Washtenaw Community College Comprehensive Report

BIO 212 Pathophysiology: Alterations in Structure and Function
Effective Term: Spring/Summer 2020

Course Cover

Division: Math, Science and Engineering Tech
Department: Life Sciences
Discipline: Biology
Course Number: 212
Org Number: 12110
Full Course Title: Pathophysiology: Alterations in Structure and Function
Transcript Title: Pathophysio:Alter Struct/Func
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Course description
Outcomes/Assessment
Objectives/Evaluation
Other:
Rationale: Three-year syllabus review
Proposed Start Semester: Fall 2019
Course Description: In this course, students are provided with an in-depth introduction to the study of human disease as an alteration of normal anatomy and physiology. This course covers major topics in pathophysiology including etiology, pathogenesis, adaptation and common clinical aspects of disease.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 60 **Student:** 60
Lab: Instructor: 0 **Student:** 0
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 60 **Student:** 60
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite
BIO 111 minimum grade "B-"
and

Prerequisite
BIO 147 minimum grade "C-"; may enroll concurrently
or
Prerequisite
BIO 237 minimum grade "C-"; may enroll concurrently

General Education

MACRAO
MACRAO Science & Math
General Education Area 4 - Natural Science
Assoc in Applied Sci - Area 4
Assoc in Science - Area 4
Assoc in Arts - Area 4
Michigan Transfer Agreement - MTA
MTA Science (no lab)

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Analyze alterations in homeostasis.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

2. Summarize alterations in cellular function, genetics and development.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

3. Articulate alterations in immune and inflammatory response.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
Who will score and analyze the data: Department faculty

4. Describe alterations in movement and support.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

5. Evaluate alterations in neural control and integration.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

6. Interpret alterations in respiration and tissue oxygenation.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

7. Discuss alterations in gastrointestinal function, endocrine function, metabolism and nutrition.
   Assessment 1
   Assessment Tool: Multiple-choice questions embedded on unit exams
   Assessment Date: Fall 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
   Who will score and analyze the data: Department faculty

8. Explain alterations in fluid balance, excretion, and reproduction.
   Assessment 1

Assessment Tool: Multiple-choice questions embedded on unit exams
Assessment Date: Fall 2022
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Answer key
Standard of success to be used for this assessment: 70% of the students will score 75% or higher.
Who will score and analyze the data: Department faculty

Course Objectives

1. Discuss the concept of homeostasis as it relates to stress, adaptation and the pathogenesis of disease.
2. Describe and differentiate cellular responses to injury and ischemia. Explain how these responses can result in necrosis and/or apoptosis.
3. Identify the factors involved in normal and abnormal fluid, electrolyte and acid-base balance.
4. Characterize normal/abnormal function of the reproductive systems.
5. Elaborate on the structure, function and disorders of the integumentary system. Discuss the basic functions of wound healing and tissue repair.
6. Identify the fundamentals of inflammation, infection, immune responses and autoimmunity and how these processes contribute to disease.
7. Distinguish between Type I, II, III, and IV hypersensitivity reactions and the effects of these reactions. Identify several diseases or conditions caused by each type of reaction and reasons for possible treatments.
8. Discuss the multi-body system responses with sepsis and septic shock syndromes.
9. Describe both the genetic and environmental factors that underlie the etiologies and pathogenesis of human cancers, and discuss prevention and reasons for possible treatment strategies.
10. Discuss the process of carcinogenesis.
11. Discuss the relationships of blood flow, O2 and CO2 transport and hemostasis to the pathophysiology and development of disease.
12. Evaluate normal, altered functions and disorders of the urinary system including its endocrine function, regulation of body fluids, electrolytes and acid/base balance.
13. Analyze the regulation, functions, pathophysiologic processes that involve the cardiovascular and pulmonary systems and their impact on disease expression.
14. Differentiate between the most common pathophysiologic and disease processes involving the gastrointestinal and biliary systems, the liver and pancreas.
15. Recognize the pathogenesis of common diseases of the endocrine organs and the influence of these diseases on the functions of other organ systems.
16. Articulate the fundamentals of gene regulation, genetic mutation (single gene, multifactorial, nuclear and mitochondrial gene disorders), chromosomal abnormalities and the influence of genetics on the pathogenesis of disease.
17. Describe and differentiate the pathophysiologic and clinical features of acute and chronic diseases of the musculoskeletal and neurological systems.
18. Discuss alterations in hemostasis and blood coagulation, blood flow, blood pressure, cardiac function and shock.
19. Explain alterations in gas exchange. List, compare and contrast lung disorders of obstruction and restriction.
20. Identify and evaluate diverse manifestations and pathologic processes as presented in individual patients. Employ skills in critical thinking and clinical reasoning through discussions, assignments and case studies. Explain how selected medical therapies have a basis in both the treatment of disease as well as the correction and/or control of homeostatic mechanisms.

New Resources for Course

Course Textbooks/Resources

Textbooks

Grossman, Sheila, Mattson Porth, Carol. *Porth's Pathophysiology; Concepts of Altered Health States*, 5th-9th Edition ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2014, ISBN: 9781451146004.

Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Testing Center

Reviewer	Action	Date
Faculty Preparer:		
Susan Dentel	*Faculty Preparer*	*Jul 21, 2019*
Department Chair/Area Director:		
Anne Heise	*Recommend Approval*	*Aug 23, 2019*
Dean:		
Victor Vega	*Recommend Approval*	*Sep 17, 2019*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Oct 31, 2019*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Nov 08, 2019*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Nov 08, 2019*

WASHTENAW COMMUNITY COLLEGE

MASTER SYLLABUS

Course Discipline Code & No: BIO 212 **Title:** Pathophysiology: Alterations in Structure and Function
Effective Term Fall 2007

vision Code: MNBS **Org #:** 12100 **Department Code:** LIF

Don't publish: ☐ College Catalog ☐ Time Schedule ☐ Web Page

Reason for Submission. Check all that apply.
- ☒ New course approval
- ☐ Three-year syllabus review/Assessment report
- ☐ Course change
- ☐ Reactivation of inactive course
- ☐ Inactivation (Submit this page only.)

Change information: Note all changes that are being made. Form applies only to changes noted.

- ☒ Consultation with all departments affected by this course is required.
- ☒ Course discipline code & number (was HSC 220)*
  *Must submit inactivation form for previous course.
- ☒ Course title (was Pathophysiology)
- ☐ Course description
- ☒ Course objectives (minor changes)
- ☐ Credit hours (credits were: _____)
- ☐ Total Contact Hours (total contact hours were: _____)
- ☐ Distribution of contact hours (contact hours were: lecture: _____ lab _____ clinical _____ other _____)
- ☐ Pre-requisite, co-requisite, or enrollment restrictions
- ☐ Change in Grading Method
- ☐ Outcomes/Assessment
- x☐ Objectives/Evaluation
- ☐ Other _____

Rationale for course or course change. Attach course assessment report for existing courses that are being changed.

Course title changed to accommodate 2-semester sequence in combination with new BIO 212, Pathophysiology: Alterations in Structure and Function (formerly HSC 220, Pathophysiology)

Additional detail to objectives.

Approvals Department and divisional signatures indicate that all departments affected by the course have been consulted.

Department Review by Chairperson ☐ New resources needed ☒ All relevant departments consulted

Print: Esta Grossman/~~David Shier~~ Faculty/Preparer Signature Esta Grossman Date: 3/29/07

Print: Esta Grossman Department Chair Signature Esta Grossman Date: 3/29/07

Division Review by Dean

☐ Request for conditional approval

Recommendation ☒ Yes ☐ No M. Stowar Dean's/Administrator's Signature 3/29/07 Date

Curriculum Committee Review

Recommendation _____

☐ Tabled ☒ Yes ☐ No Lisa Vlasy Curriculum Committee Chair's Signature 5/21/07 Date

S.

WASHTENAW COMMUNITY COLLEGE

MASTER SYLLABUS

Vice President for Instruction Approval

Roger M. Palay. — Vice President's Signature — Date 4/3/07

Approval ☒ Yes ☐ No ☒ Conditional

Do not write in shaded area.
Entered in: Banner 4/6 **C&A Database** 4/6 **Log File** 3/29/07 4/6/07 **Basic skills spreadsheet updated** ☐ **Contact fee** ☐
Please return completed form to the Office of Curriculum & Assessment and email an electronic copy to sjohn@wccnet.edu **for posting on the website.**

5/29/07 full approval

200701

Timing with respect to curriculum committee meeting. R.M.P.

5/21/07
Oh.
Roger M. Palay.
5/21/07

***Complete ALL sections which apply to the course, even if changes are not being made.**

Course:	Course title:
BIO 212	Pathophysiology: Alterations in Structure and Function

Credit hours: 4

If variable credit, give range:

_____ to _____ credits

Contact hours per semester:

	Student	Instructor
Lecture:	60	60
Lab:		
Clinical:		
Practicum:		
Other:		
Totals:	60	60

Are lectures, labs, or clinicals offered as separate sections?

☐ Yes - lectures, labs, or clinicals are offered in separate sections

☒ No - lectures, labs, or clinicals are offered in the same section

Grading options:

☐ P/NP (limited to clinical & practica)

☐ S/U (for courses numbered below 100)

☒ Letter grades

Prerequisites. Select one:

☒ College-level Reading & Writing ☐ Reduced Reading/Writing Scores (Add information at Level I prerequisite) ☐ No Basic Skills Prerequisite (College-level Reading and Writing is not required.)

In addition to Basic Skills in Reading/Writing:

Level I (enforced in Banner)

	Course	Grade	Test	Min. Score	Concurrent Enrollment (Can be taken together)	Corequisites (Must be enrolled in this class also during the same semester)
	BIO 111	B-			☐	
☒ and ☐ or	BIO 147	C-			☒	
☐ and ☒ or	BIO 237	C-			☒	
☐ and ☐ or					☐	

Level II (enforced by instructor on first day of class)

	Course	Grade	Test	Min. Score
☐ and ☐ or				
☐ and ☐ or				

Enrollment restrictions (In addition to prerequisites, if applicable.)

☐ and ☐ or Consent required ☐ and ☐ or Admission to program required Program: _____ ☐ and ☐ or Other (please specify): _____

Please send syllabus for transfer evaluation to:

Conditionally approved courses are not sent for evaluation.

Insert course number and title you wish the course to transfer as.

☐ E.M.U. as _____

☐ U of M as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

WASHTENAW COMMUNITY COLLEGE

MASTER SYLLABUS

Please send syllabus for transfer evaluation to:
Conditionally approved courses are not sent for evaluation.
Insert course number and title you wish the course to transfer as.

