35 %
- final	30-35 %
TOTAL	100%

Note:

There will be one midterm and one final examination. The final examination will cover the entire course. If the student achieves a better grade on the final exam than on the midterm examination, the midterm grade will be raised to equal that achieved on the final examination.

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

None.

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Education Council / Curriculum Committee Representative

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