

NURS 501

Pathophysiology for Advanced Nursing Practice 4 Units

Physiology is indeed an explanation of life. What other subject matter is more fascinating, more exciting, more beautiful than the subject of life?

Arthur Guyton, 1919–2003

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Office Hours: Each subsection will have office hours set by the section faculty, to be communicated to the students at the start of the semester and posted on the course wall.

I. Course Prerequisites or Corequisites

Recent, satisfactory completion of undergraduate courses that include Organic Chemistry, Nutrition, Anatomy and Physiology. It is expected that enrolled students have reviewed their undergraduate coursework in human anatomy and physiology, and possess a working knowledge of cell biology, biochemistry, nutrition, and human genetics at the undergraduate level.

II. Catalogue Description

This is a course in advanced physiology/pathophysiology including general principles that apply across the life span.

III. Course Description

This course in organ systems physiology is designed to integrate advanced physiology with pathophysiology and clinical implications across the life span for advanced nursing practice. Organ systems function and dysfunction from cell level through integrated organ levels will be presented as well as the genetic basis of disease. An understanding of alterations in biological processes that affect the body's dynamic equilibrium or homeostasis will be discussed, allowing students to differentiate abnormal physiologic functions that result in illness.

IV. Course Objectives

Objective No.	Objectives
1	Describe and accurately apply advanced concepts of biochemistry, biophysics, and cell biology as they relate to physiology and the pathophysiology of disease across the life span, and the biological underpinnings of health promotion activities and screening aimed at reducing morbidity and mortality.
2	Articulate concepts of molecular biology and genetics and apply these to understanding the molecular and cellular basis of diseases resulting from inherited or spontaneous mutations.
3	Explain sociocultural patterns of health and disease emphasizing potential biological pathways linking stress, adversity, and trauma to later morbidity and mortality.
4	Describe alterations of cell, tissue, organ, and integrative functions associated with a broad range of acute and chronic diseases across the life span. Relate these alterations to the associated symptoms, physical signs, and laboratory results commonly seen in those diseases. Demonstrate the ability to

	explain to patients and families the scientific basis of clinical decision-making, and communicate in professional language with all members of healthcare teams.
5	Identify and explain the cellular basis and major sources of evidence-based practice guidelines and their roots in the pathophysiologic basis of diseases. Demonstrate physiologically based comprehension of pharmacodynamics of common categories of therapeutic agents.
6	Demonstrate quantitative and qualitative problem-solving skills and diagnostic reasoning based on physiological and pathophysiological concepts.

V. Course Format/Instructional Methods

The format of this course will be online, using both asynchronous and synchronous approaches. Each module will consist of the following elements:

1. Preparation for the module: students will review normal anatomy and physiology of each organ system using the relevant textbook chapters and/or their undergraduate notes on a subject.
2. The modules will be organized by organ systems, and minilectures will focus on major concepts for that organ system followed by clinical applications. Each minilecture will conclude with questions to be answered prior to advancement to the next topic. Asynchronous minilectures will be supplemented by homework, textbook and other readings, online discussions, audiovisual materials, case studies, and course handouts. Synchronous sessions will focus on lecture review/Q&A with course faculty AND clinical application assignments.

VI. Student Learning Outcomes

Student learning for this course relates to one or more of the following nine nursing core competencies:

Nursing Core Competencies		NURS 501	Course Objective
1	Scientific Foundation Competencies	*	1, 2, 4, 5
2	Leadership		
3	Quality	*	5
4	Practice Inquiry		
5	Technology and Information Literacy	*	5
6	Policy		
7	Health Delivery System		
8	Ethics	*	3
9	Independent Practice		

*Highlighted in this course

The following table explains the highlighted competencies for this course, the related student learning outcomes, and the method of assessment.

SCIENTIFIC FOUNDATION COMPETENCIES		
Competencies/Knowledge, Values, Skills	Student Learning Outcomes	Method of Assessment
Family Nurse Practitioner competent in Scientific Foundation Competencies: Integrates scientific findings from nursing, biopsychosocial fields, genetics, public health, quality improvement, and organizational sciences for the continual	Critically analyzes data and evidence for improving advanced nursing practice.	Weekly LMS posting and participation in synchronous sessions Exams
	Integrates knowledge from the humanities and sciences within the context of nursing science.	
	Translates research and other forms of knowledge to improve practice processes and outcomes.	

improvement of nursing care across diverse settings.	Develops new practice approaches based on the integration of research, theory, and practice knowledge.	
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QUALITY COMPETENCIES		
Competencies/Knowledge, Values, Skills	Student Learning Outcomes	Method of Assessment
Family Nurse Practitioner competent in Quality Competencies: Recognizes that advanced practice nurse must be articulate in the methods, tools, performance measures, and standards related to quality, as well as prepared to apply quality principles within an organization.	Uses best available evidence to continuously improve quality of clinical practice.	Weekly LMS posting and participation in synchronous sessions Exams
	Evaluates the relationships among access, cost, quality, and safety and their influence on health care.	
	Evaluates how organizational structure, care processes, financing, marketing and policy decisions impact the quality of health care.	
	Applies skills in peer review to promote a culture of excellence.	
	Anticipates variations in practice and is proactive in implementing interventions to ensure quality.	

