



UNIVERSITY OF  
**NORTHERN COLORADO**

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**School of Nursing**

**Course Number/Section(s) / Semester:** NURS 326-900/ Fall 2022 Extended Campus

**Course Title:** Pathophysiology

**Credits:** 3

**Pre-requisites:** BIO 245, BIO 246 with minimum grade of D-

**Co-Requisites:** None

**Faculty member:** Courtney Gryskiewicz, MSN, RN, CNL

**Faculty Contact Information:** [Courtney.gryskiewicz@unco.edu](mailto:Courtney.gryskiewicz@unco.edu)  
Gunter 3190, 970-351-3128

**Office Hours:** By appointment Tuesdays 12:30-1:30pm and online via zoom by appointment

**Course Description:** A systems approach to alteration and disruption of physiologic functions. Focus on differentiation of pathophysiologic findings and identification of major disease processes.

**Course Objectives**

1. Explain the etiology of disease states and imbalances.
2. Analyze how health deviations alter normal physiology.
3. Identify pathological processes as they occur within human cells, tissue, organs, and organ systems.
4. Describe the pathophysiology and clinical manifestations of significant health deviations.

**Course Content Outline**

1. Fluids and Electrolytes and Acid- Base Balance
2. Infection, Immunity and Inflammation
3. Cell Growth and Function
4. Neurological Function
5. Hematological Function
6. Cardiovascular Function
7. Endocrine Function
8. Respiratory Function
9. Renal Function
10. Gastrointestinal Function
11. Musculoskeletal Function

## **Course Requirements:**

Exam I (50 questions)	100 points
Exam II (50 questions)	100 points
Exam III (50 questions)	100 points
Exam IV (100 questions)	100 points
Case Studies (15 total)	<u>100 points</u>
Point total	500 points

## **Required Texts/Resources**

Huether, S. E. & McCance, K. L. (2020). Understanding Pathophysiology. (7<sup>th</sup> edition). St. Louis: Mosby. Sherpath package for this text required.

## **Instructional Strategies**

The instructional strategies selected for this course will be based on the course objectives, content and learning needs of the course students individually and as a group. These strategies will include (but are not limited): Lecture, Exams, Case Study homework

## **Method of Evaluation:**

A = 90-100%                      B = 80-89%  
C = 70-79%                      D = 60-69%  
F < 60%

## **Course Attendance**

It is expected students will log into the course and participate every week.

## **Late Assignments/ Missed Exams**

A weekly case study will be assigned in class or in Canvas throughout the semester. Case study due dates/times are posted in Canvas. Because the answers to the case study will be posted after the due date, **late case studies will not be accepted.**

Each student may reschedule ONE exam. The student must contact the instructor **prior to the exam due date to** request an extension.

## **Disability Resources**

It is the policy and practice of the University of Northern Colorado to create inclusive learning environments. If there are aspects of the instruction or design of this course that present barriers to students' inclusion or to accurate assessments of students' achievements (e.g. time-limited exams, inaccessible web content, use of videos without captions), students should communicate about these aspects with their instructor(s) and contact Disability Resource Center (DRC) to request accommodations.

Office: (970) 351-2289, Michener Library L-80.

Students can learn more here: [www.unco.edu/disability-resource-center](http://www.unco.edu/disability-resource-center)

## **Title IX**

The University of Northern Colorado is committed to providing a safe learning environment for all students that is free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. Students who have experienced (or who know someone who has experienced) any of these incidents should know that they are not alone. UNC has staff members trained to support students to navigate campus life, to access health and counseling services, to provide academic and housing accommodations, to help with legal protective orders, and more.

Please be aware all UNC instructors and most staff members are required to report their awareness of sexual violence to the Office of Institutional Equity and Compliance (OIEC). This means that if students tell an instructor about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, the instructor must share that information with the Title IX Coordinator, Larry Loftin. Larry or a trained staff member in OIEC will contact the reporting students to let them know about accommodations and support services at UNC as well as their options to pursue a process to hold accountable the person who caused the harm to them. Students who have experienced these situations are not required to speak with OIEC staff regarding the incident. Students' participation in OIEC processes are entirely voluntary.

If students do not want the Title IX Coordinator notified, instead of disclosing this information to the instructor, students can speak confidentially with the following people on campus and in the community. They can connect you with support services and help explore options now, or in the future.

