
ARKANSAS TECH UNIVERSITY
DEPARTMENT OF NURSING



NUR/BIOL 3803- 001
APPLIED PATHOPHYSIOLOGY

Fall 2020

ARKANSAS TECH UNIVERSITY
Department of Nursing

Course: Nur/Biol 3803

Course Title: Applied Pathophysiology

Course Faculty:

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Course/Catalogue Description:

Prerequisites: BIOL 2014 or BIOL 2404 and BIOL 2054 or BIOL 3074. This course focuses on the mechanisms and concepts of selected pathological disturbances to the human body. Emphasis is placed on how the specific pathological condition effects the functioning of the system involved as well as its impact on all other body systems.

Textbook: Hubert, J. and VanMeter, K. (2018) Gould's Pathophysiology for the Health Professions (6th Ed.). W.B. Saunders Co.
ISBN: 9780323414425

Optional: Study Guide for Gould's Pathophysiology for the Health Professions (6th Ed.)
ISBN: 978-0-323-41414-2

Credit Hours: 3 Semester Hours

Contact Hours: 3 Contact Hours/Weekly

Placement: Fall or Spring Sophomore or Junior year

Justification/Rationale for the Course

By completion of this course, the student will progress toward student learning outcomes 1 and 3.

This course assists the student to think critically and apply scientific and quantitative reasoning.

Course Objectives:

Upon satisfactory completion of this course, the student will be able to:

1. Analyze various ways in which innate adaptive and compensatory physiological mechanisms are effected by specific pathological conditions.
2. Explain the physiological processes, interactions, and controls to be considered in maintaining dynamic equilibrium in the human body in the specific areas of:
 - a. Oxygen and carbon-dioxide exchange and transport
 - b. Fluid, electrolyte, and acid-base balance
3. Delineate the role and function of body defense mechanisms.
4. Predict multiple system responses to selected pathological states.

Assessment Methods:

1. Grading scale:
 - A - 90-100
 - B - 80-90
 - C - 75-80
 - D - 68-74
 - F - 67 or below
2. A grade of "C" or above must be achieved in every nursing course to progress in the nursing program.
3. A grade of "I" may be recorded for a student whose work is incomplete due to circumstances beyond the student's control. The student must take responsibility for removal of the incomplete grade according to the Arkansas Tech University's catalog requirements.
4. Examinations will be taken at designated times. If a student cannot take the exam at the regularly scheduled time, he/she is responsible for notifying the instructor as soon as possible to make arrangements to make up the examination. The makeup exam may be given in an alternative form.

5. Course Grade

The grade will be based on homework, (5) unit examinations, quizzes, assignments and a comprehensive final examination.

Unit Exams	45%
Quizzes & Assignments	45%
Final Exam	<u>10%</u>
Total	100%

CONDUCT OF THE COURSE AND POLICIES

Attendance:

As professionals, you must be responsible for your own learning experiences. You are responsible to make the most of all educational opportunities. This is a mark of professionalism. Attendance in class reflects your dedication and the value you place on your chosen profession. We, the faculty, expect you to attend ALL CLASSES.

The Arkansas Tech University catalog provides content concerning class attendance. ATU is required to document attendance.

Tardy Policy:

Regular and timely attendance in theory classes and practicum is considered essential if students are to receive maximum benefit from the nursing courses. The Nursing Department has implemented a policy, which we believe will discourage unnecessary tardiness and absences, but will not punish those conscientious students who must be absent from time to time for unavoidable reasons.

At the discretion of the instructor, a student who is tardy or absent may be allowed to complete a quiz or receive a handout if the student has been courteous enough to call the nursing department or call/e-mail the instructor before class to inform of the possibility of tardiness or absentness. This is solely at the discretion of the instructor.

Students are responsible for obtaining any missed information after class. Disrupting the learning of other students to ask questions or copy notes of the missed class time while class is in progress is inconsiderate.

Dress and Behavior:

1. Students are expected to dress appropriately while attending class.
2. Smoking and chewing tobacco are not permitted in any classroom.
3. Cell phones **MUST** be off during class.
4. No MP3, iPod, or any other electronic device used in class.
5. Recording of the lectures are allowed by instructor permission.

Academic Honesty:

Students are expected to be honest and truthful in both classroom and practicum experiences. They are expected to adhere to the Code of Ethics and uphold current standards of care. Students are referred to the Arkansas Tech University Student Handbook for more specific regulations regarding academic honesty.

Students are expected to only use authorized devices or materials for an examination and not copy from other

Cell Phone Policy:

There is a **NO cell phone policy for all upper division testing/test review**. This includes paper/pencil testing, test review, cooperative testing, and computer testing. If you are discovered with having a cell phone on your person, this will be considered a violation of the Academic Honesty Policy. If we discover that you have your cell phone with you during a unit exam/cooperative testing or unit exam review **you will receive a 0 for the test grade**.

