



**Physician Assistant Education Department**

**Master of Science in Medicine**

**3 units**

**MSM 6002 PHYSIOLOGY**

**Fall 2023**

<b>Course director:</b> <i>Brandon Sawyer, PhD</i>	Term: Fall
<b>Phone:</b> 619-849-2283	Meeting day & time: Tuesdays 9:30am to 12:30pm
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**PLNU Mission**

**To Teach ~ To Shape ~ To Send**

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

**Dr. Sawyer’s Office Hours:** MWF: 8:30-10:45am

If you have any questions about the material in this course, feel free to stop by during my office hours as listed above. Either set up an appointment or simply drop by. I do get meetings scheduled during these office hours so I am not always available at these times. I will also be in my office at other, unscheduled times. If my office hours don’t work for your schedule, e-mail or stop by and we can set up an appointment to meet.

**\*\*I am here to help you in whatever way you need. Feel free to come to me with questions about the course, your life, your future, your career, or anything else that comes up. You all matter greatly to me.**

**COURSE DESCRIPTION**

This course presents human physiology through a systems approach at the cellular, tissue and organ level. Major themes regarding commonly occurring pathophysiological processes will be introduced to

prepare students for more in-depth learning about specific disease states and patient presentations in subsequent courses.

## **COURSE GOALS**

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The goals of this course are to provide students with relevant didactic and practical knowledge upon which to connect the functions of the body to applicable pathology and related disease processes.

## **PROGRAM LEARNING OUTCOMES**

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The content in this course will contribute to the student's proficiency in this/these area(s):

3. Recommend and interpret common diagnostic and screening tests. <sup>(MK, IC, PC, PR, PB, SB)</sup>

Initials indicate PA core competency required to meet the PLO. PA Core Competencies:

MK = Medical Knowledge	IC = Interpersonal Skills & Communication	PC = Patient Care
PR = Professionalism	PB = Practice-based Learning	SB = Systems-based Practice

## **COURSE LEARNING OUTCOMES**

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Successful completion of this course requires demonstration of the skills and knowledge outlined here at, minimally, the ADVANCED BEGINNER level.

1. Explain interrelationships among molecular, cellular, tissue and organ functions in each system. <sup>(MK2)</sup>
2. Explain physiological processes of all body systems and the mechanisms for maintaining homeostasis. <sup>(MK2)</sup>
3. Distinguish the normal range of variation in human physiology. <sup>(MK2)</sup>
4. Explain the physiological basis of common diseases or syndromes, as they relate to abnormal anatomical and physiological function. <sup>(MK2)</sup>
5. Identify etiology and effects of homeostatic imbalances. <sup>(MK3)</sup>
6. Explain the process of fetal circulation and physiologic changes after birth. <sup>(MK2)</sup>
7. Demonstrate an understanding of the components of human blood and characteristics, functions, and abnormalities and disease states of each. <sup>(MK3)</sup>
8. Determine the difference between normal and pathologic states related to the hematologic and lymphatic systems. <sup>(MK3)</sup>
9. Analyze the functions of the respiratory system including gas exchange, ventilation control, and cellular gas transport in health and disease. <sup>(MK2)</sup>
10. Describe the mechanisms of ventilation and perfusion, and the diffusion of respiratory gases. <sup>(MK2)</sup>
11. Sequence the timing and events of the cardiac cycle. <sup>(MK2)</sup>
12. Describe the physiologic functions and processes of the major and accessory digestive system organs, including stimulus and control. <sup>(MK2)</sup>
13. Explain the processes of urine formation and the mechanism by which the kidneys regulate fluid volume in the human body. <sup>(MK2)</sup>

14. Demonstrate an understanding of neurophysiology at the molecular, cellular and system level. <sup>(MK2)</sup>
15. Explain the role of the endocrine system in regulating growth and development, responding to physiologic changes, and maintaining homeostasis in the human body. <sup>(MK2)</sup>
16. Predict the pathological consequences of endocrine hyposecretion and hypersecretion. <sup>(MK3)</sup>
17. Describe the physiologic functions and processes of the muscular system. <sup>(MK2)</sup>