UNC's Assault Survivors Advocacy Program (ASAP): 24 Hr. Hotline 970-351-4040 or <http://www.unco.edu/asap>

UNC Counseling Center: 970-351-2496 or <http://www.unco.edu/counseling>

UNC Psychological Services: 970-351-1645 or [http://www.unco.edu/cebs/psych\\_clinic](http://www.unco.edu/cebs/psych_clinic)

Students who are survivors, who are concerned about someone who is a survivor, or who would like to learn more about sexual misconduct or report an incident, can visit [www.unco.edu/sexual-misconduct](http://www.unco.edu/sexual-misconduct). Students may also contact OIEC at 970-351-4899 or email [titleix@unco.edu](mailto:titleix@unco.edu).

### **Academic Integrity**

Students are expected to practice academic honesty in every aspect of this course. Students who engage in academic misconduct are subject to grading consequences with regard to this course and/or university disciplinary procedures through the Dean of Students Office. More information about the academic misconduct process can be found in UNC's Student Code of Conduct (BEAR Code).

### **Attendance**

Students are expected to attend class regularly. Each instructor determines the relationship between class attendance, the objectives of the class, and students' grades. Instructors are responsible for articulating their attendance policies and their effect on grades to students. Students are responsible for knowing the attendance policy of each course. Only the instructor can approve students' absences. Students are responsible for requesting such approval. In an effort to create inclusive learning environments, instructors should not require doctors' notes to determine whether or not to excuse an absence.

### **COVID-19 (new for fall 2020)**

Due to the current global pandemic, the fall 2020 semester will be unlike any other that the University has experienced. The safety and well-being of our Community of Bears requires each of us to be prepared to do our part to protect the health of our entire campus community, as well as our friends, families, and neighbors.

The COVID-19 pandemic is a complex, challenging, and fluid situation, which continues to evolve. Therefore, students should review frequently the Spring Operations website:

<https://www.unco.edu/return-to-campus/> for updated information. UNC will follow applicable legal requirements and federal, state, and county public health recommendations and mandates in all decisions related to university operations.

To mitigate the spread of COVID-19, students, faculty and staff are expected to follow university requirements about wearing face coverings when on campus, including in the classroom. Additionally, members of the university community are expected to follow physical or social distancing requirements by keeping at least 6 feet from others, covering their coughs, and practicing good hand hygiene.

Persons who fail to adhere to these requirements will be reminded of them so that they can address and correct their noncompliance. Thereafter, persons who fail to correct their behavior will be asked to leave the classroom (until such time as they comply with UNC's requirements) and may be referred to the Dean of Students Office or Human Resources.

It is important that all members of the university community work together to do all we can to keep our community safe.

### **Equity and Inclusion**

The University of Northern Colorado (UNC) embraces the diversity of students, faculty, and staff. UNC honors the inherent dignity of each individual, and welcomes their unique perspectives, behaviors, and world views. People of all races, religions, national origins, sexual orientations, ethnicities, genders and gender identities, cognitive, physical, and behavioral abilities, socioeconomic backgrounds, regions, immigrant statuses, military or veteran statuses, sizes and/or shapes are strongly encouraged to share their rich array of perspectives and experiences. Course content and campus discussions will heighten your awareness of others' individual and intersecting identities. For information or resources, contact Chief Diversity Officer, Dr. Tobias Guzman, at 970-351-1944. If students want to report an incident related to identity-based discrimination/harassment, please visit [www.unco.edu/institutional-equity-compliance](http://www.unco.edu/institutional-equity-compliance).

### **Food Insecurity and Basic Needs**

Research shows that college students experience food insecurity at higher rates than the American household rate and that food insecurity can negatively impact academic performance and persistence. In recognition of this problem, UNC offers assistance to students facing food insecurity through an on-campus food pantry. The Bear Pantry is located in University Center 2166A and is open for regular hours throughout the semester. Please visit [www.unco.edu/bear-pantry](http://www.unco.edu/bear-pantry) for more information. Students who face challenges securing their food or housing and believe this may affect their performance in this course are also urged to contact Student Outreach and Support (SOS), which is part of the Dean of Students Office. SOS can assist students during difficult circumstances, which may include medical, mental health, personal or family crisis, illness, or injury. The Dean of Students Office/SOS can be reached at [dos@unco.edu](mailto:dos@unco.edu) or via phone at 970-351-2001.

