

## **MED 806: Cardiovascular, Pulmonary & Renal (CPR)**

*Spring 2018*

Mondays, Tuesdays, Thursdays & Fridays  
8:00 a.m. to 12:00 p.m. & 1:00 to 5:00 p.m.  
1001 Shadow Lane

Course Chairs:  
Kathleen Benson, MD  
Hidenobu Shigamitsu, MD / Raj Singh, MD

### **Course Description and Learning Objectives:**

This course takes an integrated approach to the cardiovascular, pulmonary, and renal systems to provide a broad understanding of the normal structure and function of each system. A comprehensive overview of pathophysiology, epidemiology, biostatistics, diagnostic tests, and therapeutic principles related to disorders of these systems are covered.

- Describe the essential features of the autonomic nervous system and selected pharmacologic agents that act upon it.
- Describe the essential features of the gastrointestinal, endocrine, and reproductive systems, their normal structure and function, and the epidemiology, clinical features, pathogenesis, pathophysiology, and laboratory findings associated with gastrointestinal, endocrine, and reproductive diseases (including disorders of pregnancy).
- Identify appropriate therapeutic options for selected diseases of the gastrointestinal, endocrine, and reproductive systems.
- Determine how epidemiologic, socioeconomic, behavioral, sociocultural, and community factors may impact the care of patients with diseases of the gastrointestinal, endocrine, and reproductive systems.
- Describe how wellness, nutrition, hospitality principles, pain management, and integrative medicine may contribute to the care of patients with diseases of the gastrointestinal, endocrine, and reproductive systems.
- Recognize bioethical issues germane to the medical care of patients with diseases of the gastrointestinal, endocrine, and reproductive systems.
- Recognize end-of-life issues germane to patients with gastrointestinal, endocrine, and reproductive diseases.
- Construct a differential diagnosis based on the clinical presentation of a patient with a gastrointestinal, endocrine, and/or reproductive disease and apply diagnostic reasoning to narrow the differential diagnosis.
- Develop pertinent clinical questions related to the diagnosis and/or treatment of gastrointestinal, endocrine, and reproductive diseases, and utilize appropriate resources to answer those questions in a self-directed fashion.

### **Required and Recommended Textbooks:**

#### Required

- Fletcher, R., & Fletcher, S. (2013). *Clinical Epidemiology: The Essentials*. 5<sup>th</sup> ed. Wolters Kluwer.

#### Recommended

- Drake, R. L., Vogl, W. A., & Mitchell, A. W. (2015). *Gray's Anatomy for Students*. 3<sup>rd</sup> ed. Elsevier Saunders.
- Kumar, V., Abbas, A. K., & Aster, J. C. (2014) *Robbins and Cotran Pathologic Basis of Disease* (Robbins Pathology). 9<sup>th</sup> ed. Elsevier Saunders.

*Additional materials may be assigned at the onset and throughout the duration of the course to aid/facilitate learning objectives.*

**Course Schedule & Weekly Objectives:****Week 1 – March 12-16, 2018 – Basics (Crack Lung)**

*Topics include:*

- Define resting membrane potential and describe the cellular/ionic basis and essential features of action potentials (including propagation and refractory periods)
- Salient histologic features of smooth muscle)
- The basic macroscopic organization and functions of the autonomic nervous system
- Essential features of the sympathetic nervous system, including the origin of preganglionic sympathetic neurons, the location of sympathetic ganglia, the types of receptors and associated neurotransmitters, and the general characteristics of the fight or flight response.
- Essential features of the parasympathetic nervous system (including the origin of preganglionic parasympathetic neurons, the location of parasympathetic ganglia, and the types of receptors and associated neurotransmitters)
- How sympathetic and parasympathetic nervous systems reciprocally and synergistically produce coordinated responses in target organs
- Locations and mechanisms of selected adrenoceptors and cholinoreceptors
- Pharmacologic agents that alter autonomic nervous system function and basic physiologic effects