TECHNOLOGY AND INFORMATION LITERACY COMPETENCIES		
Competencies/Knowledge, Values, Skills	Student Learning Outcomes	Method of Assessment
Family Nurse Practitioner competent in Technology and Information Literacy Competencies: Recognizes that the advanced practice nurse applies research outcomes within the practice setting, resolves practice problems, works as a change agent, and disseminates results.	Integrates appropriate technologies for knowledge management to improve health care.	Weekly LMS posting and participation in synchronous sessions Exams
	Translates technical and scientific health information appropriate for various users' needs.	
	- Assesses the patient's and caregiver's educational needs to provide effective, personalized health care. - Coaches the patient and caregiver for positive behavioral change.	
	Demonstrates information literacy skills in complex decision making.	
	Contributes to the design of clinical information systems that promote safe, quality and cost-effective care.	
	Uses technology systems that capture data on variables for the evaluation of nursing care.	

ETHICS COMPETENCIES		
Competencies/Knowledge, Values, Skills	Student Learning Outcomes	Method of Assessment

Family Nurse Practitioner competent in Ethics Competencies: Includes matters involving moral principles and social policy including professional guidelines for advanced practice nursing when providing care.	Integrates ethical principles in decision making.	Weekly LMS posting and participation in synchronous sessions Exams
	Evaluates the ethical consequences of decisions.	
	Applies ethically sound solutions to complex issues related to individuals, populations, and systems of care.	

VII. Course Assignments, Due Dates, and Grading

Assignment	Due Date	% of Final Grade
Exam 1 (65 minutes)	Week 3	12
Exam 2 (75 minutes)	Week 5	17
Exam 3 (54 minutes)	Week 7	12
Exam 4 (75 minutes)	Week 9	17
Exam 5 (75 minutes)	Week 12	17
Homework	Weekly	15%
Class Participation	Weekly	10%

Each of the major assignments is described below. All are graded on a 100-point scale but are weighted using the scheme above. **Extensions on exams and homework assignments will only be granted for serious extenuating circumstances and by prior approval of the section leader.** Late submission of homework assignments will result in a minimum 10% reduction in the homework grade.

Assignment: Exams and Exam Policies

Six closed-book exams will be given. The first four exams will each cover two weeks of content; the last two exams will each cover three weeks of content. Weighting (see table above) is proportional to the numbers of questions, averaging 15–17 questions per module.

Exams are password protected in 2NUSC and may be opened as early as 6:00 AM Pacific Time on the day following the synchronous session of the previous module. Students will have 72 hours to complete each exam, which must be completed the first time it is opened. The exam clock will be set to at least 1.5 minutes per question. Exam 6 will be made available after completion of the On Campus Intensive in week 14.

All exams may only be taken once and must be completed in one session. See course wall for specific exam date ranges.

All exams in this course will require students to deploy a software called Proctortrack. This is a software system that automatically proctors student exams, verifies student identities throughout the exam, and provides instructors with brief video clips and screenshots if potential testing violations occur. Proctortrack is fully integrated with the Learning Management System, however, students are required to complete a practice exam at the start of the semester to ensure the technology is setup properly on their computers. If students experience issues or have questions with the practice exam or with Proctortrack in general, students should contact student support for help in advance of taking the exam.

To ensure a successful testing environment, students should:

- Choose a private location with no distractions
- Have nothing around that could make noise
- Set up proper lighting and ensure his/her face is clearly visible and well-lit
- Not have food or drink
- Close all browser tabs and other programs
- Have only one keyboard, mouse, and monitor connected

- Not leave testing area/camera view during the exam
- Not take or use notes (unless specifically allowed by instructor)
- Not use or have nearby additional technology (headphones, phones, tablets, television, etc.)
- Not have other people in the room
- Have a hardwire connection

If technical problems are encountered during the exam, the student must immediately contact 2U technical support AND notify their section leader and Professor Tkacs by email that they had a technical issue.

Tests relate to student learning outcomes 1, 3, and 8.

Academic Dishonesty and Honor Code: All assignments and exams are to be prepared individually.

Academic dishonesty is defined as a student's use of unauthorized assistance with intent to deceive an instructor or other such person who may be assigned to evaluate the student's work in meeting course and degree requirements. Familiarize yourself with the University Student Conduct Code, which applies to this course. Students are expected to be independently familiar with the Code and to recognize that their work in the course is to be their own original work that truthfully represents the time and effort applied. Violations of the Code are most serious and will be handled in a manner that fully represents the extent of the Code and that befits the seriousness of its violation.

Plagiarism and cheating of any kind on an examination or assignment will result at least in an F for that assignment (and may, depending on the severity of the case, lead to an F for the entire course) and may be subject to appropriate referral for further action. It is assumed that for this course all students will adhere to the academic creed of this University and will maintain the highest standards of academic integrity. In other words, don't cheat by giving answers to others or taking them from anyone else. Course faculty will also adhere to the highest standards of academic integrity, so do not ask faculty to change your grade illegitimately or to bend or break rules for one person that will not apply to everyone.

Pacific Standard Time (PST) will be used for this course (example: assignments, exams, synchronous class sessions).

Each student will be expected to adjust his/her time zone accordingly. Accommodations or exceptions will not be granted for conflicts caused by differing time zones.

Assignment: Homework

Assigned homework must be completed and uploaded before synchronous session each week. Guidelines are provided in the toolbox document about homework grading. Students are expected to complete and upload their document within the timeframe set by the section instructor, and no later than 24 hours before live session.

Homework is to be edited for correct grammar and spelling, any references should be cited using APA format, and direct quotations must be indicated in appropriate APA format. It is expected that students will watch ALL asynchronous materials, and complete ALL online questions from the module before attempting the homework. Student engagement with the homework will also be assessed by participation during synchronous session. Please review the homework grading document posted in the course toolbox.

This assignment relates to student learning outcomes 1, 3, 5, and 8.