### **Land Acknowledgment**

The University of Northern Colorado occupies the lands in the territories of the Ute, Cheyenne, and Arapaho peoples. The University acknowledges the 48 tribes that are historically tied to the state of Colorado. Thus, the land on which UNC is situated is tied to the history and culture of our native and indigenous peoples. UNC appreciates this connection and has great respect for this land. Additionally, the University community pays its respect to Elders past, present, and future, and to those who have stewarded this land throughout the generations.

As part of the learning and reflection process please visit <https://native-land.ca/> or call the Office of Equity & Inclusion at 970-351-1944.

### **Name in Use/Pronoun in Use/Name Change**

Some students may have changed their names to better reflect their gender identity or for other reasons. The process to request that the University change the name that appears on Canvas and on the course roster is available here: <https://www.unco.edu/registrar/name-change.aspx>

### **School of Nursing Policies**

The School of Nursing policies and guidelines will be followed. These can be found in the *School of Nursing Undergraduate Handbook for your program* at <https://www.unco.edu/nhs/nursing/resources/current-student/student-handbooks.aspx>

**Portable Electronic Devices statement** (for on-campus and online synchronous sessions)

Please extend courtesy to your instructor and fellow students by turning off your portable electronic devices such as: cell phones, pagers, and iPods. Although not an audio issue, text-messaging is a distraction to other students and prevents you from full participation in class. You should keep your portable electronic devices in your backpack or purse during class. Your personal electronic devices should not be on your desks. If you know that you may need to accept an emergency phone call during class or if you have children in childcare or school, please let the instructor know. If you need to take a phone call during class, please step out of the classroom while you complete your call. Thank you for your cooperation.

**ASSIGNMENT DESCRIPTIONS:**

**Extra Credit Opportunity:** Journal article review – 10 points extra credit possible

Locate a professional article (journal, Internet) that discusses pathophysiology. An appropriate article can be found by accessing the library databases <https://search-proquest-com.unco.idm.oclc.org/nahs?accountid=12832>. To access without link, go to library.unco.edu, choose databases, choose “N” and select Nursing and Allied Health.

This database houses articles related to pathophysiology. I recommend using the search word “pathophysiology” and searching only journal articles from the past 5 years. If you need additional assistance with locating an appropriate article, use this link for instructions on how to find an article <https://www.youtube.com/watch?v=UP6x4wa5KTs> You can also contact the library, or make an appointment during instructor office hours.

- Develop a written review of the article.
  - Paper should include a cover page with the article name, your name, course number, date, and follow **APA guidelines** for headers and structure.
  - The content of the paper should be 2-3 paragraphs – **no more than 1 page**. This section should cover the ‘Content of Paper’ section described in the grading rubric below.
    - Summarize the pathophysiology as outlined in the article **and** discuss how the article relates to information from the course.
  - Cite the article reference using APA format on the ‘References’ page at the end of the paper (For APA Citation Style Help, visit the website – <http://libguides.unco.edu/apa> )
  - Paper must be typed and not handwritten
- Turn in your written review and **a copy of the article** to Canvas.
- See the Syllabus for Extra Credit due date. Late papers will not be accepted.

### Grading Rubric

Content of Paper <ul style="list-style-type: none"> <li>• Selection of an appropriate article (1)</li> <li>• <b>Brief</b> summary of pathophysiology in article (3)</li> <li>• How article relates to information from course (2)</li> </ul>	6 points
Format <ul style="list-style-type: none"> <li>• Cover page, Reference page (1)</li> <li>• APA format – pg #, running head, 12 pt font, margins, etc. (1)</li> <li>• Spelling and Grammar (1)</li> </ul>	3 points
Inclusion of article with paper	1 point