*Assigned Readings & Review Materials:*

**Week 2 – March 19-23, 2018 – Vasculature and Mediastinum**  
(RAS with Stent and subsequent Thrombosis)

*Topics include:*

- Normal embryology and anatomy of the neck and mediastinum
- Salient histologic features of blood vessels and lymphatics
- Clinical features, pathogenesis, and diagnostic findings associated with selected disorders that affect the blood vessel wall (including hypertensive disease, atherosclerosis, aneurysm, and arterial dissection)
- Clinical features, pathogenesis, and diagnostic findings associated with selected types of infectious and non-infectious vasculitis, as well as selected disorders of vascular hyperreactivity
- Clinical features, pathogenesis, and diagnostic findings associated with selected vascular neoplasms
- Clinical features, pathogenesis, and diagnostic findings associated with selected primary and secondary disorders of the mediastinum
- Epidemiology of selected diseases affecting the vasculature and mediastinum
- Major therapeutic modalities for treating selected vasculopathies and mediastinal disorders (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

*Assigned Readings & Review Materials:*

**EXAM 1: March 26, 2018**

**Week 3 – March 26-29, 2018 – Cardio I***Topics include:*

- Normal embryology and anatomy of the heart and great vessels
- Salient histologic features of the heart and great vessels, integrating the cell biology and physiology of the tissues
- Major features of the cardiac cycle (including cardiac conduction, wall mechanics, hemodynamics, and associated heart sounds)
- Neural and hormonal mechanisms that control heart function
- Heart failure
- Major congenital heart defects (including left-to-right shunts, right-to-left shunts, and obstructive disorders), and correlating the anatomic changes with the resulting clinical features
- Epidemiology of selected congenital heart defects
- Process by which electrical activity of the heart is recorded to generate an electrocardiogram (ECG/EKG)
- Salient features of a normal ECG/EKG tracing

*Assigned Readings & Review Materials:***Week 4 – April 2-6, 2018 – Cardio II***Topics include:*

- Selected ECG/EKG abnormalities and biologic disturbance underlying each
- Clinical features, pathogenesis, and diagnostic findings associated with selected arrhythmias
- Common etiologies for sudden cardiac death (SCD)
- Ischemic heart disease, and differentiate between acute and chronic etiologies of insufficient myocardial perfusion
- Clinical features, pathogenesis, and diagnostic findings associated angina pectoris and myocardial infarction
- Clinical features, pathogenesis, and diagnostic findings associated with systemic and pulmonary hypertensive heart disease
- Epidemiology of selected arrhythmias, ischemic heart disease, and hypertensive heart disease
- Major therapeutic modalities for treating arrhythmias, ischemic heart disease, and hypertensive heart disease (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

**EXAM 2: April 9, 2018****Week 5 – April 9-13, 2018 – Cardio III***Topics include:*

- Major types of valvular heart disease, and describe the etiology, clinical and diagnostic findings, and prognosis for each.
- Pathogenesis of selected cardiomyopathies (including dilated, hypertrophic, restrictive, and selected forms of myocarditis)
- Clinical features, pathogenesis, & diagnostic findings of selected cardiomyopathies
- Clinical features, pathogenesis, and diagnostic findings associated with selected primary cardiac neoplasms

- Pathogenesis of selected disorders of the pericardium, including pericardial effusions, hemopericardium, and pericarditis
- Epidemiology of selected diseases of the cardiac valves, cardiomyopathies, cardiac neoplasms, and pericardial disorders
- Major therapeutic modalities for treating valvular heart disease and cardiomyopathies (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

*Assigned Readings & Review Materials:*

Week 6 – April 16-20, 2018 – Pulmonology I (Cystic Fibrosis)

*Topics include:*

- Normal embryology and anatomy of the respiratory system (including the nasal cavities, nasopharynx, larynx, lungs, and pleura)
- Salient histologic features of the upper and lower respiratory systems
- Main features of selected congenital anomalies involving the respiratory system
- Essential concepts of respiratory physiology (including lung volumes and capacities, the mechanics of breathing, gas exchange and transport, ventilation/perfusion relationships, and control of breathing)
- Describe atelectasis and pulmonary edema, and common mechanisms for their formation
- Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and describe their relationship, pathogenesis, and typical clinical course

*Assigned Readings & Review Materials:*

**EXAM 3: April 23, 2018**

Week 7 – April 23-27, 2018 – Pulmonology II (Idiopathic Pulmonary Fibrosis)

*Topics include:*

- Define and contrast obstructive versus restrictive lung diseases
- Clinical features, pathogenesis, and diagnostic findings associated with selected obstructive lung diseases (including emphysema, chronic bronchitis, and asthma)
- Chronic obstructive pulmonary disease (COPD), and describe how this disorder relates to emphysema and chronic bronchitis
- Clinical features, pathogenesis, and diagnostic findings associated with selected restrictive lung diseases (including fibrosing diseases, granulomatous diseases, smoking-related interstitial diseases, and pulmonary alveolar proteinosis)
- Epidemiology of selected obstructive and restrictive lung diseases
- Major therapeutic modalities for treating selected obstructive and restrictive lung diseases (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

