

**MONTANA STATE UNIVERSITY**

**COLLEGE OF NURSING**

**Master Resource Outline**

**N560: Advanced Physiology and Pathophysiology**

Credits: 4 lecture

Semester Offered: Fall

Course Description: Focuses on a comprehensive study of the physiological functioning and common pathophysiological alterations in human organs and systems.

Course Objectives: The student will be able to:

1. Analyze the physiology of cellular function and structure.
2. Analyze the major chemical and genetic activities which influence basic cellular functions.
3. Compare and contrast normal physiological function with pathological alterations in each of the following body systems:
  - \* cardiovascular
  - \* respiratory
  - \* gastrointestinal
  - \* hematologic/immune
  - \* endocrine
  - \* neurological
  - \* renal
  - \* sexual and reproductive
4. Describe physiological/pathophysiological age-related variations throughout the lifespan.
5. Discuss research findings applicable to advanced physiology/pathophysiology.

Recommended Content and Concepts:

- I. Cell and General Physiology
  - A. Internal Environment
  - B. Cell and its Function
  - C. Genetic Control
  - D. Cell Membrane Transport
  - E. Cellular Aging and Apoptosis
  - F. Structure and Function of Organelles
  - G. Common Genetic Disorders and Gene Environment Interaction
- II. Blood and Immunity
  - A. Leukocytes, Macrophage and Inflammation
  - B. Immunity and Allergy
  - C. Sustained Inflammatory Response
  - D. Hemostasis and Blood Coagulation
  - E. Autoimmune Disorders
  - F. Tumor and Transplant Immunology
- III. Nerve and Muscle
  - A. Membrane Potentials
  - B. Contraction of Skeletal Muscle
  - C. Sliding Filament Theory

- IV. Heart
  - A. Cardiac Physiology
  - B. Normal Electrocardiogram
  - C. Cardiac Myopathies
  - D. Arrhythmias
  - E. Electrophysiology of Working and Pacemaker Cells
  - F. Theories of Atherogenesis
  - G. Chest Pain, Acute MI, Pump Failure
- V. Circulation
  - A. Physics of Blood, Blood Flow, Pressure Hemodynamics
  - B. Systemic Circulation
  - C. Mean Arterial Pressure
  - D. Mechanisms of Hypertension
  - E. Pulmonary Circulation
  - F. Coronary Circulation
  - G. Heart Sounds
- VI. Body fluids
  - A. Capillary Dynamics
  - B. Lymphatic System
  - C. Special Body Fluids Systems
    - 1. Cerebrospinal
    - 2. Ocular
    - 3. Pleural
    - 4. Pericardial
    - 5. Synovial
    - 6. Peritoneal
  - D. Osmotic equilibrium
  - E. Kidney Function and Disease
  - F. Acid/Base Balance
  - G. Fluid and Electrolyte Balance
  - H. Urinary Tract Infections
  - I. Cystitis, Pylonephritis
  - J. Acute and Chronic Renal Failure
- VII. Respiration
  - A. Pulmonary Ventilation/Regulation
  - B. Gas Exchange
  - C. Oxygen and Carbon Dioxide Transport
  - D. Hypoxia, Hypercarbia
  - E. Respiratory Infections
  - F. Restrictive and Obstructive Disorders
- VIII. Nervous system
  - A. Organization of Nervous System
  - B. Neuronal Mechanisms
  - C. Sensory Receptors
  - D. Somatic Sensations
  - E. Motor Functions
    - 1. Spinal cord
    - 2. Brain stem
  - F. Activation of the Brain
    - 1. RAS
    - 2. Cerebral cortex
    - 3. Limbic system
    - 4. Hypothalamus
    - 5. ANS
  - G. Pain, Temperature Regulation, and Sleep

- H. Altered Levels of Consciousness
- I. Seizures
- J. Delirium, Confusion, Dementia
- K. Degenerative Disorders, e.g. Multiple Sclerosis, Parkinson's
- IX. Gastrointestinal Tract
  - A. Motility
  - B. Secretory
  - C. Digestion
  - D. Absorption
  - E. GI disorders--Gastroesophageal Reflex, Peptic Ulcer Disease, Cirrhosis, Pancreatitis
- X. Endocrinology
  - A. Hormones
  - B. Regulatory Mechanisms
  - C. SIAD
  - D. Diabetes--Type I and Type II
  - E. Hypothyroidism, Hyperthyroidism
  - F. Adrenal Dysfunction
- XI. Reproduction
  - A. Reproductive Physiology
  - B. Human Sexuality Across the Life Span
  - C. Alterations of Sexual Response in Health and Illness

Examples of student learning activities:

Lecture, discussion, small group work, case studies, assigned readings and audiovisual aids.

Reviewed/Approved by GAAC: 11/05; 12/06

Reviewed/Approved by Faculty: 1/07; 4/07