**Lecture Learning Outcomes and Objectives**

**Week 12: RESPIRATION**

*Given 2 hours of discussion and assigned reading on the subject, upon an examination and within 70% accuracy, the student should be able to:*

1. Contrast the respiratory exchange surface of a hydra, an earthworm, a fish, an insect, and a vertebrate and show that each is suitable to the environment.
2. Show that countercurrent flow increases the efficiency of gills in extracting oxygen from water.
3. Explain how the tracheal system in insects accomplishes ventilation and exchange.
4. Trace the path of air in the human respiratory system and discuss the cleansing role of the tracheal lining.
5. Describe the mechanics of ventilation in humans and compare to birds.
6. Explain how breathing rate in humans can be modified.
7. Discuss the transport of O2 and CO2; internal and external respiration; Blood pH regulation
8. List and discuss factor that can affect oxygen binding to hemoglobin
9. List and discuss lower respiratory tract infections and disorders including lung cancer
10. Understand the terms: alveolus, bronchiole, bronchus, trachea, diaphragm, larynx, mucus, nasal cavity, trachea, pharynx, intercostal muscles, tidal ventilation, bicarbonate buffer, hemoglobin, heme group, sickle cell, thalassemia.