Teacher Role: Resource person, Evaluator, and Facilitator

Student Roles: Learner, and Communicator

Teacher-Learning Strategies: Lecture, class discussion, audiovisual material

Discrimination Statement:

Arkansas Tech University does not discriminate on the basis of color, sex, sexual orientation, gender identity, race, age, national origin, religion, veteran status, genetic information, or disability in any of our practices, policies, or procedures. If you have experienced any form of discrimination or harassment, including sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the institution. If you report such an incident of misconduct to a faculty or staff member, they are required by law to notify Arkansas Tech University's Title IX Coordinator and share the basic fact of your experience. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus. For more information please visit: <http://www.atu.edu/titleix/index.php>.

Disability/Special Accommodations:

Arkansas Tech University values diversity and inclusion and is committed to a climate of mutual respect and full participation of all students. My goal is to create a learning environment that is useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or prevent an accurate assessment of your achievement, please meet with me privately to discuss your needs and concerns. You may also contact the Office of Disability Services, located in Doc Bryan Student Center, Suite 141, in person, via phone at (479) 968-0302 or TTY (479) 964-3290, via email at disabilities@atu.edu, or visit their website at <https://www.atu.edu/disabilities/index.php> in order to initiate a request for accommodations.

**UNIT 1 - Orientation to Pathophysiology
 Basic Pharmacology/Therapies
 Fluid & Electrolytes/Acid & Base
 Respiratory Disorders**

OBJECTIVES

On completion of this unit, the student should be able to:

1. Describe the course objectives and position in the curriculum.
2. Utilize knowledge of fluid, electrolytes, acid, base, and the inflammatory process to determine their effects in specific pathological conditions.
3. Discuss the normal anatomy and physiology of the respiratory system.
4. Describe the pathophysiology of infectious/ inflammatory processes including asthma, pneumonia, and tuberculosis.
5. Discuss the pathophysiology of degenerative/ deficient processes including emphysema and respiratory distress syndrome.
6. Describe the pathophysiology of the genetic/ congenital abnormalities including cystic fibrosis.
7. Define and describe common terms used in pharmacology.
8. Differentiate types of adverse reactions.
9. Compare methods of drug administration.

LEARNING ACTIVITIES

Read Chapters 1, 2, 3 and 13
In class quizzes and activities

**UNIT 2 - Cardiovascular Disorders
 Musculoskeletal Disorders
 Skin Disorders
 Inflammation and Healing**

OBJECTIVES

On completion of this unit, the student should be able to:

1. Discuss the normal anatomy and physiology of the cardiovascular system.
2. Discuss the pathophysiology of the infectious/ inflammatory processes including pericarditis and thrombophlebitis.
3. Discuss the pathophysiology of the degenerative/deficient processes including hypertension, CHF, hyperlipidemia, arteriosclerosis/ atherosclerosis, myocardial infarction, and cardiomyopathy.
4. Discuss the normal anatomy of physiology of the integumentary system.
5. Discuss the pathophysiology of inflammatory processes including burns and ultraviolet skin damage.
6. Describe the local and systemic effects of inflammation.
7. Explain the effects of chronic inflammation.
8. Discuss the modes of treatment of inflammation.
9. Discuss the normal anatomy and physiology of the musculoskeletal system.
10. Discuss the pathophysiology of infectious/ inflammatory processes of the musculoskeletal system including fractures, osteomyelitis, osteoarthritis, and gout.
11. Discuss the pathophysiology of degenerative/ deficiency processes of the musculoskeletal system including scoliosis, osteoporosis, and muscular dystrophy.

LEARNING ACTIVITIES

Read Chapters 5, 8, 9 & 12 In
class quizzes and activities

UNIT 3 - Urinary System Disorders
Infection
Immunity
Digestive System Disorders

OBJECTIVES

On completion of this unit, the student should be able to:

1. Discuss the normal anatomy and physiology of the urinary system.
2. Discuss the pathophysiology of infectious/ inflammatory processes including urinary tract infection, pyelonephritis, glomerulonephritis, and nephrotic syndrome.
3. Discuss the pathophysiology of the degenerative/ deficient processes including renal calculi and renal failure.
4. Describe the basic characteristics of bacteria, viruses, fungi and mycoplasmas.
5. Discuss the locations, advantages and disadvantages of resident (normal) flora.
6. Describe the stages in the development and course of an infection including the signs of an infection.
7. Describe the normal immune response and the components of the immune system.
8. Explain the methods of acquiring immunity.
9. Discuss the normal anatomy and physiology of the gastrointestinal system.
10. Discuss the pathophysiology of infectious/ inflammatory processes of the gastrointestinal system including gastroesophageal reflux disease, gastritis and inflammatory bowel disease.
11. Discuss the pathophysiology of degenerative/ deficient processes of the gastrointestinal system including ulcers and bowel obstruction.
12. Discuss the normal anatomy and physiology of the biliary tract, and exocrine function of the pancreas.
13. Discuss the pathophysiology of infections/ inflammatory processes of the biliary tract and the exocrine pancreas including hepatitis, cirrhosis, cholecystitis, cholelithiasis, and pancreatitis.
14. Discuss the pathophysiology of eating disorders.