## **INSTRUCTIONAL OBJECTIVES**

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Upon completion of the **GENERAL PHYSIOLOGY** section of the course the student will be able to:

1. State the functions of each organ system of the body, explain the mechanisms by which each functions and relate the functions and the anatomy and histology of each organ system. <sup>Comprehension</sup>
2. Understand and demonstrate the interrelations of the organ systems to each other. <sup>Application</sup>
3. Predict and explain the integrated responses of the organ systems of the body to physiological and pathological stresses. <sup>Application</sup>
4. Assess therapeutic interventions using knowledge of cellular responses to injury, and the underlying etiology, biochemical and molecular alterations. <sup>Evaluation</sup>
5. Apply knowledge of the vascular and leukocyte responses of inflammation and their cellular and soluble mediators to the causation, resolution, prevention, and targeted therapy of tissue injury. <sup>Application</sup>
6. Apply knowledge of the molecular basis of neoplasia to an understanding of the biological behavior, morphologic appearance, and classification of specific neoplasia. <sup>Application</sup>

Upon completion of the **MUSCULAR PHYSIOLOGY** section of the course the student will be able to:

1. Describe the basic functions of muscle tissue. <sup>Knowledge</sup>
2. Describe aerobic and anaerobic muscle metabolism. <sup>Knowledge</sup>
3. Explain the relationship of form to function in skeletal muscle at the tissue and cellular levels. <sup>Comprehension</sup>
4. Describe the function of acetylcholine in eliciting skeletal muscle contraction. <sup>Knowledge</sup>
5. List the major channels found in the sarcolemma of a skeletal muscle fiber, including those at the motor end plate. <sup>Knowledge</sup>
6. Define depolarization, repolarization and hyperpolarization. <sup>Knowledge</sup>
7. Describe the sliding-filament theory of muscle contraction. <sup>Knowledge</sup>
8. Summarize the events in a muscle contraction cycle. <sup>Comprehension</sup>
9. Predict how changes in ion concentration, channel function, and the quantity of neurotransmitter will affect muscle contraction. <sup>Evaluation</sup>
10. Describe muscle twitch, summation, tetanus, tone, fatigue and oxygen debt. <sup>Knowledge</sup>
11. Explain the function of the motor unit. <sup>Comprehension</sup>
12. Describe the mechanisms and sources of energy that muscle fibers use to obtain ATP for muscle contraction. <sup>Knowledge</sup>
13. Discuss the relationship of motor unit size to muscle function, including the affect on power and precision. <sup>Comprehension</sup>
14. Contrast isometric, isotonic, concentric, and eccentric contraction. <sup>Evaluation</sup>

Upon completion of the **NEUROPHYSIOLOGY** section of the course the student will be able to:

1. Discuss the role of the nervous system in maintaining homeostasis. <sup>Knowledge</sup>
2. Describe the features and functional areas of each cerebral lobe. <sup>Knowledge</sup>

3. Describe and explain clinical abnormalities in the structure and function of cerebral cortical systems. Comprehension
4. Describe the concentration gradients for sodium, potassium, calcium, and chloride in neurons at rest. Knowledge
5. Describe the major function(s), interrelationships and clinical abnormalities of somatomotor systems. Comprehension
6. List the major receptor classifications and representative receptor agonists and antagonists for these transmitters. Comprehension
7. Relate each of the special senses to its specific receptor cells, describe how the receptor cells transduce stimuli, and explain the pathway of sensory information from receptor cells to the cerebral cortex. Application
8. Explain the neurophysiology of the retina and central visual system Comprehension
9. Describe the formation and function of cerebrospinal fluid, and explain the flow from its point of origin to point of exit. Comprehension
10. Describe the normal pressure, flow, volume (ventricular vs. cisternal), and composition of the CSF. Comprehension
11. Describe the blood brain barrier and the role of P-glycoprotein in maintaining the integrity of the CSF composition. Comprehension
12. Describe pre and postganglionic neurons of the ANS. Knowledge
13. Describe the function of the neurotransmitters and receptors in autonomic responses. Knowledge
14. Describe the responses of the body to stimulation by the sympathetic and parasympathetic divisions of the ANS. Knowledge
15. Describe functional and clinical significance of excitatory and inhibitory neurotransmitters. Knowledge
16. Summarize the physiological changes that occur with Cushing response. Comprehension
17. Explain the function of the limbic system. Comprehension
18. Compare the functional differences between the somatic and autonomic divisions of the nervous system. Analysis
19. Compare and contrast the blood-brain barrier of the circumventricular organs with that of the majority of the neural tissue in the brain. Analysis
20. Compare and contrast presynaptic inhibition with post-synaptic inhibition (ipsp). Analysis
21. Compare and contrast resting membrane potentials, action potentials, and post-synaptic potentials. Analysis
22. Predict how fluctuations in extracellular fluid (ECF) or intracellular fluid (ICF) ion concentrations, channel function, and the quantity of neurotransmitter will affect resting membrane potential, action potentials, synaptic transmission, and post-synaptic potentials. Evaluation