Assignment: Class Participation

The class participation grade recognizes student comprehension of the material and their ability to communicate their knowledge with peers. Class participation is evidenced by contributions during synchronous sessions AND in the weekly wrap-up wall as described in the rubric found in the course toolbox. Grading for class participation is based on:

- Communication that is respectful of all course participants.
- **Weekly posting on the wrap-up wall that concludes each module.**
- Quality of student online posts and participation in synchronous sessions - Student asynchronous and synchronous contributions should consist of:
 - o Factually correct and well-written substantive responses

- Questions on the lecture material or readings
- Answers to questions posted by other students
- Comments that add information to a previous thread
- Links to informative websites relating to the topic of the week.
- **Quality of sources:** In addition to the required and recommended readings, students should first access the materials available online in the Norris Medical Library (<http://nml.usc.edu/>). Resources such as Access Medicine, Clinical Key, and Up to Date are written by experts, are peer-reviewed, and are frequently updated to keep up with the pace of medical discoveries. You may also use other well-respected Internet sources when posting links, including Cleveland Clinic, WebMD, Medscape, the New York Times Health section, American Diabetes Association, American Heart Association, NIH, CDC, and similar organizations.
- **You may not use Wikipedia as a source for any coursework.**
- **Attribution:** Students must accurately cite sources of all information posted, and indicate when direct quotations are used in their online postings, using APA Sixth Edition format.

This assignment relates to student learning outcomes 1, 3, 5, and 8.

Note: Faculty reserve the right to modify content and/or date for assignments and/or exams. In some cases, depending on National and University holidays, live session days and times may be adjusted. Notice of such changes will be given at the start of the semester, to permit students to arrange their work schedules accordingly.

Class grades will be based on the following:

Class Grades		Final Grade	
3.85–4.00	A	93–100	A
3.60–3.84	A-	90–92	A-
3.25–3.59	B+	87–89	B+
2.90–3.24	B	83–86	B
2.60–2.89	B-	80–82	B-
2.25–2.59	C+	77–79	C+
1.90–2.24	C	73–76	C
		70–72	C-

Within the School of Social Work, grades are determined in each class based on the following standards, which have been established by the faculty of the School: (1) Grades of A or A- are reserved for student work which not only demonstrates very good mastery of content but which also shows that the student has undertaken a complex task, has applied critical thinking skills to the assignment, and/or has demonstrated creativity in her or his approach to the assignment. The difference between these two grades would be determined by the degree to which these skills have been demonstrated by the student. (2) A grade of B+ will be given to work which is judged to be very good. This grade denotes that a student has demonstrated a more-than-competent understanding of the material being tested in the assignment. (3) A grade of B will be given to student work which meets the basic requirements of the assignment. It denotes that the student has done adequate work on the assignment and meets basic course expectations. (4) A grade of B- will denote that a student's performance was less than adequate on an assignment, reflecting only moderate grasp of content and/or expectations. (5) A grade of C would reflect a minimal grasp of the assignments, poor organization of ideas, and/or several significant areas requiring improvement. (6) Grades between C- and F will be applied to denote a failure to meet minimum standards, reflecting serious deficiencies in all aspects of a student's performance on the assignment.

As a professional school, class attendance and participation is an essential part of your professional training and development at the USC Suzanne Dworak-Peck School of Social Work. You are expected to attend all classes and meaningfully participate. For Ground courses, having more than 2 unexcused absences in class may result in the lowering of your grade by a half grade. Additional absences can result in additional deductions. For VAC courses, meaningful participation requires active engagement in class discussions and maintaining an active screen. Having more than two unexcused absences in class may result in the lowering of your grade by a half grade. Additional absences in the live class can result in additional deductions. Furthermore, unless directed by your course instructor, you are expected to complete

all asynchronous content and activities prior to the scheduled live class discussion. Failure to complete two asynchronous units before the live class without prior permission may also lower your final grade by a half grade. Not completing additional units can result in additional deductions.

VIII. Required and Supplementary Instructional Materials and Resources

Course notes:

Course notes are provided by the instructor to accompany each slide set. These are the primary resources to study each week as you work through the asynchronous content. Textbook readings and articles found in the library course reserves are indicated for each module; however, to be efficient and manage your time, you should only read the content that directly relates to information in the course slides. You may wish to skim textbook information on related topics, but information assessed in the course exams is drawn from the lectures and lecture notes.

Required Textbook:

Costanzo, L. (2017). *Physiology* (6th ed.). Philadelphia, PA: Elsevier/Saunders. ISBN 978-0-323-47881-6 (**Weekly readings listed under: Physiology, Costanzo**)

Recommended textbook:

Kumar, V., Abbas, A. K., & Aster J. C. (2018). *Basic pathology* (10th ed.). Philadelphia, PA: Elsevier/Saunders. ISBN 978-0-323-35317-5 (**Weekly readings listed under: Basic Pathology, Kumar, Abbas & Aster**)

This book is available for free to USC students - online access is through the “Clinical Key” link in the Norris Medical Library website. However, purchase of the book is highly recommended as this is a brand new edition of a classic in the field.

Textbook readings will be supplemented by journal articles as appropriate; representative articles are listed in the weekly outline below and are found in the USC Library Course Reserves System.

Recommended Guidebook for APA Formatting:

American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, D.C.: American Psychological Association.

Other Recommended Resources (not mandatory)

Marieb, E. N., & Hoehn, K. (2012). *Human anatomy and physiology* (9th ed.). Boston, MA: Pearson.