☒ E.M.U. as _HSC220_____ ☐ _____ as _____

☒ U of M as _HSC 220_____ ☐ _____ as _____

☐ _____ as _____ ☐ _____ as _____

Course	**Course title**
BIO 212	Pathophysiology: Alterations in Structure & Function

Course description State the purpose and content of the course. Please limit to 500 characters.	The focus of this course is the application of the concepts of normal anatomy and physiology to the study of the disease processes in humans. The course includes identification of the etiology and pathogenesis of disease, alterations in normal body function, and the reaction and adaptation of the body to disease.	
Course outcomes List skills and knowledge students will have after taking the course. **Assessment method** Indicate how student achievement in each outcome will be assessed to determine student achievement for purposes of course improvement.	**Outcomes** (applicable in all sections)	**Assessment** Methods for determining course effectiveness
	1. Build on the concept of normal function expounded in Biology 111, and for each main system, explain the mechanisms of pathophysiology as they contrast to normal function, and illustrate with specific diseases.	1. Multiple choice and/or short answer questions on unit exam
	2. Describe the multiple defense systems that protect our normal organ-system functions. Explain how dysfunction of these systems can disrupt these defenses	2. Multiple choice and/or short answer questions on unit exam
	3. Explain the roles of genetic factors in determining normal and abnormal anatomy and physiology.	3. Multiple choice and/or short answer questions on unit exam

Course Objectives Indicate the objectives that support the course outcomes given above. Course Evaluations Indicate how instructors will determine the degree to which each objective is met for each student.	Objectives (applicable in all sections)	Evaluation Methods for determining level of student performance of objectives
	1. Build on the concept of normal function expounded in Biology 111, and for each main system, explain the mechanisms of pathophysiology as a contrast to normal function, and illustrate with specific diseases. (a) Discuss the disease process as a breakdown in homeostasis. Give examples. (b) Identify the role that stress plays in successful adaptation and in disease. (c) Clearly describe the difference between a positive & negative feedback loop, the situations in normal physiology where each is used, and which predominates in disease. List specific examples of each. (d) Identify & discuss the changes that occur in injured/stressed cells. (e) List specific examples of types of adaptive changes that normal tissues undergo in relation to a specific injury; discuss atrophy, hypertrophy, hyperplasia, dysplasia, and metaplasia, and identify conditions under which each can occur. (f) List & describe the major events in the repair process & their order of occurrence. (g) Differentiate between apoptosis and necrosis as methods of tissue death, and describe the etiologies, types, results, and possible complications of each process. (h) Identify the factors involved in normal and abnormal fluid, electrolyte and acid-base balance -- Review the different compartments for body fluids. -- Review the factors that affect normal water movement. -- Review the normal distribution of electrolytes in different body compartments. -- Review the role of ADH, natiuretic homone, and aldosterone in fluid and electrolyte balance. -- Identify the mechanisms causing edema. -- Explain the normal mechanism for buffering hydrogen ion, and the role of carbonate and phosphate buffers in the blood. -- Define isotonic, hypertonic, and hypotonic fluid alterations in normal and disease states. -- Identify the consequences of abnormal levels of sodium, potassium, calcium, phosphate, and magnesium, using the proper clinical terms to describe these conditions.	

	-- Differentiate between respiratory acidosis and alkalosis, and metabolic acidosis and alkalosis in terms of etiology, signs and symptoms, and treatments. (i) Characterize normal/abnormal functioning of the hematological system: -- Review the components of normal blood. Identify normal values for RBC's, WBC's, platelets, hematocrit, hemoglobin. -- Explain the significance of a reticulocyte count. -- Review the formation of each kind of blood cell and where this formation takes place. Explain the role of erythropoietin in RBC formation. Identify where it is produced. -- Differentiate between the etiologies, pathogeneses, outcomes, and treatments for the various types of anemias and polycythemias. -- List the roles that the spleen normally plays in RBC function. Expalin why an enlarged spleen can lead to anemia and what forms of anemia might cause an enlarged spleen. -- Explain why multiple bone fractures might result in anemia and why kidney disease might result in anemia. -- Expalin why emphysema might result in polycythemia and why congestive heart failure (CHF) can result in polycythemia. -- Define the terms leukocytosis, leukopenia, neutrophilia, monocytosis, lymphocytosis, neutropenia, agranulocytosis. -- Differentiate between the leukemias and lymphomas with respect to pathogenesis, signs and symptoms, and discuss reasons for current treatments. -- Describe the pathogenesis of multiple myeloma, its signs and symptoms and discuss reasons for current treatments. Explain how this disease relates to kidney failure. -- Describe, in general, the sequence of events involved in the formation of a fibrin clot, the intrinsic and extrinsic pathways, and the role of platelets and clotting factors. -- Differentiate between anticoagulants and "clot busters," in terms of appropriate situations for use. -- List the main etiologies for clotting abnormalities, and list examples of pathologies that fall under each type of abnormality. -- Identify the possible etiologies, pathogenesis, and treatment pros and cons for DIC. -- Of all the hematological diseases mentioned, list which are caused by Genetics? Nutrition?

Pathogens? Drugs? Unknown Agents?

(j) Characterize normal/abnormal functioning of the peripheral vascular system

-- Review the names and locations of the main peripheral blood vessels, both arteries and veins.

-- Review the structural differences between an artery, vein, and capillary, and discuss how these differences reflect their specific function.

-- Review the mechanism for vasodilation and vasoconstriction of peripheral blood vessels, and the physiological function of each.

-- Define: congestion, hyperemia, edema, thrombosis, embolism, exudate, hemorrhage, aneurysm, arteriosclerosis, atherosclerosis, varicose veins. List several possible causes for each condition, results of each condition, and possible treatments.

-- Discuss the importance of hydrostatic and colloid osmotic pressures in capillary function. Explain what would happen if hydrostatic pressure in a capillary increased; if colloid osmotic pressure increased.

-- Compare and contrast the effects of a venous thrombus with the effects of an arterial thrombus.