Upon completion of the **ENDOCRINE PHYSIOLOGY** section of the course the student will be able to:

1. Explain the principle of negative and positive feedback control of hormone secretion. Comprehension
2. Contrast the terms endocrine, paracrine, and autocrine based on the site of hormone release and the pathway to the target tissue. Analysis
3. Contrast major differences in mechanisms of action of peptides and steroids working through membrane receptors and steroids, vitamin D, and thyroid hormones working through nuclear receptors. Analysis
4. Describe the physiology of normal glucose metabolism. Comprehension
5. Discuss the hypothalamic-pituitary-end organ axes and corresponding hormonal feedback loops. Comprehension
6. Explain the physiology of normal and abnormal adrenal function. Comprehension

7. Identify the target cells for vasopressin and explain why vasopressin is also known as antidiuretic hormone. Comprehension
8. Describe the 3 major families of the anterior pituitary hormones and their biosynthetic and structural relationships. Comprehension
9. Identify appropriate hypothalamic factors that control the secretion of each of the anterior pituitary hormones, and describe their route of transport from the hypothalamus to the anterior pituitary. Comprehension
10. Explain the role of the hypothalamus in homeostatic functions of neuroendocrine regulation, water/osmolar balance, temperature regulation, food intake/energy balance, and circadian rhythm regulation. Comprehension
11. Identify the steps in the biosynthesis, storage, and secretion of tri-iodothyronine (T3) and thyroxine (T4) and their regulation. Comprehension
12. Describe the absorption, uptake, distribution, and excretion of iodide. Comprehension
13. Explain the relationship of thyroid hormone binding in blood on free and total thyroid hormone levels. Comprehension
14. Relate the significance of the conversion of T4 to T3 and reverse T3 (rT3) in extra-thyroidal tissues. Comprehension
15. Describe the physiologic effects and mechanisms of action of thyroid hormones. Comprehension
16. Describe the biosynthesis of the adrenal steroid hormones (glucocorticoids, mineralocorticoids, and androgens) and the key structural features that distinguish each class. Comprehension
17. Describe the cellular mechanism of action of adrenal cortical hormones. Comprehension
18. Identify the major physiological actions and therapeutic uses of glucocorticoids. Comprehension
19. Describe the control of glucagon secretion. Comprehension
20. Identify the major hormones secreted from the endocrine pancreas, their cells of origin, and their chemical nature. Comprehension
21. List the target organs or cell types for glucagon and describe its principal actions on each. Comprehension
22. List the major target organs or cell types for insulin, the major effects of insulin on each, and the consequent changes in concentration of blood constituents. Comprehension
23. Identify the time course for the onset and duration for the biological actions of insulin. Comprehension
24. Describe the relationship between blood glucose concentrations and insulin secretion. Comprehension
25. Describe the roles of neural input and gastrointestinal hormones on insulin secretion. List the factors that modulate the secretory response. Comprehension

Upon completion of the **GASTROINTESTINAL PHYSIOLOGY** section of the course the student will be able to:

1. Identify the sources and typical amounts of fluid and nutrients entering and leaving the gastrointestinal tract daily. Comprehension
2. For major classes of nutrients (carbohydrates, proteins, fats), differentiate the processes of ingestion, digestion, absorption, secretion, and excretion; include the location in the GI tract where each process occurs. Comprehension
3. Discuss how afferent and efferent extrinsic nerves (sympathetic and parasympathetic) interact with the enteric nervous system and regulate the functions of the GI tract. Comprehension
4. Identify the cell type and anatomical location of the endocrine cells secreting major GI hormones, such as gastrin, secretin, cholecystokinin (CCK), GLP-1, GLP-2, leptin, and motilin. Comprehension
5. Describe the physiological function of the components of saliva. Comprehension
6. Define the components of the saliva important in oral hygiene. Knowledge
7. Differentiate between the neural and muscular composition and function in the upper versus lower esophagus including the upper and lower esophageal sphincters. Comprehension

8. List the major components secreted by the exocrine pancreas and the principal cell types involved in this secretion. Knowledge
9. Describe the process of digestive enzyme synthesis, packaging and how this process maintains the integrity of the pancreas. Comprehension
10. Describe the mechanisms by which chyme from the stomach is neutralized in the duodenum. Comprehension
11. Describe the mechanism by which pancreatic zymogens are activated in the small intestine. Comprehension
12. List the stimuli that release secretin and CCK and explain the route by which these regulatory peptides stimulate the pancreas. Knowledge
13. Describe the storage, digestion, and motility roles of the stomach. Comprehension
14. Discuss the composition of gastric luminal fluid and how it is affected by the intake of a meal as well as variable gastric secretions of acid, alkali, and attendant salts. Comprehension
15. Identify the proteins secreted into the gastric lumen by chief cells, parietal cells, and mucous cells. Contrast the functions and regulation of these secretions. Comprehension
16. Identify the gastric cell types secreting gastrin, somatostatin, histamine, and gastrin releasing peptide. Describe the stimuli that promote and inhibit release of these peptides, and their cellular targets. Comprehension
17. Describe the role of HCl in the gastric digestion of carbohydrates and protein, and how pepsinogen is activated. Comprehension
18. List the mechanisms contributing to gastric mucosal defense and how they can be compromised by drugs or pathogens. Knowledge
19. Describe the function and dysfunction of gastric peristalsis, the pyloric sphincter, and duodenal feedback in controlling gastric emptying rate. Comprehension
20. Contrast the mechanism of reabsorption of bile acids/salts in the small intestine versus the colon. Analysis
21. Describe the enterohepatic circulation, including any different handling among primary and secondary bile salts, and bile acids. Comprehension
22. Describe how rates of absorption are affected by the macroscopic and microscopic architecture of the gut epithelium. Comprehension
23. Describe the sequential digestion of ingested starch by enzymes of the salivary glands, pancreas, and the intestinal apical membrane. Comprehension
24. Describe the sequential digestion of ingested proteins by gastric pepsin, pancreatic enzymes, and enzymes at the intestinal apical membrane. Comprehension
25. Compare the membrane transport mechanisms responsible for uptake of sugars, amino acids and di-peptides by intestinal epithelial cells. Analysis
26. Describe the mechanisms for the uptake, processing and release of lipids by the small intestinal epithelium and consequences of their malabsorption. Comprehension
27. Compare the absorption of fat-soluble and water soluble vitamins and give examples of diseases resulting from their malabsorption. Analysis
28. Describe the mechanisms that mediate the intestinal trans-epithelial movement of water, the major electrolytes, iron and calcium. Comprehension
29. Describe the mechanisms, localization and regulation of colonic sodium absorption. Comprehension
30. Describe the role of dietary fiber in promoting colonic motility. Comprehension
31. Describe the role of short chain fatty acids in colonic sodium absorption and in both colonic and body energy metabolism. Comprehension
32. Describe the control of peristalsis by the enteric nervous system. Comprehension
33. Describe major motor patterns in the GI tract and their functions. Comprehension
34. Describe the role of colonic motility in facilitating the recovery of water and electrolytes. Comprehension