### Course schedule

Week	Topics	Readings: Huether text
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1	Course Orientation & Introduction to Pathophysiology Fluids and Electrolytes and Acid Base Balance	Chapter 5
2	Immunity & Immune Deficiencies, Hypersensitivities, Inflammation & Infection  Cancer	Chapter 6, 7, & 8 Chapter 10 & 11
3	Cancer (cont.) Structure & Function of the Neurological System Pain, Temperature, Sleep and Sensory Function Cerebral Hemodynamics	Chapter 13 Chapter 14 Chapter 15
4	Concepts of Neurological Dysfunction Alterations of Neurological Function	Chapter 15 Chapter 16 & 17
5	<b><u>EXAM # 1– Due by midnight 2/13</u></b> Structure & Function of the Hematologic System Alterations of Hematologic Function	Chapter 20 Chapter 21
6	Structure & Function of the Cardiovascular and Lymphatic System Alterations of Cardiovascular Function	Chapter 23  Chapter 24
7	Alterations of Cardiovascular Function (cont.)	Chapter 24
8	<b><u>EXAM # 2 – Due by midnight 3/6</u></b> Mechanisms of Hormonal Regulation Alterations of Hormonal Regulation	Chapter 18 Chapter 19
9	Alterations of Hormonal Regulation (cont.)	Chapter 19
	SPRING BREAK	
10	Structure & Function of the Pulmonary System Alterations of Pulmonary Function <b>Extra Credit Paper Due 3/27</b>	Chapter 26 Chapter 27
11	Alterations of Pulmonary Function (cont.)	Chapter 27
12	<b><u>EXAM # 3 – Due by midnight 4/10</u></b> Structure & Function of the Renal and Urologic Systems Alterations of Renal and Urinary Tract Function	Chapter 29 Chapter 30
13	Alterations of Renal and Urinary Tract Function (cont.) Structure & Function of the Gastrointestinal System	Chapter 30 Chapter 35
14	Structure & Function of the Gastrointestinal System Alterations in Gastrointestinal System	Chapter 35 Chapter 36
15	Structure & Function of the Musculoskeletal System Alterations of Musculoskeletal Function	Chapter 38 Chapter 39
16	<b>Exam #4 (comprehensive final) – Due by midnight 5/6</b>	

**Course Units:**

Topic	Objectives
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<p><b>Fluids and Electrolytes and Acid Base Balance</b></p> <p><b>Reading: Chapter 5</b></p>	<p><b>Fluids and Electrolyte Balance</b>  Differentiate intracellular from extracellular compartment in terms of distribution and composition of water, electrolytes, and other osmotically active solutes. Relate the concept of a concentration gradient to the process of diffusion and osmosis.  List causes of edema and explain how they contribute to the formation of edema. Describe the mechanisms of regulation of sodium and water balance. Describe causes, manifestations, and treatment of alterations in fluid volume and sodium concentration.  State the causes of hypokalemia and hyperkalemia in terms of altered intake, output, and transcellular shifts.  Relate the functions of potassium to the manifestations of hypokalemia and hyperkalemia.</p> <p><b>Disorders of Acid-Base Balance</b>  Describe the intracellular and extracellular, respiratory, and renal mechanisms for regulating the pH.  Differentiate between metabolic versus respiratory and primary versus compensatory mechanisms of acid-base disorders.  List common causes and compare manifestations and treatments of metabolic and respiratory acidosis and metabolic and respiratory alkalosis.  State normal values for arterial blood gases and interpret ABG findings.</p>
<p><b>Inflammation, Hypersensitivities, Infection, and Immunodeficiency</b></p> <p><b>Cellular Proliferation: Cancer</b></p> <p><b>Reading: Chapters 6,7,8, 10,11</b></p>	<p><b>Immunity and Inflammation</b>  Describe the characteristics of immunogens and immunoglobulins. Describe the functions of the macrophage. Contrast and compare the development and function of the T and B lymphocytes, immunoglobulins, and natural killer cells.  Describe the “general” role of cytokines in the immune response. Contrast humoral and cell-mediated immunity and explain the role of the complement system in the immune response.  Differentiate between “passive” and “active” immunity.  State the five cardinal signs of acute inflammation and describe the physiologic mechanisms involved.  Describe the vascular and cellular responses to inflammation.  Name and describe the function of the mediators of inflammation.</p> <p><b>Alterations in the Immune Response</b>  Describe humoral (B-cell), cellular (T-cell), and combined immunodeficiency. Describe the four types of hypersensitivity responses and identify whether they are immediate or delayed responses and give examples of each.  Explain immunologic tolerance and describe mechanisms postulated to underlie autoimmune disease.</p> <p><b>Acquired Immunodeficiency Syndrome</b>  State the virus responsible for AIDS and explain how it differs from most other viruses.  Describe the pathophysiology of AIDS.  Identify the antibody detection tests for HIV infection.</p>