LEARNING ACTIVITIES

Read Chapters 6, 7, 17 & 18

In class quizzes and activities

**UNIT 4 - Blood and Circulatory System Disorders
Neoplasms and Cancer
Lymphatic System Disorders**

OBJECTIVES

On completion of this unit, the student should be able to:

15. Explain the functions of blood.
16. Trace the hematopoiesis of red blood cells and platelets.
17. Differentiate between red cell antigens and antibodies in persons with type A, B, AB, and O blood.
18. Explain the determination of the RH factor.
19. Explain the functions of blood vessels, platelets, and coagulation factors.
20. Cite normal values for hematologic tests including hemoglobin, red blood cells, hematocrit, white blood cells, and platelets.
21. Discuss the pathophysiology of infectious/ inflammatory processes including sepsis and disseminated intravascular coagulation (DIC).
22. Discuss the pathophysiology including acquired anemias (iron deficiency anemia, megaloblastic anemias, pernicious anemia, and folic acid deficiency anemia), anemias of bone marrow failure, hemolytic anemias, and secondary anemias.
23. Describe the disorders resulting from genetic/ congenital influences on the hematologic system including thalassemias, sickle cell anemia, and hemophilia.
24. Discuss basic principles of neoplastic disorders including common terms, epidemiology, incidence, pathogenesis, etiology, predisposing factors, and impact of cancer.
25. Describe the prevention and assessment of cancer including cancer cell growth, classification of neoplasms, prevention, diagnosis, staging, and grading.
26. Discuss the treatment of cancer including surgery, radiation, chemotherapy, hormonal therapy,
27. biotherapy, targeted therapy, bone marrow, and peripheral blood stem cell transplantation.
28. Identify the structures that constitute the lymphatic system and their general functions.
29. Identify and describe the disorders resulting from obstruction of the flow of lymph in the lymphatic circulation.

Read Chapters 10, 11 and 20
In class quizzes and activities

**UNIT 5 - Nervous System Disorders/Pain/Sensory Organ Disorders
Endocrine System Disorders
Reproductive System Disorders**

OBJECTIVES

On completion of this unit, the student should be able to:

1. Discuss the normal anatomy and physiology of the neurological system.
2. Discuss the pathophysiology of infectious/ inflammatory processes in relation to the neurological system including meningitis and head trauma.
3. Discuss the pathophysiology of the degenerative/ deficient disorders of the neurological system including multiple sclerosis, Parkinson's, CVA, and epilepsy.
4. Discuss the normal anatomy and physiology of the eyes.
5. Discuss the pathophysiology of degenerative/ deficient processes of the eyes including glaucoma, cataract formation, retinal detachment, diabetic retinopathy, and retinal degeneration.
6. Discuss the normal anatomy and physiology of the ears.
7. Discuss the pathophysiology of conductive hearing impairment and sensorineural hearing impairments.
8. Discuss the pathophysiology of degenerative/ deficient processes of the ear caused by the aging process.
9. Discuss the pathophysiology of pain; both acute and chronic.
10. Discuss how neurotransmission of pain signals modulated at the receptor, spinal cord, and brain.
11. Describe the structure and function of the organs and hormones of the endocrine system and their regulation.
12. Cite diagnostic tests related to endocrine function including hormone levels and BMR.
13. Discuss the degenerative/deficiency processes of the endocrine system including the hypofunction of the pancreas (diabetes mellitus); and the hyperfunction and hypofunction of the thyroid, parathyroid, and adrenals, and anterior pituitary.
14. Discuss the effect of acute metabolic stress on the bodies' metabolism.
15. Describe how insulin, catecholamines, thyroid hormone, cortisol and growth hormone effect the metabolism of fats, sugars, and proteins.
16. Describe normal anatomy and physiology of the reproductive system.
17. Describe the pathophysiology of the male and female reproductive system including infertility, congenital abnormalities, BPH, menstrual disorders, and common STI's.

LEARNING ACTIVITIES

Read Chapters 4, 14, 15, 16, and 19

In class quizzes and activities