-- Discuss if a vein or an artery is more likely to develop an aneurysm and why.

-- Describe the multiple etiologies, pathogenesis, diagnostic tests and reasons for current treatments for atherosclerosis.

-- Describe the multiple etiologies, pathogenesis, diagnostic tests and reasons for current treatments for hypertension.

-- Explain how the kidneys, adrenal glands, arterioles, and sympathetic nervous system relate to hypertension.

(k) Characterize normal/abnormal functioning of the heart

-- Review normal cardiac function, the anatomy of the heart, the pathway of blood through the heart, the conduction system of the heart, the events in the cardiac cycle, the vessels connected to the heart, and the neural mechanisms regulating heart function.

-- Review and be able to trace the coronary circulation, pulmonary circulation, and multiple pathways in the systemic circulation.

-- Review the relationships of blood flow, pressure, and resistance.

-- Review the roles of chemoreceptors and baroreceptors in cardiovascular regulation.

-- Review the roles of sympathetic and parasympathetic nervous systems in cardiovascular

regulation, including the function of alpha and beta sympathetic receptors and the baroreflex arc.

-- Review cardiac output, stroke volume, heart rate, arterial blood pressure, pulse pressure, pulse, central venous pressure, preload, afterload, contractility, ejection fraction. Identify how these parameters are interrelated.

-- Review the relationships between mean arterial pressure, cardiac output and total peripheral resistance.

-- Decsribe the relationship between cardiac output, stroke volume, and heart rate.

-- Describe the relationship between myocardial O2 supply and demand and state the factors that can effect each variable.

-- Describe the possible causes of myocardial ischemia, the progression of the disease, cardiac attempts at compensation, signs and symptoms, and reasons for current treatments.

-- Define myocardial infarction (MI), Identify three types of MI and the reasons for the current treatment for each type. Discuss the phases of MI, complications, and specific events in the disease process.

-- Identify the relationship of MI and: arrythmias, abnormal origin of the heart beat. and conduction blockage defects. Describe EKG pictures of these conditions.

-- Identify the major causes of valvular disorders. Differentiate between valvular stenosis and valvular insufficiency (valvular regurgitation) with respect to etiologies, associated abnormal heat sounds, and reasons for current treatment.

(l) Normal/Abnormal Functioning of the Respiratory System

-- Describe how the position of the right bronchus relate to the correct positioning of an endotracheal tube.

-- Describe how smoking affects the epithelium of the respiratory system.

-- Review, step-by-step, the process of ventilation. Identify the pressure relationships and the functions of ribs, intercostal muscles, and diaphragm. State the normal ventilatory rate.

-- Review the roles of O2 and CO2 in the control of breathing, the location of the central and peripheral respiratory centers, and how each controls the rate of breathing.

-- Review the relationship between cardiac regulation and respiratory regulation, including baroreceptors and chemoreceptors. Identify where

	they are located. Identify the ideal relationship between ventilation and perfusion. -- Identify the time that it normally takes to perfuse blood, its relationship to heart rate, and how a rapid heart rate interfere with perfusion. -- Review and trace the pathway of the pulmonary circulation, the bronchial circulation, blood starting in the bronchial circulation and ending up in the pulmonary circulation, and vice versa. Identify the specific function of each circulation route. -- Review two ways that the blood transports oxygen,. and the normal values for PaO2 and PvO2. -- Explain the meaning of the HbO2 dissociation curve and its uses. -- Review how the blood transports CO2, the chemical relationship between blood CO2 and pH, the chemical equation for bicarbonate formation, and the normal values for PCO2. -- Explain how respiratory problems can cause acid-base imbalance (acidosis or alkalosis). Identify what PCO2 values are seen in acidosis and alkalosis. -- Describe how the respiratory system is used to correct acid-base imbalance. Contrast this to the role of the kidney in causing and-or correcting acid-base imbalance. -- Often a patient with COPD is called a 50/50 patient. Explain how this relates to PO2 and PCO2. -- Identify the origin of surfactant in embryonic development and its function in the infant, child, and adult. Explain reasons for current treatment with Exosurf and/or ECMO. -- Explain the current theory on the cause of SIDS. Describe how SIDS babies are maintained, if they survive. -- Define and give signs and symptoms of: hypoxemia, hypoxia, hypercapnia, hypocapnia, cyanosis. -- Explain the relationship between tissue hypoxia and blood hypoxemia. -- Be able to define the following terms and identify causes of each: Cough, Atalectasis. Dead space, Pneumothorax, Shunt. Compliance, Sputum, Digitial clubbing, Hemoptysis, PO2, Dyspnea, PCO2, Alveolar hypo or hyper ventilation, Apnea, Ventilatory hyper or hypo ventilation, Crepitus, Acidosis, Alkalosis, Hypoxia, Hypoxemia -- Enumerate the multiple causes of COPD and of restrictive disorders. Describe what characteristic signs and symptoms the patient has in each case. -- Identify the specific blood pH changes usually associated with obstructive disorders and restrictive	