	<p>List the three stages of HIV infection and describe the signs/symptoms associated with each stage.          Explain “opportunistic infection” and name the most common infections and malignancies encountered in the clinical course.</p> <p><b>Alterations in Cell Differentiation: Neoplasms</b>          Differentiate between cell proliferation and differentiation.          Differentiate between benign and malignant neoplasm.          Describe the process through which a normal cell line is transformed into a cancer cell line and the role of heredity, carcinogens, viruses and immunologic defects in the process.          Describe methods used to detect and diagnose cancer and the TNM classification system.          Discuss the major approaches to cancer treatment.</p>
<p><b>Neurological System</b></p> <p><b>Reading: Chapters 13, 14, 15, 16, 17</b></p>	<p><b>Organization and Control of Neural Function</b>          Differentiate between the central and peripheral nervous system.          List the three parts of a neuron and describe their structure and function and discuss the energy requirements of nervous tissue.          Describe the interaction of the presynaptic and postsynaptic terminals and the role of neurotransmitters in cell communication.          Trace an afferent and efferent neuron from its site in the periphery through its entrance into or exit from the spinal cord.          Compare the location and functions of the sympathetic and parasympathetic nervous system and the role of neurotransmitters.</p> <p><b>Somatosensory Function</b>          Describe the organization and functioning of the somatosensory system.          Describe the mechanisms of pain and the pain pathways.          Describe the different types of pain and differentiate between acute and chronic pain.</p> <p><b>Disorders of Motor Function</b>          Describe the functions of the pyramidal and extrapyramidal systems.          Describe the neural pathways for control of motor function and differentiate between upper and lower motor neuron lesions.          Relate the clinical manifestations of myasthenia gravis to its cause.          Describe the manifestation of peripheral nerve root injury due to a ruptured intervertebral disk.          State the possible mechanisms responsible for the development of Parkinson’s disease and characterize the manifestations and treatment of the disorder.          Explain the significance of demyelination and plaque formation in multiple sclerosis and relate it to the manifestations.          Consider the various forms of spinal cord injuries and the level of injury and relate these to the effects of the injury on ventilation and communication, the autonomic nervous system, cardiovascular function, sensorimotor function, and bowel and bladder function.</p> <p><b>Disorders of Brain Function</b>          Describe the mechanisms of brain injury.</p>

	<p>State the determinants of intracranial pressure and describe compensatory mechanisms.</p> <p>Explain the types of brain herniation and key clinical signs.</p> <p>Describe the manifestations of global brain injury including consciousness, brain death, and persistent vegetative state.</p> <p>Compare the pathologies of ischemic and hemorrhagic stroke and explain the significance of transient ischemic attacks.</p> <p>Cite the most common cause of subarachnoid hemorrhage and state the complications associated with it.</p> <p>Describe the mechanism of brain damage in coup-countercoup injuries.</p> <p>Compare three types of hematomas with respect to cause and manifestations.</p> <p>Describe infections associated with the brain.</p> <p>Differentiate between the origin of seizure activity in partial and generalized forms of epilepsy and compare the manifestations of simple partial seizures with those of complex partial seizures and major and minor seizures.</p> <p>Describe the cause, changes in brain tissue, and stages of Alzheimer's disease.</p>
<p><b>Hematological System</b></p> <p><b>Reading: Chapter 20, 21</b></p>	<p><b>Blood Cells and the Hematopoietic System</b></p> <p>Describe the composition of plasma.</p> <p>Name the types of blood cells and cite their major function.</p> <p>Trace the process of hematopoiesis from stem cell to mature blood cell.</p> <p>State the purpose of the erythrocyte sedimentation rate.</p> <p><b>Disorders of Hemostasis</b></p> <p>Describe two causes of hypercoagulability and factors that contribute to each.</p> <p>Describe the mechanisms and manifestations of thrombocytopenia.</p> <p>Describe Hemophilia A and explain the relationship to factor VIII.</p> <p>Describe the physiologic basis of acute disseminated intravascular coagulation.</p> <p><b>The RBC and Alterations in Oxygen Transport</b></p> <p>Describe the role of iron and erythropoietin in the production of RBCs.</p> <p>Describe the formation, transport, and elimination of bilirubin.</p> <p>Name the laboratory normal values and significance of RBC count, Hemoglobin, and Hematocrit.</p> <p>Describe the manifestations of anemia in general and compare the different types and their mechanisms.</p> <p>Discuss the hemoglobinopathy associated with sickle cell anemia.</p> <p>Explain the etiology and manifestations associated with iron–deficiency anemia, megaloblastic anemia, aplastic anemia, and chronic anemia.</p> <p>Differentiate red cell antigens from antibodies in persons with type A, B, AB, or O blood.</p> <p>List the signs and symptoms of a blood transfusion reaction.</p> <p>Compare polycythemia vera and secondary polycythemia.</p> <p><b>Disorders of the White Blood Cell and Lymphoid Tissues</b></p> <p>List the types of White Blood Cells and their precursors.</p> <p>Describe the two types of neutropenia and the manifestations.</p> <p>Describe the pathogenesis and manifestations of infectious mononucleosis.</p> <p>Compare Acute Lymphocytic and Acute Myelocytic Leukemia.</p> <p>Compare Chronic Lymphocytic and Myelocytic Leukemia.</p>

