The Cardiology Module of the Pharmacotherapy sequence integrates the pathophysiology of cardiovascular disease and applied therapeutics. The course is designed to integrate information gained in previous or companion courses and/or presentations, e.g., physiology, biochemistry, medicinal chemistry, pharmaceutics, pharmacokinetics and pharmacodynamics into a working knowledge of clinical pharmacology and pharmacotherapy that forms the basis of pharmacists' professional responsibility.

**Textbook(s) / Required Learning Resources**
Pharmacotherapy: A Pathophysiologic Approach. DiPiro, et al. (Eds.) Publisher: McGraw-Hill/Appleton & Lange, 9th edition (2014). This textbook is available at UNC Health Science Library. Additional readings including practice guidelines, primary literature, and review articles may be required. Such readings will be posted on Sakai in advance of the related lecture.

 **The overall goals of this course sequence are to:**

* Develop problem-solving and critical-thinking skills needed to prevent, analyze, and resolve pharmacotherapeutic problems related to cardiovascular and renal disease.
* Integrate information from medicinal chemistry, physiology, pathology, pathophysiology, pharmaceutics, pharmacokinetics/dynamics, literature analysis and previous pharmacotherapeutic presentations and/or course work in order to understand principles of applied pharmacotherapy related to cardiovascular and renal disease.
* Apply the knowledge, skills, and evidence-based principles learned throughout the pharmacotherapeutic modules to solve pharmacotherapeutic problems for cardiovascular and renal patient-specific scenarios.

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| **Desired Course Outcomes**At the end of the course, students will be able to provide the following services to patients with or healthcare providers caring for patients with cardiovascular and renal diseases:1. **Provide patient-centered care**:  Design, implement, monitor, evaluate, adjust and accept professional responsibility for patient-specific, evidence-based care to promote safe and optimal pharmacotherapy outcomes.
2. **Provide population-based care:** Design, develop, implement, monitor, and evaluate population-specific, evidence-based pharmaceutical care services (disease management, medication therapy management and related policies and protocols.
3. **Manage drug and health information**, **informatics, and other technologies** to improve patient care and management of the practice.
4. **Promote public health:** Assure the availability of pharmacy-based services and contribute to the development of health policies that promote optimal health.
5. **Communicate and collaborate:** Demonstrate effective communication and interpersonal skills resulting in effective information exchange and team work with patients and caregivers and professional associates.
6. **Demonstrate professionalism:**  Demonstrate the attributes of a professional, including a commitment to and accountability for carrying out professional responsibilities; maintaining professional competence; and adhering to legal and ethical principles.
7. **Demonstrate critical thinking and problem solving skills:** Demonstrate reasoned and reflective consideration of evidence in a particular context to make a judgment and apply critical thinking skills, including investigation, application, analysis, creativity, synthesis and evaluation, to clinical or other professional problem-solving and decision making.
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| **Learning Objectives** Based upon the principles and concepts presented in lectures, case-based discussion, recitation, and related reading, students should be able to complete the following objectives, when providing pharmaceutical care:1. Recognize medical problems, symptoms, and/or abnormal laboratory values that may require pharmacotherapy, that may alter the selection and/or dosing regimen of drugs, or that may be caused or worsened by pharmacotherapy.
2. Evaluate the risks vs. benefits of therapy for a particular medical problem by recognizing the prognosis if the problem is left untreated and the efficacy and toxicity of various pharmacotherapy strategies based upon the respective principles of pathophysiology, medicinal chemistry, and applied pharmacology.
3. Determine an overall therapeutic goal when a particular problem is to be treated; establish a therapeutic goal for each form of therapy; and list parameters that must be monitored to determine whether or not each goal is met.
4. List the class of drugs and other non-drug modes of therapy, such as diet, that may be used in the treatment of a problem; discuss efficacy and toxicity and/or advantages and disadvantages of each class of drug considering the severity of the disease; and select the most efficacious, least toxic and most appropriate agent within a drug class based on differences in pharmacokinetics, cost, etc.
5. Recognize whether the choice of drug or dose of drug will be affected by other patient diseases or problems.  The student should list drugs which are contraindicated in a particular case, and predict the influence of the drug selected on the patients' other medical problems.
6. Determine whether any clinically significant drug interactions are likely to occur during therapy for multiple problems.  If an interaction is likely, the student should select the next best alternative for the interacting drug(s).
7. Summarize a safe, effective dosing regimen for each of the drugs selected for therapy based on age, weight, liver and kidney function, etc.
8. Alter drug administration regimens (increase dose, give on empty stomach, etc.) or select the next best alternative if therapy fails based on the therapeutic goal.
9. Describe the common and/or significant adverse reactions for each drug selected and identify the parameters necessary to monitor for drug toxicity.
10. Evaluate outcomes of an implemented pharmacotherapeutic plan.  Assess effectiveness, adverse effects, and benefits of drug therapy.  Decide to conclude, continue, or revise the pharmacotherapeutic plan.