	disorders and their etiologies. -- Define what is meant by an over-inflated lung (hyperinflation), and its possible etiologies. -- List several causes of atelectasis. -- List several causes of a pneumothorax. -- Describe the cause, effects, and reasons for current treatments for pulmonary vasoconstriction. Define "cor pulmonale" -- Explain why asthma is classified as a Type I hypersensitivity disorder. -- List some adaptive mechanisms that respiratory patients use that impinge on the functioning of other systems.. -- Define "status asthmaticus" --Discuss the genetics, signs and symptoms, pathogenesis, and reasons for current treatments for cystic fibrosis. -- Identify several extrapulmonary disorders that result in restricted ventilation. -- Define what is meant by respiratory distress syndrome. (A.R.D.S.) and list its multiple causes./ -- List some cardiovascular disorders that affect the lungs, for example: pulmonary edema, pulmonary emboli. Identify signs and symptoms, and how the body attempts to compensate. -- Identify some necrotic disorders that affect the lungs, such as TB and cancer. -- Clinically, it is not a good idea to give O2 without the aid of a respirator to a chronic COPD patient in respiratory distress. Explain why this is so. --(m) <u>Characterize normal/abnormal functioning of the renal system</u> -- Review the steructure of the urinary system, including its connection to the circulatory system. Indicate the differences between male and female urinary systems. -- Review the specific functions of each part of the nephron and how they relate to the functions of filtration, reabsorption, and secretion. -- Define glomerular filtration rate (GFR), and describe how it is measured. -- Review the location and function of the juxtaglomerular apparatus and the macula densa and how they relate to normal blood pressure regulation . -- Review how the kidney regulates acid-base balance; electrolyte balance; water balance; blood pressure; red blood cell production; bone health via Vitamin D.	

	-- Identify hormones (ADH, aldosterone, parathormone, calcitonin, and renin) that effect tubular function, and describe the likely effects of hyper- or hypo- secretion of these hormones. -- Compare the roles of the respiratory system and urinary system in acid-base regulation. -- Define the following terms and list causes of each: Anuria, Dysuria, Calculi, Proteinuria, Glycosuria, Urolithiasis, Polyuria, Nephrotic syndrome, Oliguria, Uremia, Dialysis, Azotemia, Metabolic Acidosis/Alkalosis, Fluid overload, Nephrostomy, Uremic frost, Hyperphosphatemia, Hypophosphatemia, Hypernatremia, Hyponatremia, Hyperkalemia, Hypokalemia, Bacteriemia, Hydronephrosis, Albuminuria, Hematuria, Hypercalemia, Hypocalemia. -- Differentiate between chronic and acute renal failure. Identify the similarities and differences with respect to etiologies, sequence of events, outcome, and reasons for current treatments. -- Identify what the BUN level measures, and the usefulness of this test. -- Explain significance of a unchanging urine specific gravity of 1.010. -- Identify the most common infecting organism in urinary tract infections. -- List four causes of obstruction in the urinary tract. -- Differentiate among cysitis, pyelonephritis, glomerular nephritis, nephrosclerosis, renal tubular acidosis, and renal artery stenosis. Identify causes and pathogenesis. -- Describe relationship between chronic renal failure and hypertension. -- List several systemic diseases that have important secondary effects on the kidneys. -- Discuss the uremic syndrome, including the manifestations especially related to electrolyte balance, acid-base balance, rbc, and CNS disturbances. -- Differentiate between the two main types of dialysis (hemodialuysis vs. peritoneal dialysis). Give advantages and disadvantages of each. -- Describe the potential complications of renal transplantation. -- Explain why most renal patients suffer from anemia, and why EPO is used in this situation. (n) <u>Characterize normal/abnormal functioning of the nervous system</u>	

	-- Describe the major theories of pain: the specificity theory, the intensity theory, the gate control theory, and the pattern theory. -- Differentiate between acute and chronic pain. -- Describe the process of normal thermoregulation. -- Discuss the effects of the three major alterations in body temperature: fever, hyperthermia, and hypothermia. -- Identify and discuss the normal sleep cycle. -- Describe the types of sleep disorders and give an example of each. -- Describe the common ocular pathophysiologies, including causation, manifestations, and complications. -- Differentiate between conductive and sensorineural hearing losses. -- Describe alterations in smell and taste with causation and effect. -- Define normal proprioception and identify the effects of altered proprioception. -- Identify the major causes of altered levels of arousal with differentiating manifestations and short-term and long-term effects. -- Identify the areas of the brain and pathophysiologic theories associated with disorders of cognition. -- Compare and contrast the major motor syndromes: CNS motor, motor unit, pyramidal, extrapyramidal, cerebellar, and upper and lower motor neuron. -- Demonstrate and describe posturing responses (i.e., decorticate, decerebrate). -- Differentiate between neuropathies and myopathies. -- Identify the areas of the brain damaged when the manifestations are alterations in emotions and behaviors. -- Identify the major cerebral function deficits from cognitive descriptions of behaviors. -- Compare and contrast the various forms of dysphasia. -- List the causes of cerebral edema and give examples of pathophysiology producing each. -- Describe the mechanisms and manifestations of the herniation syndromes. -- Define the different types of head injuries with examples of the type of force needed to produce each (i.e., subdural hematoma, contusion,	

	concussion). -- Identify signs and symptoms of increased intracranial pressure. -- Discuss the manifestations of complete and partial spinal cord injuries in both the acute and rehabilitative phases. -- Identify known causes of low back pain. -- Describe the pathophysiologies producing interruption of cerebral vascular flow with reference to location, manifestations, and rehabilitation potential. -- Discuss the cellular pathophysiology and manifestations of the central nervous system tum -- Describe infectious processes occurring in the central nervous system. -- Identify the diseases of basal ganglia degeneration and describe the manifestations of each. -- Describe the different syndromes that determine the initial manifestations of multiple sclerosis. -- Differentiate between upper and lower motor neuron diseases. -- Identify four major congenital abnormalities of the central nervous system and discuss the manifestations of each. -- Describe the differences in central nervous system tumors in children and adults. (o) <u>Characterize Normal and Abnormal Functioning of the Endocrine System</u> -- Review the location of each of the endocrine glands, their hormones, functions of each hormone, and how individual hormones are transported to their target organs. -- Review several specific examples of how negative feedback control regulates endocrine function. -- Review the releasing hormones produced by the hypothalamus and their specific functions. -- Review the glands that are controlled by hypothalamic-pituitary feedbackand the glands that are controlled directly by negative feedback with the organ itself. -- Explain how diagnostic lab values may indicate the source of a lesion in an endocrine system disorder. -- List several possible causes and reasons for	