	<p>Compare the pathogenesis and manifestations of Hodgkin's disease and non-Hodgkin's lymphoma.</p>
<p><b>Cardiovascular and Lymphatic System</b></p> <p><b>Reading: Chapter 23, 24</b></p>	<p><b>Control of the Circulation</b>  Compare the functions and distribution of blood flow and blood pressure in the systemic and pulmonary circulations.  Describe the cardiac cycle incorporating volume, pressure, and electrocardiographic changes that occur during arterial and ventricular systole and diastole.  Explain preload, afterload, cardiac contractility, and heart rate and their effect on cardiac output.  Describe mechanisms to regulate arterial blood pressure and local control of blood flow.  Describe the role of baroreceptors, chemoreceptors and autonomic nervous system in the regulation of cardiac and vascular function.  Relate the effects of inward and outward forces in the capillary and explain how they relate to the formation of edema.</p> <p><b>Alterations in Blood Flow</b>  Describe the possible mechanisms involved in the development of atherosclerosis and list the risk factors involved.  Describe the process of aneurysm formation and explain the manifestations and treatment of a dissecting aortic aneurysm.  Cite risk factors associated with venous thrombosis and describe the manifestations of the disorder and its treatment.</p> <p><b>Alterations in Blood Pressure</b>  Define the terms arterial blood pressure, systolic blood pressure, diastolic blood pressure, pulse pressure, and mean arterial blood pressure.  Explain how cardiac output and peripheral vascular resistance interact in determining systolic and diastolic blood pressure.  Define hypertension (per the Joint National Committee) and differentiate essential, systolic, secondary, and malignant forms of hypertension.  Describe the possible influence of genetics, age, race, obesity, sodium intake, alcohol consumption, and stress on the development of essential hypertension.  Describe behavior modification strategies and pharmacologic approaches to treating hypertension.</p> <p><b>Alterations in Cardiac Function</b>  Compare Acute Pericarditis, Pericardial Effusion, Cardiac Tamponade, and Constrictive Pericarditis.  Describe blood flow in the coronary circulation and relate it to the metabolic needs of the heart.  Describe the use of ECG, stress testing, nuclear imaging, and cardiac catheterization in assessment of coronary circulation.  Characterize the pathogenesis of atherosclerosis in terms of fixed atherosclerotic lesions, unstable plaque, and thrombosis with obstruction.  Distinguish between non-ST segment elevation infarction and ST-segment elevation myocardial infarction in terms of pathology, symptomatology, ECG changes, and serum cardiac markers.</p>