Learning objectives for individual topics are provided at the end of this document following the course schedule. |
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**Description of Teaching / Learning Methods**
The basic class format for all pharmacotherapy topics is a combination of lecture overview of the scheduled topic with (or followed by) active participation of students in case-based discussion/application.  In some cases, the introductory overview may be accomplished by pre-session online tutorials or other learning methods outside of the classroom.  The topic overview provides an opportunity for students to seek clarification of information contained in the reading materials.  Although faculty may present limited information to update or clarify required reading, a general review of information contained in the required reading will not be provided in order to provide adequate time for case discussion and drug-therapy decision-making.  Students are responsible for reading and reviewing information contained in required readings.  The class format is heavily weighted towards the application of didactic information contained in the required reading or other pre-class tutorials.

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|  **Day** | **Time** | Topic |
|  | 1-1:50 | Hyperlipidemia\* |
|  | 2-2:50 | Hyperlipidemia |
|  | 1-1:50 | Hyperlipidemia |
|  | 2-2:50 | Hyperlipidemia |
| -- | -- | Hyperlipidemia Case Note(Jan 14th and 16th) |
| Tues | 10-10:50 | Hypertension\* |
|  | 11-11:50 | Hypertension |
| Thurs | 10-10:50 | Hypertension |
|  | 1-1:50 | Hypertension |
|  | 2-2:50 | Hypertension |
| Tu | 10-10:50 | **Exam I (Lec #1-11)** |
|  | 11-11:50 | **Exam I (Lec #1-11)** |
|  | 1-1:50 | Thromboembolic Disorders\* |
|  | 2-2:50 | Thromboembolic Disorders |
| -- | -- | Ischemic Heart Disease Case Note(Jan 28th and 30th) (No Note Due) |
| Mon | 1-1:50 | Thromboembolic Disorders |
|  | 2-2:50 | Thromboembolic Disorders |
| Tu | 10-10:50 | Thromboembolic Disorders |
|  | 11-11:50 | Ischemic Heart Disease (Stable Angina)\* |
|  | 1-1:50 | Ischemic Heart Disease (Stable Angina) |
|  | 2-2:50 | Ischemic Heart Disease (Stable Angina) |
| Th | 10-10:50 | Ischemic Heart Disease (ACS)\*  |
|  | 1-1:50 | Ischemic Heart Disease (ACS) |
|  | 2-2:50 | Ischemic Heart Disease (ACS) |
| Mon | 1-1:50 | **Exam II (Lec #12-22)** |
|  | 2-2:50 | **Exam II (Lec #12-22)** |
| Tu | 10-10:50 | Chronic Heart Failure\* |
|  | 11-11:50 | Chronic Heart Failure |
| Th | 10-10:50 | Chronic Heart Failure |
|  | 1-1:50 | Chronic Heart Failure |
|  | 2-2:50 | Acute Heart Failure |
| -- | -- | Heart Failure Case Note(Feb 11th and 13th) |
| Tu | 10-10:50 | Arrhythmia Overview\* |
|  | 11-11:50 | Arrhythmia (Atrial Fibrillation) |
|  | 1-1:50 | Arrhythmia (Atrial Fibrillation) |
|  | 2-2:50 | Arrhythmia (Atrial Fibrillation) |
|  | 1-1:50 | Cardiovascular Surgery |
|  | 2-2:50 | Cardiovascular Surgery |
|  | 1-1:50 | **Exam III (Lec #23-33)** |
|  | 2-2:50 | **Exam III (Lec #23-33)** |