35. Describe the sequence of events in the colon and anal sphincters occurring during reflexive defecation, differentiating those movements under voluntary control and those under autonomic control. Comprehension

Upon completion of the **CARDIOVASCULAR PHYSIOLOGY** section of the course the student will be able to:

1. Diagram the cardiac cycle in its entirety. Analysis
2. State the steps in excitation-contraction coupling in cardiac muscle. Knowledge
3. Outline the sequence of events that occurs between the initiation of an action potential in a cardiac muscle cell and the resulting contraction and then relaxation of that cell. Knowledge
4. Provide specific details about the special role of Ca<sup>2+</sup> in the control of contraction and relaxation of cardiac muscle. Application
5. Describe the role of Starling's Law of the Heart in keeping the output of the left and right ventricles equal. Comprehension
6. Beginning in the SA node, diagram the normal sequence of cardiac activation (depolarization) and the role played by specialized cells. Predict the consequence of a failure to conduct the impulse through any of these areas. Evaluation
7. Explain the ionic mechanism of pacemaker automaticity and rhythmicity and identify cardiac cells that have pacemaker potential and their spontaneous rate. Identify neural and humoral factors that influence their rate. Comprehension
8. Define preload and explain why ventricular end-diastolic pressure, atrial pressure and venous pressure all provide estimates of ventricular preload. Explain why ventricular end-diastolic pressure provides the most reliable estimate. Comprehension
9. Define afterload and explain how arterial pressure influences afterload. Comprehension
10. Define ejection fraction and be able to calculate it from end diastolic volume, end systolic volume, and/or stroke volume. Predict the change in ejection fraction that would result from a change in a) preload, b) afterload, and c) contractility. Comprehension
11. Draw, in correct temporal relationship, the pressure, volume, heart sound, and ECG changes in the cardiac cycle. Identify the intervals of isovolumetric contraction, rapid ejection, reduced ejection, isovolumetric relaxation, rapid ventricle filling, reduced ventricular filling and atrial contraction. Comprehension
12. Describe the various phases of ventricular systole and ventricular diastole. Contrast the relationship between pressure and flow into and out of the left and right ventricles during each phase of the cardiac cycle. Analysis
13. Explain the EKG tracings found in a normal cardiac cycle including rate calculations, rhythm and axis and identify abnormalities. Comprehension
14. Describe the Cushing Reflex and the CNS ischemic pressor response. Comprehension

Upon completion of the **HEMATOLOGY** section of the course the student will be able to:

1. Explain the normal functioning of red blood cells and hemoglobin; white blood cells and stem cells; platelets, the coagulation system; and lymph nodes, the spleen, and differentiation of lymphocytes Comprehension
2. Identify cell differentiation in the bone marrow. Knowledge

Upon completion of the **FETAL CIRCULATION** section of the course the student will be able to:

1. Describe the intracardiac and extracardiac shunts that are present in the fetal circulation. Comprehension
2. Explain the compensatory mechanisms present in the fetal circulation to handle the low oxygen environment. Comprehension
3. Explain what changes occur in the fetal circulation at birth. Comprehension
4. Explain what factors cause the closure of the shunts after birth. Comprehension

Upon completion of the **RESPIRATORY PHYSIOLOGY** section of the course the student will be able to:

1. Define total lung capacity, tidal volume, forced expiratory volumes, functional residual capacity, and residual volume. Knowledge
2. Define and contrast the relationships between alveolar ventilation and the arterial PCO<sub>2</sub> and PO<sub>2</sub>. Comprehension
3. Describe how pulmonary vascular resistance changes with alterations in cardiac output or pulmonary arterial pressure. Identify the zones in which these two mechanisms apply. Comprehension
4. Define oxygen diffusing capacity, and discuss its effect on alveolar-capillary gas exchange and the disorders which might impact it. Comprehension
5. Describe the kinetics of oxygen transfer from alveolus to capillary. Knowledge
6. Describe how the ventilation/perfusion (V/Q) ratio of an alveolar-capillary lung unit determines the PO<sub>2</sub> and PCO<sub>2</sub> of the blood emerging from that lung unit. Knowledge
7. Discuss the neurophysiologic basis of REM and NREM sleep. Comprehension
8. Outline the current understanding of regulatory mechanisms in the brainstem and diencephalon regulating the appearance of NREM, REM and wake states. Include the neurotransmitters and the mechanism of the circadian rhythm underlying the sleep-wake cycle. Application