This is the textbook for many undergraduate Anatomy and Physiology courses, and it often comes with online access to learning aids such as animations and self-tests. **HIGHLY RECOMMENDED for students who have not taken a physiology course in several years.** If you can find a more recent edition, that would be good. If you do not have your undergraduate book and notes, you will find it advantageous to study this book before class each week.

Hammer, G. D., & McPhee, S. J. (2014). *Pathophysiology of disease: An introduction to clinical medicine* (7th ed.). New York, NY: McGraw-Hill.

This is Dr. Tkacs’ “go-to” book for pathophysiology concepts. Although it is sometimes presented in greater depth than will be covered in class, it is an excellent resource, particularly the hematology and liver chapters.

This book is available for free to USC students - online access is through the “Access Medicine” link in the Norris Medical Library website.

RECOMMENDED READINGS:

Journal articles and a book chapter recommended in several of the modules are found in the “Course Reserves” section of the USC Libraries. You should download these items and read them on the designated weeks.

Course Overview

Week	Content	Assignments
1	Module 1: Chemical and Biomolecular Basis of Pathophysiology	Homework
2	Module 2: Molecular Biology, Genetics, and Neoplasia	Homework
3	Module 3: Cell Physiology and Pathophysiology	Homework, Exam 1
4	Module 4: Principles of Hematology	Homework
5	Module 5: Principles of Immunology	Homework
6	Module 6: Infectious Diseases	Homework, Exam 2
7	Module 7: Circulatory Physiology and Vascular Diseases	Homework
8	Module 8: Cardiac Cellular Physiology and Mechanisms of Heart Disease	Homework, Exam 3
9	Module 9: Physiology and Pathophysiology of the Lungs	Homework
10	Module 10: Kidney Function and Disease, Fluid and Electrolyte Balance	Homework
11	Module 11: Function and Dysfunction of the Gastrointestinal System and Liver	Homework, Exam 4
12	Module 12: The Nervous System, Part 1	Homework
13	Module 13A: The Nervous System, Part 2	Homework
	Module 13B: Function and Dysfunction of Endocrine Systems	Homework
14	Module 14: Endocrinology 2: Metabolism, Diabetes, and Obesity	Homework
15		Exam 5
Study Days / No Classes		
Final Examinations		

Course Schedule—Detailed Description

Module 1: Chemical and Biomolecular Basis of Pathophysiology
Topics (Clinical Applications)
• Introductory concepts • Review of major concepts in chemistry • Review of major concepts in biochemistry • Biological molecules (sickle cell anemia; phenylketonuria)

This module relates to course objectives 1 and 2.

Required Readings

Class notes - download from first page of the module in the LMS

Recommended web activity

See information in class notes regarding highly recommended activities in the University of Arizona Biology Project website.

Module 2: Molecular Biology, Genetics, and Neoplasia

Topics

- Overview and replication
- Transcription
- Translation
- Concepts in genetics and genomics (cystic fibrosis)
- Technical approaches in genomics (fragile X syndrome)
- Related genetics/genomics topics (pharmacogenomics)
- Genomics and cancer (BRCA mutations)

This module relates to course objective 2.

Required Readings

Class notes (found on module overview page)

Basic Pathology, Kumar, Abbas, & Aster:

Chapter 1, The genome, pp. 1-6

Chapter 6, Introductory comments, pp. 189-190; Genetic lesions in cancer, pp. 201-203; Introduction to “Hallmarks of Cancer”, pp. 204-205; “Summary” statements on each of the hallmarks: pp. 208, 211, 212-213, 214, 217, 218, 219, 220, 223, 226, 227-228

Recommended Readings

Feero, W. G., Guttmacher, A. E., & Collins, F. S. (2010). Genomic medicine—An updated primer. *The New England Journal of Medicine*, 362(21), 2001-2011.

<http://www.nejm.org/doi/pdf/10.1056/NEJMra0907175>

Vogelstein, B., & Kinzler, K.W. (2015). The path to cancer—Three strikes and you’re out. *The New England Journal of Medicine*, 373, 1895-1898.

Recommended web activity

See information in class notes regarding helpful websites.

Module 3: Cell Physiology and Pathophysiology

Topics

- Cell overview
- Membrane transport (familial hypercholesterolemia, diabetes medications)
- Signal transduction (cholera)
- Cell adaptations (myocardial infarction and cell death)

This module relates to course objectives 2 and 4.

Required Readings

Class notes

Physiology, Costanzo:

Chapter 1, Membranes and membrane transport pp. 1-11; Ion channels, pp. 14-15

Chapter 2, Autonomic receptors, adrenoceptors, pp. 59-64

Chapter 9, Mechanisms of hormone action, pp. 402-407

Basic Pathology, Kumar, Abbas & Aster:

Chapter 1, Cellular housekeeping, pp. 6-13; Cellular metabolism and mitochondrial function, pp. 13-16

Chapter 2, Introduction, Overview of cellular responses to stress and noxious stimuli, Cell death pathways and mechanisms, cell adaptation, pp. 31-51

Recommended Readings

The University of Arizona: *The Biology Project*. <http://www.biology.arizona.edu/>

Tutorial and self-test: Cell biology

Module 4: Principles of Hematology

Topics

- Red blood cells
- Iron-deficiency anemia
- Macrocytic anemias
- Hemoglobin and hemolytic anemias
- Hemostasis overview and platelets
- Coagulation cascade
- Clotting review and anticlotting mechanisms
- Disorders of hemostasis

This module relates to course objectives 1, 2, and 4.

Required Readings

Class notes

Allister, L.M., Torres, C., Schnall, J., Bhatia, K., & Miller, E.S. (2017) Jaundice, Anemia, and Hypoxemia. *J Emerg Med* 52(1), 93-97.