*Assigned Readings & Review Materials:*

**EXAM 4: May 7, 2018**

Week 8 – May 14-18, 2018 – Pulmonology III (Lung CA presenting as Pneumonia)

*Topics include:*

- Define and contrast community versus hospital-acquired pneumonia
- Clinical features, pathogenesis, and diagnostic findings associated with selected infectious disorders of the lung (including bacterial, viral, and fungal pneumonias)
- How immunosuppression may alter susceptibility to specific pulmonary infections
- Clinical features, pathogenesis, and diagnostic findings associated with selected neoplastic diseases of the lung (including carcinoma, neuroendocrine tumors, and metastatic tumors)
- Clinical features, pathogenesis, and diagnostic findings associated with pleural disorders (including effusions, pneumothorax, and selected pleural tumors)
- Epidemiology of selected pulmonary infections and neoplasms
- Major therapeutic modalities for treating significant infectious pneumonias, lung neoplasms, and pleural disorders (including the uses, contraindications, side effects, and major drug-drug interactions associated with pharmacologic interventions)

*Assigned Readings & Review Materials:*

Week 9 – May 21-25, 2018 – Renal I (Bartter Syndrome)

*Topics include:*

- Normal embryology and anatomy of the kidneys, ureters, and urinary bladder
- Salient histologic and ultra-structural features of the kidney, ureter, and urinary bladder, integrating the cell biology and physiology of the tissues
- Principal clinical manifestations of chronic kidney disease
- Define and contrast nephritic and nephrotic syndromes
- Major histologic and/or ultra-structural changes associated with selected primary glomerular diseases, and describe how the changes relate to the underlying pathophysiology
- Clinical features, pathogenesis, and diagnostic findings associated with selected primary glomerulopathies
- Epidemiology of selected diseases of the renal glomerulus
- Major therapeutic modalities for treating selected primary glomerulopathies (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

*Assigned Readings & Review Materials:*

**EXAM 5: May 29, 2018**

Week 10 – May 29 – June 1, 2018 – Renal II (FSGS)

*Topics include:*

- Major histologic and/or ultra-structural changes associated with selected systemic diseases that involve the glomerulus, and describe how the changes relate to pathophysiology
- Clinical features, pathogenesis, and diagnostic findings associated with selected systemic diseases that involve the glomerulus
- Clinical features, pathogenesis, and diagnostic findings associated with selected tubular and interstitial diseases of the kidney
- Epidemiology of selected diseases of the renal glomerulus, tubule, and interstitium
- Major therapeutic modalities for treating selected systemic glomerulopathies and tubular/interstitial diseases, including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions

**Week 11 – June 4-8, 2018 – Renal III (Cystinuria with Stones)***Topics include:*

- Clinical features, pathogenesis, and diagnostic findings associated with selected vascular disorders that affect the renal system (renal artery stenosis and diffuse cortical necrosis)
- Clinical features, pathogenesis, and diagnostic findings associated with selected congenital disorders that affect the renal system (including autosomal dominant polycystic kidney disease, autosomal recessive polycystic kidney disease, and medullary sponge kidney)
- Clinical features, pathogenesis, and diagnostic findings associated with selected obstructive disorders that affect the renal system (including urolithiasis)
- Clinical features, pathogenesis, and diagnostic findings associated with selected neoplastic disorders that affect the renal system (including benign processes, *e.g.* angiomyolipoma, oncocytoma and malignant processes, *e.g.* renal cell carcinoma)
- Clinical features, pathogenesis, and diagnostic findings associated with selected disorders of the lower urinary system
- Epidemiology of selected vascular, neoplastic, and obstructive diseases of the kidney, as well as various disorders of the lower urinary system
- Major therapeutic modalities for treating selected vascular, congenital, and neoplastic disorders of the kidney, as well as selected disorders of the lower urinary system (including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions)

*Assigned Readings & Review Materials:***Week 11 – June 4-8, 2018 – Synthesis***Topics include:*

- Epidemiology, risk factors, pathogenesis, pathology, pathophysiology, clinical features, laboratory diagnosis, and treatment/management of selected complex, multisystem disorders that involved the cardiovascular, pulmonary, and/or renal systems

**FINAL EXAM: June 8, 2018****Course Requirements & Evaluation:**

Six (6) summative National Board of Medical Examiners (NBME) exams will be administered throughout the duration of the course, utilizing U.S. Medical Licensing Examination (USMLE)-type questions. Formative and summative assessments for small group activities, *e.g.* active engagement in problem-based learning sessions, in addition to preparation quizzes and written assignments will be administered throughout the course's duration. It is imperative that students engage in individual, small group, and class discussions to effectively contribute to active learning activities as well as offer and receive constructive feedback and assessment.