	possible treatments for endocrine diseases involving hyposecretion; involving hypersecretion. -- Review the normal function of the thyroid gland, the role of iodine, and the etiologies, signs, symptoms, and reasons for possible treatment of hyper and hypo thyroidism. -- Discuss the etiology and pathogenesis of a thyroid storm. -- Explain how hyperthyroidism may lead to congestive heart failure. -- Review the normal functions of Ca++ in homeostasis. -- Review how parathormone, calcitonin, and Vitamin D regulate Ca++ balance. -- Describe the etiology, signs and symptoms and reasons for possible treatments of hypercalcemia and hypocalcemia. -- Differentiate between the adrenal medulla and adrenal cortex in terms of the types of hormones secreted and their functions. Identify which part of the adrenal plays a role in emergency situations and which part in long-term stress? -- Identify the etiology, signs and symptoms and reasons for possible treatmentst for Cushing syndrome. -- Explain why Cushing results in a diabetic type syndrome; increased incidence of myocardial infarction; and increased incidence of congestive heart failure. -- Know why people with glucocorticoid excess have a higher probability of infection. -- Identify the primary and secondary causes of aldosteronism and its connection to hypertension. -- Identify the causes of hirsutism and virilism in females. -- Describe the characteristics of a true hermaphrodite. Define what is meant by an "intersex" person. -- Identify the etiology of androgen insensitivity syndrome, the signs and symptoms and how this differs from the etiology of intersexuality. -- Describe the etiology, signs and symptoms, and reasons for possible treatment of Addison disease. -- Review each of the pituitary hormones and their overall function. -- List the effects effects of panhypopituitarism on the endocrine system; identify reasons for possible treatments. -- List the effects of hyperpituitarism; identify rreasons for possible treatments.	

	-- Compare and contrast giantism and acromegaly. -- Discuss symptoms of pituitary dwarfism. -- Identify several hormones that directly affect blood glucose and list the specific effect of each. -- Know the definition, causes, and treatment of diabetes mellitus; hyperglycemia; hypoglycemia; diabetic coma; DKA; insulin shock. -- Discuss the causes and probable results of insuln resistance. -- Explain why a person in a diabetic coma has a "fruity breath." -- Differentiate between the symptoms of a person in a diabetic coma and in insulin shock. -- Explain the difference in course and reasons for possible treatments between Type I diabetes (IDDM) and Type II diabetes (NIDDM). -- Identify the cause and reasons for possible treatments for diabetes insipidus. -- Review the relationship between ACTH, cortisol, and the stress response. (p) <u>Characterize Normal and abnormal functioning of the gastrointestinal system</u> -- Review the organs in the GI tract, including accessory organs that secrete into the tube, the functions of each organ, and the location of the sphincters. -- Review the innervation of the GI tract, paying special attention to the vagus nerve. -- Review the hormones produced by the GI tract and accessory organs and their effects. -- Identify definitions, etiologies, signs and symptoms, and treatments for: achalasia, diffuse esophageal spasm, esophagitis, and two types of a hiatal hernia. -- Discuss how diffuse esophageal spasm tends to mimic cardiac disease and how that might complicate treatment.. -- Explain why the prognosis is so poor for esophageal cancer. -- Identify the cause and symptoms of esophageal reflux (GERD and reasons for possible treatments. -- List the main jobs of the stomach. -- Identify the relationship between gastric disorders and pernicious anemia. -- Describe a positive feedback loop involved in the development of ulcers.	

	-- Identify the definitions, etiologies, signs and symptoms, and reasons for possible treatments for: gastritis (acute and chronic), peptic ulcers (duodenal and gastric), stress ulcers. Identify the most common site for a peptic ulcer. -- Explain the role of Helicobactor pylorii in the development of ulcers, and identify the reasons for possible current treatments for ulcers. -- Discuss the cause and results of "dumping syndrome." -- Be able to list several complications of intractable ulcers. -- Identify the incidence and prognosis of gastric cancer. -- Define: pyloroplasty, gastrectomy. -- Identify the role of intrinsic factor in the stomach. -- Differentiate between a malabsorptive syndrome and an obstructive one. List the signs and symptoms of each. -- Differentiate between malabsorption and maldigestion. -- Identify the definitions, etiologies, signs and symptoms, and reasons for possible treatments for: non-tropical sprue (celiac disease), lactase deficiency, Crohn disease, paralytic ileus, adhesions, volvulus, intussusception, and hernias. -- Define and identify the causes of peritonitis. -- Identify the frequency and prognosis for cancer of the small intestine. -- Be able to define ileostomy. Why might an ileostomy result in pernicious anemia, and how might this be avoided? -- Discuss why the small intestine is particularly susceptible to chemotherapeutic side effects. -- Identify what disorders of the large intestine lead to an increase in clotting time. -- Identify the definitions, etiologies, signs and symptoms, and reasons for possible treatments for: diverticulosis, diverticulitis, ulcerative colitis. -- Discuss the relationship between colitis and cancer of the colon; between Crohn disease and cancer of the colon. -- Identify the etiology of toxic megacolon. -- Discuss the incidence and prognosis of colon cancer, and why the prognos is better than in other parts of the GI tract. -- Draw the main route for metastasis of cancer of the large intestine. -- Define: hemorrhoids, anal or rectal fissure,	