Baker, J., & Xu, Y. (2005). Profound normocytic anemia in a 36-year-old woman with syncopal episodes. *Lab Medicine*. 36(6), 350-352.

Basic Pathology, Kumar, Abbas & Aster:

Chapter 4, Hemorrhage, hemostasis and thrombosis, pp. 100-111

Chapter 12, Red cell disorders, pp. 442-459; Bleeding disorders, pp. 485-491

Module 5: Principles of Immunology

Topics

- Introduction to host defense, neutrophil function
- Acute inflammation, cells, and mediators
- Acute and chronic inflammation processes
- Adaptive immunity overview
- Humoral immunity, antibodies, and vaccines
- Hypersensitivity and autoimmunity (asthma, hay fever, rheumatoid arthritis)

This module relates to course objectives 1, 4, and 5.

Required Readings

Class notes

Basic Pathology, Kumar, Abbas & Aster:

Chapter 3, Inflammation, pp. 57-78, Outcomes of acute inflammation, chronic inflammation pp. 79-86

Chapter 5, The normal immune response; cells and tissues of the immune system; overview of lymphocyte activation and adaptive immune responses; hypersensitivity; autoimmune diseases pp. 121-162

Module 6: Infectious Diseases

Topics

- General concepts
- Agents of infection, prions, and viruses
- Bacteria and normal flora
- Pathogenic bacteria
- Fungi and parasites
- Clinical applications (community-acquired pneumonia, Clostridium difficile)
- HIV and infectious disease lab testing

This module relates to course objectives 5 and 6.

Required Readings

Class notes

Basic Pathology, Kumar, Abbas & Aster

Chapter 9 General mechanisms of microbial pathogenesis; the microbiome; techniques for identifying infectious agents, pp. 341-348; Transmission and dissemination of microbes; how microorganisms cause disease, pp. 349-355

Chapter 13 Pulmonary infections, community-acquired bacterial pneumonias, community-acquired viral pneumonias pp. 519-524

Module 7: Circulatory Physiology and Vascular Diseases

Topics

- Overview and resistance
- Mechanisms of vascular smooth muscle contraction and relaxation
- Autonomic mechanisms of vascular regulation
- Capillary function and edema
- Atherosclerosis (myocardial infarction, stroke, peripheral arterial disease)
- Hypertension and shock

This module relates to course objectives 1, 2, and 4.

Required Readings

Class notes

Physiology, Costanzo

Chapter 1, Smooth muscle, pp. 40-43

Chapter 4, pp. 117-124; Pressures in the cardiovascular system, pp. 127-131; Regulation of arterial pressure; microcirculation; local flow regulation, pp. 163- 176

Basic Pathology, Kumar, Abbas, & Aster

Chapter 10

Structure and function of blood vessels; blood pressure regulation; hypertensive vascular disease, vascular wall response to injury, atherosclerosis pp. 361-378

Module 8: Cardiac Cellular Physiology and Mechanisms of Heart Disease

Topics

- Electrical basis of heart function
- The heart as a pump
- Cardiac cycle and heart performance
- Disorders of electrical activity (ectopic beats, atrial fibrillation)
- Coronary artery disease (acute coronary syndrome)
- Heart failure

This module relates to course objectives 1, 2, 3, and 5.

Required Readings

Class notes

Physiology, Costanzo

Chapter 1 Skeletal muscle filaments, mechanisms of contraction and relaxation, pp. 34-39

Chapter 4 Cardiac electrophysiology, autonomic regulation, electrocardiogram, cardiac muscle contraction, through Frank-Starling relationship, pp. 131-150; cardiac cycle, pp. 154-158

Basic Pathology, Kumar, Abbas & Aster

Chapter 11

Overview of heart disease, heart failure, pp. 399-403 Ischemic heart disease; arrhythmias, pp. 409-420

Module 9: Physiology and Pathophysiology of the Lungs

Topics

- Lung overview and terminology
- Lung mechanics (pulmonary fibrosis, emphysema)
- Airway resistance
- Pathologic changes in airway resistance (asthma, chronic obstructive pulmonary disease)
- Gas exchange
- Pathologies of gas exchange (hypoxemia, ventilation/perfusion mismatch)
- Pulmonary vasculature considerations (hypoxic vasoconstriction, pulmonary embolism, pulmonary edema)

This module relates to course objectives 1, 2, 4, and 5.

Required Readings

Class notes

Physiology, Costanzo

Chapter 5, Structure of the respiratory system, lung volumes and capacities, mechanics of breathing, gas exchange, oxygen transport in blood, pp. 189-195 (skip alveolar ventilation equation and alveolar gas equation); 197-213 (skip diffusion-limited and perfusion-limited gas exchange); 216-223, hypoxemia and hypoxia, pp. 239-241.

Basic Pathology, Kumar, Abbas & Aster

Chapter 13, Obstructive versus restrictive pulmonary diseases, pp. 498-505; idiopathic pulmonary fibrosis, pp. 507-508

Recommended Readings

Heckman, E.J. & O'Connor, G.T. (2015) Pulmonary Function Tests for Diagnosing Lung Disease. *Journal of the American Medical Association* 313(22), 2278-2279.

Johnson, J.D. & Theurer, W.M. (2014) A Stepwise Approach to the Interpretation of Pulmonary Function Tests. *American Family Physician* 89(5), 359-366.

