Registrar's Office
W 1990-91

ZOOLOGY 341

VERTEBRATE PHYSIOLOGY

Instructor: Phil. Johnson J 222

Classes- Tuesday, Thursday 11.00am - 12.30pm

Text-book: Animal Physiology
K. Scmidt-Nielsen

Evaluation:

Quizzes	40%
Mid-term exam	25%
Final exam	35%

TOPIC OUTLINE

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 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

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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 principle - diffussion
     - osmosis
     - active transport
     - osmoregulation
   - problems of osmoregulation
   - osmoregulatory organs - vertebrate kidny
     - extrarenal organs
   - osmoregulation in - aqueous habitats
     - terrestrial habitats
   - nitrogenous wastes