	colostomy. -- Identify the probable relationship between colon disorders and a high residue diet. -- List signs and symptoms of appendicitis. -- List the preventative tests now being used to detect colon cancer. -- Review the functions of each of the major accessory organs: liver, pancreas, and gall bladder, and their anatomic relationships. -- Review the pathways and functions of the dual circulations of the liver. -- Explain why liver disease may cause: varices of the esophagus or rectum, severe edema and ascites, jaundice, high blood ammonia, bleeding disorders, pernicious anemia, gynecomastia, hypertension, congestive heart failure, CNS disturbances, spleenomegaly, and steatorrhea, aldosteronism. -- List several specific causes of jaundice. -- Identify the definitions, etiologies, signs and symptoms, reasons for possible treatments, and complications and prevention of cirrhosis. -- Identify the definitions, etiologies, signs and symptoms, reasons for possible treatments, complications, and prevention of hepatitis. -- List the main disorders of the gall bladder. -- Explain what dietary changes are advised after removal of the gall bladder. -- Identify the etiology, signs, and symptoms of acute and chronic pancreatitis. -- Identify the prognosis for pancreatic cancer. (q) <u>Charcterize normal/abnormal function of the reproductive systems</u> -- Review the function of the graafian follicle, the corpus luteum, the seminiferous tubules, and the interstitial cells -- List the events in the menstrual cycle and the hormones involved. -- Identify the hormone responsible for labor during pregnancy. -- Identify what symptoms occur hormonally, physically, and psychologically during menopause. -- Describe delayed or precocious puberty. -- Describe the alterations in menstruation. -- Identify the manifestations of premenstrual syndrome and at least one pathophysiologic explanation for its occurrence.	

	-- Discuss the various sites of infection and inflammation in the female reproductive system, including manifestations and treatments. -- List the tumors of the female reproductive system, including reasons for possible treatments and prognosis of each. -- Discuss the various sites of inflammation and infection in the male reproductive system, including manifestations and reasons for possible treatments. -- Differentiate between a varicocele, hydrocele, and spermatocele. -- Compare benign prostatic hypertrophy with prostate cancer. -- Describe the common impairments to normal male reproductive function. -- Differentiate between fibrocystic breast disease and breast cancer, with attention to risk factor detection, manifestations, reasons for possible treatments, and prognosis. -- Identify the name, cause, and reasons for possible treatments for the major sexually transmitted diseases. (s) <u>Characterize Alterations of Musculoskeletal Function:</u> -- Compare the types of fractures. -- Differentiate between osteoporosis, osteomalacia, and osteomyelitis. -- Identify the various types of musculoskeletal tumors. -- Differentiate between inflammatory and noninflammatory joint disease and discuss a specific example of each. -- Describe the pathophysiology of gout. -- Identify the causes of contractures. -- Discuss techniques to limit or decrease muscle atrophy caused by inactivity. -- Compare disorders of the muscles produced by infection, inflammation, or metabolic abnormalities, and give a specific example of each. -- Describe the toxic myopathy related to alcohol abuse. -- Describe rhabdomyosarcoma. -- Describe osteogenesis imperfecta. -- Discuss the osteochondroses. -- Describe the pathophysiology and manifestations of the muscular dystrophies.	

	-- Describe the most common bone tumors of childhood: osteosarcoma and Ewing sarcoma. (t) Characterize Structure, Function, and Disorders of the Integumentary System -- Describe the development of pressure ulcers, with attention to the risk factors for development. -- Compare the various forms of dermatitis. -- Compare and contrast acne vulgaris and acne rosacea. -- Describe the skin lesions produced by the following infectious agents: Streptococcus, Staphylococcus, herpes virus, papillomavirus, tinea, candidiasis. -- Discuss the similarities and differences between seborrheic keratosis, keratoacanthoma, and actinic keratosis. -- Describe the cancers of the skin, with attention to incidence, risk factors, manifestations, possible reasons for treatments, and prognosis. -- Describe the depth and extent of injury for first-, second-, and third-degree burns. -- Discuss the consequences of body fluid shifts related to burn trauma. -- Differentiate between male and female pattern alopecia. -- Identify the causative organisms of paronychia. -- Describe atopic and diaper dermatitis, focusing on manifestations and possible reasons for treatments. -- Describe the common skin infections produced by bacteria, fungi, and viruses in children. -- Compare the following childhood diseases: rubella, rubeola, roseola, chickenpox, shingles, and smallpox. -- Describe how pediculosis can be spread. -- Describe the similarities and differences between vascular skin disorders seen in children. -- Define erythema toxicum neonatorum. **2. Describe the multiple defense systems that protect our normal organ-system functions. Explain how dysfunction of these systems can disrupt these defenses**	