Module 10: Kidney Function and Disease, Fluid and Electrolyte Balance

Topics

- Overview and key concepts
- Glomerular filtration and vulnerability (glomerulonephritis, proteinuria, albuminuria)
- Regulation of renal blood flow and glomerular filtration rate
- Tubule cell function (diuretic mechanisms)
- Regional nephron function (ischemic tubular necrosis)
- Modulation of fluid and electrolyte balance (diabetes insipidus, acute or chronic hypovolemia)
- Clinical considerations (acute renal failure—acute kidney injury/chronic kidney disease)

This module relates to course objectives 1, 2, 4, and 5.

Required Readings

Class notes

Physiology, Costanzo

Chapter 6

Anatomy and blood supply, body fluids, pp. 245-249; renal blood flow, pp. 257-259; glomerular filtration, pp. 261-265; sodium balance and tubular segment functions, regulation of sodium balance pp. 276-288; water balance, pp. 298-307.

Basic Pathology, Kumar, Abbas & Aster

Chapter 14

Introduction and principles of glomerular diseases through Mediators of Immune Injury, pp. 549-554

Recommended Readings

Chawla, L. S., Eggers, P. W., Star, R. A., & Kimmel, P. L. (2014). Acute kidney injury and chronic kidney disease as interconnected syndromes. *The New England Journal of Medicine*, 371(1), 58-66.

Dowling, T. C., Wang, E.-S., Ferruci, L., & Sorkin, J. D. (2014). Glomerular filtration rate equations overestimate creatinine clearance in older individuals enrolled in the Baltimore longitudinal study on aging: Impact on renal drug dosing. *Pharmacotherapy*, 33(9), 912-921.

Harel, Z., Simel, D.L., & Wald, R. (2017) Urinalysis in the Evaluation of Proliferative Glomerulonephritis. *Journal of the American Medical Association*, 318(13), 1276-1277.

Module 11: Function and Dysfunction of the Gastrointestinal System and Liver

Topics

- Overview and upper gastrointestinal function/dysfunction (GERD and peptic ulcer)
- Small intestine, digestion, and absorption
- Intestinal pathophysiology (celiac disease, bariatric surgery, intestinal obstruction)
- Liver—structure and metabolic functions
- Protective, clearance, and other functions
- Acute and chronic liver disorders (cholestasis, acute hepatitis, portal hypertension, fatty liver disease, cirrhosis)

This module relates to course objectives 1, 2, 3, 4, 5, and 6.

Required Readings

Class notes

Physiology, Costanzo

Chapter 8, Structure of the GI tract, innervation, regulatory substances, pp. 339-348; gastric secretion, pp. 360-366; bile secretion, digestion and absorption, vitamins, intestinal fluid and electrolyte transport, pp 370-389, liver, pp. 389-391

Basic Pathology, Kumar, Abbas & Aster

Chapter 15 Reflux esophagitis and GERD, Barrett esophagus, pp. 593-596; stomach pp. 598-603; celiac disease, pp. 612-613; infectious diarrheas, pp. 614-620; inflammatory bowel disease, pp. 621-626
Chapter 16 Liver structure, function, and liver diseases through hepatitis C virus, pp. 637-647; alcoholic and nonalcoholic fatty liver disease, pp. 652-656.

Recommended Readings

Hammer, G. D., & McPhee, S. J. (2014). *Pathophysiology of disease: An introduction to clinical medicine* (7th ed.). New York, NY: McGraw-Hill. Khalili, M., & Burman, B. (2014). Chapter 14: Liver disease, pp. 385-426.**

** From Chapter 14, focus particularly on these sections and topics: Introduction, Structure and Function of the Liver, Overview of Liver Disease. Within the section on “Pathophysiology of selected liver diseases,” focus on these topics: alcoholic chronic hepatitis, nonalcoholic fatty liver disease (NAFLD), idiopathic chronic hepatitis, pathology, clinical manifestations, cirrhosis, portal hypertension, and ascites.

Module 12: The Nervous System, Part 1

Topics

- Introduction to the nervous system
- Synaptic transmission
- Neurotransmitters
- Pathophysiology of depression, stress, anxiety
- Mechanisms of pain transmission

This module relates to course objectives 1, 2, 3, 4, 5, 6.

Required Readings

Class notes

Physiology, Costanzo

Chapter 1 Resting membrane potential, action potentials, synaptic transmission, pp. 18-34

Chapter 3 Organization of the nervous system, cells of the nervous system, sensory pathways, sensory receptors - up to receptive fields, pp. 69-77 somatosensory system and pain, pp. 80-85; higher functions of the nervous system, pp. 112-113.

Basic Pathology, Kumar, Abbas & Aster

Chapter 23 Neurodegenerative diseases through Parkinson Disease, pp. 874-879

Recommended Reading

Benowitz, N. L. (2010). Nicotine addiction. *New England Journal of Medicine*, 362(24), 2295-2303.

Additional asynchronous content

Prior to viewing asynchronous lectures, please view the two neuroanatomy videos. You will find these as the first two elements in module 12

Module 13A: The Nervous System, Part 2

Topics

- Overview and spinal cord introduction (myasthenia gravis, Lambert-Eaton syndrome)
- Spinal cord motor neurons and stretch reflex (hyperreflexia, hyporeflexia)
- Brainstem control of motor function
- Cortical control of movement (lower motor neuron lesion, upper motor neuron lesion)
- Accessory systems in motor control (Parkinson's disease, cerebellar disorders)

This module relates to course objectives 1, 2, 4, 5, 6.