Students are expected to arrive on time to all course sessions and prepared to participate actively and engage in all learning and small group activities. Additionally, students are expected to be respectful, take responsibility and accountability for their own choices, actions, and/or decision. This includes the demonstration of personal and professional integrity.

**Grading:**

A pass/fail (P/F) grade is based upon satisfactory participation in small group activities, the timely

completion of written assignments and exercises, and successful passage on the summative NBME exams.

**Dress Code:**

Students represent not only themselves, but also the medical profession to those with whom they have contact. Appropriate and professional attire should be worn, especially when students are in patient care settings or when contact with patients is anticipated. Students should be aware that personal appearance may serve to inspire or hinder the establishment of the trust and confidence that are essential in the doctor-patient relationship. Jeans, sandals, and shorts (and other casual attire) are not considered professional dress. Scrubs are worn in the operating room, in the anatomy lab or in other clinical circumstances to protect the operator's clothing from soilage. Scrubs, in general, should not be worn outside of the lab or hospital, and scrubs worn in the operating room should not be worn outside of the operating room. *(Please refer to Section 6: Professionalism in the UNLV SOM Student Handbook for guidelines pertaining specifically to dress and deportment.)*

**University Expectations and Resources:**

Academic Misconduct – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

Copyright – The University requires all members of the University Community to familiarize themselves and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Disability Resource Center (DRC) – The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with UNLV SOM's Senior Associate Dean for Student Affairs, as well as a Disabilities Specialist at the DRC to discuss appropriate options.

If you are registered with the UNLV Disability Resource Center, please submit your Academic Accommodation Plan from the DRC to UNLV SOM's Office of Student Affairs to develop strategies for implementing an accommodations plan that meets both your needs and UNLV SOM requirements. Any information provided is private and confidential. To maintain confidentiality, please do not approach course chairs or instructors before or after class to discuss accommodation needs.

Religious Holidays Policy – Any student missing class quizzes, examinations, or any other class or

lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the Senior Associate Dean for Student Affairs and the course chair or faculty preceptor no later than the end of the first two weeks of classes, January 31, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructor or the university that could not have reasonably been avoided. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Incomplete Grades – Course or clerkship/elective faculty share responsibility with individual students to monitor their performance in the curriculum. The Student Progress Committee (SPC) follows student performance throughout the curriculum, and is responsible for approving all remediation plans once students have been assigned an insufficient grade, such as an ‘Incomplete’ or ‘Fail.’

Remediation plans are developed by individual course directors, based upon individual student’s identified academic and professional deficits, and tailored by both the course director and the SPC. The SPC determines deadlines for the adequate remediation of the course and provides final approval of the remediation plan. Students have the option, upon request, to appear before the SPC when plans for remediation are being considered.

*Please note:* In Phase 3 of the curriculum, any remediation of elective or advanced clerkship deficits must be completed prior to April 1 to meet the School of Medicine’s graduation requirements. Students are not permitted to remediate more than two (2) course grades of ‘Incomplete’ during a single academic year. Students who receive more than two incomplete grades must be reviewed by the SPC. *(Please refer to Section 7: Academic Policies in the UNLVSOM Student Handbook for guidelines pertaining specifically to academic progress and actions.)*

Tutoring & Academic Resources – The Academic Skills Team (AST) provides academic assistance for all UNLVSOM students taking UNLVSOM courses. Students are encouraged to stop by the AST to utilize a variety of academic services, including test-tasking skills and strategies, coping with test anxiety, and improving self-study skills in preparation for USMLE and board exams. The AST is located at: 2040 West Charleston Boulevard, 89102.

UNLV E-mail – By policy, faculty and staff should e-mail students’ UNLV e-mail accounts only. All UNLV students receive a Rebelmail account after they have been admitted to the university. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. Students’ e-mail prefixes are listed on class rosters, and the suffix is: @unlv.nevada.edu.