	(a) Be able to describe possible extrinsic causes of disease. -- Identify the possible modes of entry of an infectious agent into a host. Describe its means of dissemination once in the host. -- Define & give examples of opportunistic infections. -- Identify nutritional deficiencies That may cause a specific disease. (b List 3 overall purposes for the inflammatory process. (c) Review functional characteristics of the 3 types of granulocytes and two types of agranulocytes, where each is manufactured, and their role in inflammation. (d) Identify 5 organs specifically involved in the inflammatory & immune responses and their specific roles. (e) Review the origin of (place of manufacture) and the functions of: complement, fibrn, histamine, fibrinogen, cytokine. interferon, prothrombin, antibodies, prostaglandins, interleukins (f) List and describe the major events--vascular, cellular, & chemical--of acute inflammation & their order of occurrence. -- Be able to describe the origin & problems caused by the following: granulomas, abces, fistula, adhesions, incisional hernias, scar tissue, contractures, keloid ---List some of the overall systemic effects of inflammation. (g) Identify the overall important differences and similarities between the inflammatory response & the immune response. -- Define and give the function of: antigen (Ag); plasma cell, B lymphocyte, antibody (Ab), memory cell, T lymphocyte, Macrophage, T-4 cell, presenting cell, T-8 cell -- Identify several ways in which Abs neutralize	

	invaders. -- Differentiat between active & passive immunity. -- Compare & contrast the specific cells, methods, & effects of humoral & cell-mediated systems i.e., B cells and T cells. -- Identify the role of the "histocompatibility antigen" -- Define "hypersensitivity" and explain the difference between immediate and delayed hypersensitivity. (g) Distinguish between Type I, II, III, IV, hypersensitivity reactions and the effects of these reactions. Identify several diseases or conditions caused by each type of reaction, and reasons for possible treatments. (h) Identify several immunosuppressive diseases and their etiology, pathogenesis, and reasons for possible treatments. -- Discuss the etiology, pathogenesis, complications, testing methods, transmission and reasons for possible treatments of HIV/AIDS as an example of an immunosupressive disorder. -- Discuss maternal-child transmission of HIV/AIDS and current strategies to prevent this. (i) Discuss the multi-body system responses with sepsis and septic shock syndromes. **3. Explain the role of genetics in determining normal and abnormal anatomy and physiology.** (a) Define DNA, gene, and chromosome, and explain the specific relationship between them. (b) Distinguish between an dominant gene & an autosomal recessive gene. --- Identify at least 4 normal characteristics determined by autosomal dominant genes; by recessive genes. --- Identify at least 4 disease conditions caused by autosomal dominant or recessive genes. (c) Distinguish between an autosomal gene and an X-linked or Y-linked gene.	

	---Identify 4 abnormal conditions that are due to X-linked recessive genes. --- Explain why diseases caused by these genes are found more frequently in males. (d) Describe how karyotypes are generated and their role in the analysis of genetic diseases. (e) Describe the main mechanisms for chromosomal abnormalities. --- Identify 4 conditions that are due to changes (duplications, loss, breakage) in the normal karyotype. ---Distinguish between autonsomal chromosome defects and sex-linked chromosomal defects, giving examples. (f) Be able to list the currently available methods for prenatal genetic testing, genetic testing during pregnancy,and post-natal testing. Explain the role of genetic counseling professionals. (g) Be able to describe both the genetic and environmental factors that underlie the etiologies and pathogenesis of human cancers, and discuss prevention and resons for possible treatment strategies. (h) Differentiate between mitochondrial DNA and nuclear DNA. ---Identify several diseases that have a componant due to mutations of mitochondrial genes or associated nuclear genes. ---Identify the common characteristics found in mitochondrial diseases, and explain why these are present. (i) Discuss the process of carcinogenesis.	

List all new resources needed for course, including library materials.

Student Materials:

List examples of types		Estimated costs
Texts	*Pathophysiology* by Price and Wilson	$125
Supplemental reading	Coursepack/Notes by Esta Grossman	$100
Supplies		
Uniforms		
Equipment		
Tools		
Software		

Equipment/Facilities: Check all that apply. (All classrooms have overhead projectors and permanent screens.)

Check level only if the specified equipment is needed for all sections of a course.

- ☐ Level I classroom
  Permanent screen & overhead projector
- ☐ Level II classroom
  Level I equipment plus TV/VCR
- ☒ Level III classroom
  Level II equipment plus data projector, computer, faculty workstation

- ☐ Off-Campus Sites
- ☒ Testing Center
- ☒ Computer workstations/lab
- ☐ ITV
- ☐ TV/VCR
- ☐ Data projector/computer
- ☒ Other cadaver lab, supplemental

Assessment plan:

Learning outcomes to be assessed (list from Page 3)	Assessment tool	When assessment will take place	Course section(s)/other population	Number students to be assessed
1. Build on the concept of normal function expounded in Biology 111, and for each main system, explain the mechanisms of pathophysiology as a contrast to normal function, and illustrate with specific diseases.	A cluster of core multiple choice and/or short essay questions on each unit exam.	Every 3 years W 08	All sections	100%
2. Describe the multiple defense systems that protect our normal organ-system functions. Explain how dysfunction of these systems can disrupt these defenses	A cluster of core multiple choice and/or short essay questions on each unit exam.	Every 3 years W 08	All sections	100%
3. Explain the role of	A cluster of core multiple	Every 3 years	All sections	100%

genetics in determining normal and abnormal anatomy and physiology.	choice and/or short essay questions on each unit exam.	" W08	"	"

Scoring and analysis of assessment:

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally developed rubric, external evaluation, other). Attach the rubric.

   For all outcomes, item analysis will be used.

2. Indicate the standard of success to be used for this assessment.
   For all outcomes, a cluster of exam questions on each exam will be designated in advance for assessment. The class average percent of correct responses will be calculated. The minimum level for a successful outcome is 70%.

3. Indicate who will score and analyze the data.
   Instructors teaching BIO 212 will collect and analyze the data. Instructors will draw from the same pool of standardized questions which is provided by the Life Sciences department.

4. Explain the process for using assessment data to improve the course.

The assessment data gathered in this way will provide information for syllabus review and revision. The department will review the data to determine what content areas should receive more or different emphasis or whether changes should be made to the core outcome.