	<p>Explain the complications, medical management, use of thrombolytic therapy and revascularization interventions associated with myocardial infarction. Distinguish between and compare the effects of rheumatic fever and bacterial endocarditis. Compare the effects of stenotic and regurgitant mitral and aortic valvular heart disease on cardiovascular function</p> <p><b>Disorders of Cardiac Conduction and Rhythm</b>  Describe the cardiac conduction system and relate it to the mechanical functioning of the heart.  Draw an ECG tracing, state the origin of the component parts of the tracing, and relate it to the four phases of the cardiac action potential.  Describe the possible mechanisms for dysrhythmia generation.  Compare the effects of premature ventricular contractions, ventricular tachycardia, and ventricular fibrillation on cardiac function.  Describe the characteristics of first-, second-, and third-degree heart block.  Explain the use of pharmacologic and electrical interventions to treat dysrhythmias.</p> <p><b>Heart Failure and Circulatory Shock</b>  Describe the physiology of heart failure including the compensatory mechanisms. Differentiate right-sided versus left-sided heart failure.  Describe the physiologic mechanisms underlying the manifestations of congestive heart failure.  Relate the effect of left ventricular failure to the development and manifestations of pulmonary edema.  Describe the physiology of shock including the compensatory mechanisms and cellular changes that occur.  List the chief characteristics of hypovolemic shock, cardiogenic shock, neurogenic (vasogenic) shock, anaphylactic shock and septic shock.  Characterize changes in thirst, skin blood flow, pulse rate, urine output, and sensorium as indicators of shock.  Define multiple organ dysfunction syndrome (MODS) and cite its significance in shock.</p>
<p><b>Endocrine System</b></p> <p><b>Reading: Chapter 18, 19</b></p>	<p><b>Mechanisms of Endocrine Control</b>  Describe the mechanism of hormone synthesis, transport, and inactivation. State the role of the hypothalamus in regulating pituitary control of endocrine function and explain positive and negative feedback control.  Describe the mechanisms of hypofunction and hyperfunction and discuss the clinical features of hypopituitarism.</p> <p><b>Disorders of Endocrine Control</b>  Discuss the pathophysiology and clinical manifestations of syndrome of inappropriate antidiuretic hormone secretion.  Discuss the pathophysiology and clinical manifestations of diabetes insipidus  State the effects of a deficiency in growth hormone and describe short stature growth hormone deficiency.  Relate the functions of growth hormone to the manifestations of acromegaly and adult-onset growth hormone deficiency.</p>

	<p>Diagram the hypothalamic-pituitary-thyroid feedback system and state the actions of thyroid hormone.          Discuss congenital and acquired hypothyroidism and myxedema.          Describe hyperthyroidism and Graves' disease and thyroid storm.          Describe the function of the adrenal cortical hormones and their feedback regulation.          Relate the functions of the adrenal cortical hormones to Addison's disease and Cushing's syndrome.</p> <p><b>Diabetes Mellitus</b>          Describe the actions of insulin, glucagon, epinephrine, growth hormone, and the adrenal cortical hormones in regulation of blood glucose levels.          Compare the distinguishing features of type 1 and type 2 diabetes mellitus.          Relate the physiologic functions of insulin to the manifestations of diabetes mellitus.          Discuss the role of diet and exercise in the management of diabetes mellitus.          Describe and compare diabetic ketoacidosis with hyperosmolar non-ketotic state.          Describe the clinical manifestations of insulin-induced hypoglycemia.          Describe the pathophysiology and clinical manifestations of the chronic complications of diabetes mellitus.</p>
<p><b>Respiratory System</b>   <b>Reading: Chapter 26, 27</b></p>	<p><b>Control of Respiratory Function</b>          Describe the respiratory lobules, lung circulation, and the two types of alveolar cells.          Explain ventilation and the mechanics of breathing.          Define inspiratory reserve, expiratory reserve, vital capacity, and residual volume.          Differentiate between ventilation, perfusion, and diffusion.          Explain the difference between pO<sub>2</sub> and hemoglobin-bound oxygen and O<sub>2</sub> saturation content.          Describe the function of chemoreceptors and lung receptors in the regulation of ventilation.          Describe several breathing patterns and their significance.</p> <p><b>Disorders of Ventilation and Gas Exchange</b>          Differentiate between the causes and manifestations of spontaneous and tension pneumothorax.          Describe the causes and manifestations of atelectasis.          Relate the pathologic changes that occur in bronchial asthma to the production of signs and symptoms.          Explain the distinction between chronic bronchitis and emphysema in terms of pathology and clinical manifestations.          Describe the genetic abnormality responsible for cystic fibrosis and state the disorder's effect on lung function.          State the most common cause of pulmonary embolism and the clinical manifestations of the disorder.          Explain pulmonary hypertension and cor pulmonale.          Describe the pathologic lung changes that occur in acute respiratory distress syndrome and relate them to the clinical manifestations of the disorder.          Define the terms hypoxia, hypoxemia, and hypercapnia and state a general definition for respiratory failure.          Compare the manifestations and treatment of hypoxia and hypercapnia.          Describe the signs and symptoms and treatment for hyperventilation syndrome.</p>