Upon completion of the **RENAL PHYSIOLOGY** section of the course the student will be able to:

1. Define acids, bases, and buffers. Knowledge
2. List the buffer systems available in the human body. Knowledge
3. Describe the interrelationships of the pH, the PCO<sub>2</sub> of the blood, and the plasma bicarbonate concentration, and state the Henderson-Hasselbalch equation. Comprehension
4. State the normal ranges of arterial pH, PCO<sub>2</sub> and bicarbonate concentration, and defines alkalosis and acidosis. Knowledge
5. List the potential causes of respiratory acidosis and alkalosis and metabolic acidosis and alkalosis. Knowledge
6. Discuss the respiratory and renal mechanisms that help to compensate for acidosis and alkalosis. Comprehension
7. Evaluate blood gas data to determine a subject's acid-base status. Evaluation
8. Classify and explain the causes of tissue hypoxia. Analysis
9. Identify major routes and normal ranges for water intake and loss, and predict how changes in intake and loss affect the distribution of total body water. Application
10. Identify the site of erythropoietin production, the adequate stimulus for erythropoietin release, and the target tissue for erythropoietin action. Knowledge
11. Contrast the movement between intracellular and extracellular compartments caused by increases or decreases in extracellular fluid osmolality. Comprehension
12. Define renal blood flow, renal plasma flow, glomerular filtration rate, and filtration fraction and list typical values. Knowledge



13. Given the capillary and Bowman's capsule hydrostatic and oncotic pressures, calculate the net filtration force at the glomerular capillaries. Predict the changes in glomerular filtration caused by increases or decreases in any of those pressures. <sup>Application</sup>
14. Identify which components of the filtration barrier whose damage would result in hematuria and proteinuria. <sup>Knowledge</sup>
15. Predict the change in renal blood flow and GFR caused by urinary tract obstruction, hypoalbuminemia, and diabetic nephropathy. <sup>Application</sup>
16. Describe the contribution of the major nephron segments to the reabsorption of the filtered load of solute and water. <sup>Comprehension</sup>
17. Given urine and plasma osmolarities and urine volume, calculate osmolar and free water clearance. Identify expected free water clearance for an individual producing either dilute or concentrated urine. <sup>Application</sup>
18. Describe the nephron sites and molecular mechanisms of action of the following classes of diuretics (osmotic, carbonic anhydrase inhibitors, loop, thiazide, K<sup>+</sup>-sparing). <sup>Comprehension</sup>
19. Diagram the formation and generation of angiotensin II, beginning with renin. Identify four factors that can promote renin release. <sup>Analysis</sup>
20. Describe the role of the renin-angiotensin-aldosterone system in the regulation of systemic arterial blood pressure in volume-replete and volume-depleted states and in secondary forms of hypertension. <sup>Comprehension</sup>

*Note: Superscripts identify the Bloom's Taxonomy level for each objective.*

#### UNIT INSTRUCTION

Unit	Week	Lecture
I	1	<b>Introductions</b> General Physiology
	2	Muscular Physiology
	Friday of Week 2	<b>Unit I Exam</b>
II	3	Neurophysiology
	4	Neurophysiology
	5	Endocrine Physiology
	6	Endocrine Physiology
	Friday of Week 6	<b>Unit II Exam</b>
	7	Gastrointestinal Physiology
III	8	Gastrointestinal Physiology
	9	Cardiovascular Physiology
	10	Cardiovascular Physiology
	11	Cardiovascular Physiology: Hematology and Fetal Circulation
	Friday of Week 11	<b>Unit III Exam</b>
IV	12	Respiratory Physiology

	13	Respiratory Physiology
	14	Renal Physiology
	15	Renal Physiology
	16	<b>Unit IV Exam</b>

## REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

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**Note: Texts prefaced with double asterisks are provided in Access Medicine.**

**\*\*Ganong's Review of Medical Physiology, 26e (2019)** by Kim E. Barrett, et al  
ISBN-13: 978-1260122404

## LEARNING MODALITIES

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Modalities include lectures, on-line pre-lecture activities, reading assignments, and case studies. The class schedule and assignments can be found in Canvas.