Required Readings

Class notes

Physiology, Costanzo

Chapter 3 Motor systems, pp.103-112 - focus only on information that correlates with course notes

Basic Pathology, Kumar, Abbas & Aster

Chapter 22, Disorders of neuromuscular junction, p. 839

Module 13B: Function and Dysfunction of Endocrine Systems

Topics

- General concepts and pituitary function
- Thyroid function
- Thyroid dysfunction (Hashimoto's thyroiditis, Graves disease, goiter)

This module relates to course objectives 1, 2, 4, and 6.

Required Readings

Class notes

Physiology, Costanzo

Chapter 9 Hormone synthesis, regulation of hormone secretion, pp. 395-401; Mechanisms of hormone action and second messengers, hypothalamic-pituitary relationships, anterior lobe hormones, pp. 402-415; thyroid hormones, pp. 419-427

Basic Pathology, Kumar, Abbas & Aster

Chapter 20 Thyroid, through Graves Disease pp. 755-762

Module 14: Endocrinology 2: Metabolism, Diabetes, and Obesity

Topics

- HPA axis overview (iatrogenic adrenal hypofunction)
- Pancreatic hormone introduction and the anabolic state
- Catabolism
- Insulin
- Anti-insulin hormones
- Type 1 diabetes mellitus
- Type 2 diabetes mellitus
- Diabetes-related conditions (gestational diabetes, polycystic ovary syndrome, obesity)

This module relates to course objectives 1, 2, 3, 4, 5, and 6.

Required Readings

Class notes

Physiology, Costanzo

Chapter 9 Endocrine pancreas pp. 440-448; actions of glucocorticoids, pp. 434-435

Basic Pathology, Kumar, Abbas & Aster

Chapter 20 Endocrine pancreas, pp. 772-783.

Recommended Readings

Bancks, M.P., Kershaw, K., Carson, A.P., Gordon-Larsen, P., Schreiner, P.J. & Carnethon, M.R. (2017) Association of modifiable risk factors in young adulthood with racial disparity in incident type 2 diabetes during middle adulthood. *Journal of the American Medical Association*, 318, 2457-2465.

Gardner, C.D., Trepanowski, J.F., Del Gobbo, L.C., Hauser, M.E., Rigdon, J., Ioannidis, J.P.A., Desai, M. & King, A.C. (2018) Effect of low-fat vs low-carbohydrate diet on 12-month weight loss in overweight adults and the association with genotype pattern or insulin secretion. The DIETFITS randomized clinical trial. *Journal of the American Medical Association*, 319, 667-679.

Study Days / No Classes

Final Examinations

University Policies and Guidelines

IX. ATTENDANCE POLICY

Students are expected to attend every class and to remain in class for the duration of the unit. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. Students are expected to send an email notifying their section instructor or the course lead (tkacs@usc.edu) of any anticipated absence or reason for tardiness.

University of Southern California policy permits students to be excused from class for the observance of religious holy days. This policy also covers scheduled final examinations which conflict with students' observance of a holy day. Students must make arrangements *in advance* to complete class work which will be missed, or to reschedule an examination, due to holy days observance.

Please refer to Scampus and to the USC School of Social Work Student Handbook for additional information on attendance policies.

X. ACADEMIC CONDUCT

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

XI. SUPPORT SYSTEMS

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

USC Student Health Sexual Assault & Survivor Support: <https://studenthealth.usc.edu/sexual-assault/>
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED) / Title IX Compliance – (213) 740-5086

equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support

Incidents of bias, hate crimes and micro aggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

USC Support and Advocacy (USCSA) – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/sssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu

XII. ADDITIONAL RESOURCES

Students enrolled in the Virtual Academic Center can access support services for themselves and their families by contacting Perspectives, Ltd., an independent student assistance program offering crisis services, short-term counseling, and referral 24/7. To access Perspectives, Ltd., call 800-456-6327.

XIII. STATEMENT ABOUT INCOMPLETES

The Grade of Incomplete (IN) can be assigned only if there is work not completed because of a documented illness or some other emergency occurring after the 12th week of the semester. Students must NOT assume that the instructor will agree to the grade of IN. Removal of the grade of IN must be instituted by the student and agreed to be the instructor and reported on the official "Incomplete Completion Form."

XIV. POLICY ON LATE OR MAKE-UP WORK

Papers are due on the day and time specified. Extensions will be granted only for extenuating circumstances. If the paper is late without permission, the grade will be affected.

XV. POLICY ON CHANGES TO THE SYLLABUS AND/OR COURSE REQUIREMENTS

It may be necessary to make some adjustments in the syllabus during the semester in order to respond to unforeseen or extenuating circumstances. Adjustments that are made will be communicated to students both verbally and in writing.

XVI. CODE OF ETHICS OF THE NATIONAL ASSOCIATION OF SOCIAL WORKERS (OPTIONAL)

Approved by the 1996 NASW Delegate Assembly and revised by the 2017 NASW Delegate Assembly

<https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English>

Preamble

The primary mission of the social work profession is to enhance human well-being and help meet the basic human needs of all people, with particular attention to the needs and empowerment of people who are vulnerable, oppressed, and living in poverty. A historic and defining feature of social work is the profession's focus on individual well-being in a social context and the well-being of society. Fundamental to social work is attention to the environmental forces that create, contribute to, and address problems in living.

Social workers promote social justice and social change with and on behalf of clients. "Clients" is used inclusively to refer to individuals, families, groups, organizations, and communities. Social workers are sensitive to cultural and ethnic diversity and strive to end discrimination, oppression, poverty, and other forms of social injustice. These activities may be in the form of direct practice, community organizing, supervision, consultation, administration, advocacy, social and political action, policy development and implementation, education, and research and evaluation. Social workers seek to enhance the capacity of people to address their own needs. Social workers also seek to promote the responsiveness of organizations, communities, and other social institutions to individuals' needs and social problems.