	<p><b>Respiratory Tract Infections</b>  Differentiate among the various types of pneumonias in terms of pathogens, manifestations, and prognosis.  Differentiate between primary and reactivated tuberculosis.  List three forms of fungal infections that affect the lungs.</p>
<p><b>Renal System</b>   <b>29, 30</b></p>	<p><b>Control of Renal Function</b>  Explain the structure and function of the glomerulus and tubular components of the nephron.  Describe the elimination and endocrine functions of the kidney.  Describe the characteristics of normal urine and the significance of the specific gravity.  Explain the significance of serum creatinine and blood urea nitrogen levels in evaluating renal function.  Describe the physiologic action of diuretics.</p> <p><b>Disorders of Renal Function</b>  Describe the genetic basis for renal cystic disease, the pathology of the disorder, and its signs and symptoms.  List the common causes of urinary tract obstruction and describe the effects of urinary tract obstruction on renal function.  Describe the types of renal calculi and the manifestations and treatment associated with kidney stones.  Cite the organisms most responsible for UTIs and state predisposing factors related to UTIs.  Explain the pathogenesis of kidney damage in pyelonephritis.  Describe the two types of immune mechanisms involved in glomerular disorders.  Relate the proteinuria, hematuria, pyuria, oliguria, edema, hypertension, and azotemia that occur with glomerulonephritis to changes in glomerular structure.</p> <p><b>Renal Failure</b>  Distinguish between acute and chronic renal failure in terms of causes, treatment, and outcome.  Differentiate the prerenal, intrinsic, and postrenal forms of acute renal failure in terms of the mechanisms of development and manifestations.  Cite the two most common causes of acute tubular necrosis and describe the course of the diseased in terms of initiation, maintenance, and recovery phases.  Describe the progression of stages to end stage renal disease.  List the common problems associated with end-stage renal disease, including alterations in fluid and electrolyte balance and disorders of skeletal, hematologic, cardiovascular, immune, neurologic, skin, and sexual function, and explain their physiologic significance.  Describe dietary management of chronic renal failure.</p>
<p><b>Digestive System</b>   <b>Reading: Chapter 35, 36</b></p>	<p><b>Control of Gastrointestinal Function</b>  Review the structure and organization and motility of the GI tract.  Describe the function of gastric secretions and hormones in the process of digestion.  Compare the digestion and absorption of carbohydrates, fats, and proteins.</p> <p><b>Disorders of Gastrointestinal Function</b></p>

	<p>Describe the manifestations associated with GI disorders.          Discuss the pathophysiology of gastroesophageal reflux          Explain the relationship between the gastric mucosal barrier and the development of ulcers including the role of H. Pylori.          Differentiate between the causes and manifestations of acute and chronic gastritis.          Describe the pathophysiology and manifestations of peptic ulcer disease.          Discuss the risks, incidence and manifestations of cancer of the stomach.          Compare the characteristics of Crohn’s disease and ulcerative colitis.          Differentiate constipation and fecal impaction from intestinal obstruction.          List the risk factors associated with colorectal cancer and cite the screening methods for detection.          Describe the manifestations of peritonitis.</p> <p><b>Disorders of Hepatobiliary and Pancreas Function</b>          Describe the functions of the liver.          Discuss the process of bilirubin and bile production and the relation to jaundice.          Compare hepatitis A, B, and C in terms of source of infection, incubation period, acute manifestations, development of chronic disease, and the carrier state.          Characterize the liver changes that occur with cirrhosis and describe the physiologic basis for portal hypertension and relate it to the development of ascites and esophageal varices.          Relate the functions of the liver to the manifestations of liver failure.          Describe the formation of gallstones and the clinical manifestations of acute and chronic cholecystitis.          Differentiate between acute and chronic pancreatitis.          State the reason for poor prognosis in pancreatic cancer.</p>
<p><b>Musculoskeletal System</b></p> <p><b>Reading: Chapter 38, 39</b></p>	<p><b>Structure and Function of the Musculoskeletal System</b>          Name and characterize the function of the types of bone cells.          Discuss the function of parathyroid hormone, calcitonin, and vitamin D in terms of bone formation and metabolism.          Discuss the structure, function of bones, joints, and skeletal muscles.</p> <p><b>Alterations of Musculoskeletal Function</b>          Differentiate between different types of fractures.          Discuss complications of fracture healing.          Describe risk factors that contribute to the development of osteoporosis and prevention strategies for this disorder.          Compare/ contrast non-inflammatory joint disease with inflammatory joint disease.          Discuss fibromyalgia.</p>