## ATTENDANCE AND PARTICIPATION POLICY

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Regular and punctual attendance at all classes is considered essential to optimum academic achievement. However, we recognize that as adults you have other life responsibilities and challenges that may interfere. Ultimately you are responsible for your education and your ability to demonstrate mastery of the course and program objectives.

1. You **MUST** attend:
  - PE and clinical skills labs appropriately dressed and with all necessary equipment
  - examinations on the date and time for which they are schedule
  - community learning groups
2. We expect
  - active participation in all class activities.
  - completion of all class preparatory assignments prior to commencement of class.
  - respect for the class, peers and faculty.
  - on-time arrival for all classes, laboratories, learning groups or any scheduled activities.  
Routine tardiness demonstrates a lack of professionalism and will not be tolerated

## INCOMPLETES AND LATE ASSIGNMENTS

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All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned under extremely unusual circumstances. Students failing an examination or practicum must complete the designated remediation (See REMEDIATION below) within the assigned time.

## FINAL EXAMINATION POLICY

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Successful completion of this class requires taking the final examinations (written and practical) on their respective scheduled days. No requests for early examinations or alternative days will be approved.

## ASSESSMENT AND GRADING

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Student course grades are calculated using all assessment tools utilized during the course. These include quizzes, written examinations, written assignments, practicums, and evaluation of skills.

Assignment	Points	% OF GRADE
Exam #1	50	11%
Exam #2	100	21%
Exam #3	125	26%
Exam #4	75	16%
Weekly Reading Quizzes (15 x 5 points each)	75	16%
Clinical Physiology Case Study	50	11%
Total Points	475	100%
Exam Total	350	74%

Grading will be in keeping with Point Loma Nazarene University policy for graduate programs and will be as follows:

A = 93-100	C = 73-76
A- = 92-90	C- = 70-72
B+ = 87-89	D+ = 67-69
B = 83-86	D = 63-66
B- = 80-82	D- = 60-62
C+ = 77-79	F = 0-59

## REMEDIATION

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Remediation is the process by which both the student and the program are assured that performance indicating a deficiency in knowledge or skills is subsequently demonstrated to be satisfactory. This may include a re-test over missed material, a skills demonstration or a review of missed material with completion of corrected answers. It is important to note that this is content remediation, not grade remediation and no grade will be changed based on these activities.

Within 48 hours of the posting of a grade of <70%, the student MUST contact the course director to discuss the student's performance and create a remediation plan. Unless otherwise directed by the course director, remediation activities must be completed within 5 days.

## PLNU COPYRIGHT POLICY

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Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### **PLNU ACADEMIC HONESTY POLICY**

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Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies in the Graduate and Professional Studies Catalog for definitions of kinds of academic dishonesty and for further policy information.

### **SEXUAL MISCONDUCT AND DISCRIMINATION**

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Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix)

### **PLNU ACADEMIC ACCOMMODATIONS POLICY**

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While all students are expected to meet the minimum standards for completion of this course as established by the Technical Standards and the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. ([DRC@pointloma.edu](mailto:DRC@pointloma.edu) or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students' equal access to and benefits of PLNU programs and activities. After the student files the

required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

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#### **USE OF TECHNOLOGY**

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In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the [Technology and System Requirements](#) information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources please contact [student-tech-request@pointloma.edu](mailto:student-tech-request@pointloma.edu).

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

**This syllabus is subject to change. Students are encouraged to check course messages and emails in order to remain current.**

**ARC-PA standards (5th edition) addressed in this course: B2.02(b)**