The mission of the social work profession is rooted in a set of core values. These core values, embraced by social workers throughout the profession's history, are the foundation of social work's unique purpose and perspective:

- Service
- Social justice
- Dignity and worth of the person
- Importance of human relationships
- Integrity
- Competence

This constellation of core values reflects what is unique to the social work profession. Core values, and the principles that flow from them, must be balanced within the context and complexity of the human experience.

Code of Ethics for Nurses

Ethics is an integral part of the foundation of nursing. Nursing has a distinguished history of concern for the welfare of the sick, injured, and vulnerable and for social justice. This concern is embodied in the provision of nursing care to individuals and the community. Nursing encompasses the prevention of illness, the alleviation of suffering, and the protection, promotion, and restoration of health in the care of individuals, families, groups, and communities. Nurses act to change those aspects of social structures that detract from health and well-being. Individuals who become nurses are expected not only to adhere to the ideals and moral norms of the profession but also to embrace them as a part of what it means to be a nurse. The ethical tradition of nursing is self-reflective, enduring, and distinctive. A code of ethics makes explicit the primary goals, values, and obligations of the profession.

The Code of Ethics for Nurses serves the following purposes:

- It is a succinct statement of the ethical obligations and duties of every individual who enters the nursing profession.
- It is the profession's nonnegotiable ethical standard.
- It is an expression of nursing's own understanding of its commitment to society.

There are numerous approaches for addressing ethics; these include adopting or subscribing to ethical theories, including humanist, feminist, and social ethics, adhering to ethical principles, and cultivating virtues. The Code of Ethics for Nurses reflects all of these approaches. The words *ethical* and *moral* are used throughout the Code of Ethics. "Ethical" is used to refer to reasons for decisions about how one ought to act, using the abovementioned approaches. In general, the word *moral* overlaps with *ethical* but is more aligned with personal belief and cultural values. Statements that describe activities and attributes of nurses in this Code of Ethics are to be understood as normative or prescriptive statements expressing expectations of ethical behavior.

The Code of Ethics for Nurses uses the term *patient* to refer to recipients of nursing care. The derivation of this word refers to "one who suffers," reflecting a universal aspect of human existence. Nonetheless, it is recognized that nurses also provide services to those seeking health as well as those responding to illness, to students and to staff, in health care facilities as well as in communities. Similarly, the term *practice* refers to the actions of the nurse in whatever role the nurse fulfills, including direct patient care provider, educator, administrator, researcher, policy developer, or other. Thus, the values and obligations expressed in this Code of Ethics apply to nurses in all roles and settings.

The Code of Ethics for Nurses is a dynamic document. As nursing and its social context change, changes to the Code of Ethics are also necessary. The Code of Ethics consists of two components: the provisions and the accompanying interpretive statements. There are nine provisions. The first three describe the most fundamental values and commitments of the nurse; the next three address boundaries of duty and loyalty, and the last three address aspects of duties beyond individual patient encounters. For each provision, there are interpretive statements that provide greater specificity for practice and are responsive to the contemporary context of nursing. Consequently, the interpretive statements are subject to more frequent revision than are the provisions.

Additional ethical guidance and detail can be found in ANA or constituent member association position statements that address clinical, research, administrative, educational, or public policy issues.

Code of Ethics for Nurses with Interpretive Statements provides a framework for nurses to use in ethical analysis and decision-making. The Code of Ethics establishes the ethical standard for the profession. It is not negotiable in any setting nor is it subject to revision or amendment except by formal process of the House of

Delegates of the ANA. The Code of Ethics for Nurses is a reflection of the proud ethical heritage of nursing, a guide for nurses now and in the future.

XVII. ACADEMIC DISHONESTY SANCTION GUIDELINES

Some lecture slides, notes, or exercises used in this course may be the property of the textbook publisher or other third parties. All other course material, including but not limited to slides developed by the instructor(s), the syllabus, assignments, course notes, course recordings (whether audio or video) and examinations or quizzes are the property of the University or of the individual instructor who developed them. Students are free to use this material for study and learning, and for discussion with others, including those who may not be in this class, unless the instructor imposes more stringent requirements. Republishing or redistributing this material, including uploading it to web sites or linking to it through services like iTunes, violates the rights of the copyright holder and is prohibited. There are civil and criminal penalties for copyright violation. Publishing or redistributing this material in a way that might give others an unfair advantage in this or future courses may subject you to penalties for academic misconduct.

XVIII. COMPLAINTS

Please direct any concerns about the course with the instructor first. If you are unable to discuss your concerns with the instructor, please contact the faculty course lead. Any concerns unresolved with the course instructor or faculty course lead may be directed to the student's advisor and/or the Chair of your program.

XIX. Tips for Maximizing Your Learning Experience in this Course (Optional)

- ✓ Be mindful of getting proper nutrition, exercise, rest and sleep!
- ✓ Come to class.
- ✓ Complete Required Readings: and assignments BEFORE coming to class.
- ✓ BEFORE coming to class, review the materials from the previous Unit AND the current Unit, AND scan the topics to be covered in the next Unit.
- ✓ Come to class prepared to ask any questions you might have.
- ✓ Participate in class discussions.
- ✓ AFTER you leave class, review the materials assigned for that Unit again, along with your notes from that Unit.
- ✓ If you don't understand something, ask questions! Ask questions in class, during office hours, and/or through email!
- ✓ Keep up with the assigned readings.

Don't procrastinate or postpone working on assignments.
