COURSE OUTLINE

Zo 341 - VERTEBRATE PHYSIOLOGY

F. 91-92

Instructor:	Phil Johnson J222, 539 2827
Classes:	Tuesday, Thursday 11.00 - 12.30
Textbook:	Animal Physiology, 4th ed. (1990) K. Schmidt-Nielsen (Cambridge Univ. Press)

Evaluation:

Quizzes (7)	35%
Mid-term exam	25%
Final exam	40%

Zo 341 - COURSE CONTENTS

1. Introduction to physiology.

2. Energy metabolism:
   - calorimetry and metabolic rate.
   - factors affecting metabolic rate,
     - eg. body size,
       - temperature,
       - locomotion
   - temperature relationships of: ectotherms,
     - heterotherms,
     - endotherms.
   - thermostatic regulation of body temperature.

3. Respiration:
   - general considerations,
   - the Gas Laws,
   - gases in the blood,
   - the vertebrate lung,
   - the vertebrate gill,
   - regulation of gas transfer and respiration,
   - regulation of body pH.

4. Circulation:
   - the mammalian heart,
   - electrical activity of the heart,
   - mechanical properties of the heart,
   - morphology of other vertebrate hearts,
   - haemodynamics,
   - regulation of capillary blood flow,
   - cardiovascular control by the CNS.

5. Nerves:
   - general laws - Donnan's Equilibrium,
     - Nernst's Equation.
   - resting potential,
   - action potential,
   - structure of neuron,
   - structure and function of synapses,
   - biological transducers,
   - integration of nerve and muscle (reflex arc),
   - intensity coding,
   - autonomic nervous system.

6. Muscles:

- classification of muscles,
- skeletal muscle - structure,
  - sliding filament theory,
  - excitation,
  - length - tension,
  - contraction mechanics,
  - metabolic sub-types,
- cardiac muscle,
- smooth muscle.

7. Endocrines:

- definition of hormones,
- types of hormones (by structure and function),
- mechanisms of hormonal action,
- regulation of hormonal action,
- hormonal diseases.

8. Water and solute metabolism:

- physical principles - diffusion,
  - osmosis,
  - active transport,
  - osmoregulation,
- problems of osmoregulation,
- osmoregulatory organs - vertebrate kidney,
  - extrarenal organs,
- osmoregulation in aquatic habitats,
- osmoregulation in terrestrial habitats,
- nitrogenous wastes.