

**PHRD 535 Hematology/Oncology Integrated Module****I. Contact Information**

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**II. Course Prerequisites/Co-requisites**

Enrollment in the course requires completion of second year pharmacy courses with a grade of "C" or better.

**III. Course Description****a. Catalogue Description**

**PHRD 535. Hematology/Oncology Integrated Module. 3 Cr.** Selection of appropriate therapy for hematological and oncologic disease states based on treatment guidelines, disease pathophysiology, and the pharmacologic and physiochemical properties of medications. Prerequisites: Third year pharmacy standing and a grade of "C" or better in all course work.

**b. Course Description and Rationale**

This course will cover the chemical composition and pharmacology of the different classes of chemotherapeutic agents as well as biological agents used in targeted therapy and supportive care including anemia. The students will then be able to discuss the basic principles of cancer treatment with regard to the following: etiology, diagnosis, staging, prognosis, and treatment types for the most common cancer types; structure of anticancer agents and their chemistry and discuss supportive care issues. In addition the course will address the indications, methodology, and complications of Bone Marrow and Solid Organ Transplant. The course will also cover diseased related

to hyper and hypocoagulation with chemistry and pharmacology related to those states.

#### **IV. Course Objectives and Outcomes**

**a. This course will directly address the following College of Pharmacy competencies:**

1. Provide Comprehensive Patient Specific Pharmaceutical Care.
  - A. Evaluate the appropriateness of a given prescription or medication order based on patient and disease-specific factors.
    - i. Analyze the prescription regarding the medication, dose, delivery form, and duration of use as being appropriate for the patient and disease state.
    - b. Analyze and interpret information gathered to identify any drug-related problem.
      - 1) Assess the prescription for interaction potential, including interactions with other medications (both prescription and non-prescription), disease states, foods, and herbals.
      - 2) Determine availability and appropriateness of medications and dosage form. (pharmaceutics)
      - 3) Identify appropriate duration of therapy for that disease state.
  - C. Develop and implement an evidence-based care plan. (pharmacology, med chem., physiology, pathology, etc.)
    - i. Identify goals of therapy that are individualized to the patient.
    - ii. Develop a plan of care that includes interventions to resolve drug therapy problems, achieve the goals of therapy, and prevent drug therapy problems.
    - iii. Develop a schedule to follow-up and evaluate the effectiveness of outcomes from drug therapies and assess any adverse events experienced by the patient.
    - iv. Evaluate patient outcomes with respect to the achievement of goals of therapy, patient adherence, patient safety, and the development of new drug therapy problems.
  - E. Document all activities involved with the provision of comprehensive patient specific pharmaceutical care.
4. Identify, Interpret, and Evaluate Literature Needed for the Provision of Drug Information and Pharmaceutical Care.
  - H. Draw appropriate conclusions from research results.
  - I. Assess the potential impact and implication of published information on current practices.
6. Think Critically.
  - A. Identify, retrieve, understand, analyze, synthesize, and evaluate information needed to make informed, rational, and ethical decisions.
    - i. Systematically gather, organize, and extract relevant information using a variety of methods and research tools.
    - ii. Analyze information within appropriate scientific, social, and clinical contexts.
      - a. Identify principles of organization and the logic of arguments.
      - b. Identify and test assumptions, biases, and prejudices implicit in arguments.
      - c. Employ appropriate mathematical and statistical tools and electronic technology to analyze information.

- d. Assess accuracy, soundness, fairness, significance, relevance, completeness, and persuasiveness of information, arguments, and sources. (consider difference between information & the information source)
      - iii. Synthesize information in order to draw conclusions, hypothesize, conjecture alternatives, or plan a course of action.
      - iv. Evaluate conclusions and solutions according to appropriate criteria, and revise as necessary.
      - v. Provide support for rationale, solutions, and results.
    - B. Solve complex problems that require an integration of one's ideas and values within a context of scientific, social, cultural, legal, clinical, and ethical issues.
      - i. Interpret problems within appropriate contexts.
      - ii. Prioritize problems based on identifiable criteria and standards.
      - iii. Apply systematic problem-solving strategies.
      - iv. Articulate and implement a defensible solution and apply appropriate criteria to monitor outcomes.
      - v. Implement modifications based on monitoring data.
    - C. Display habits, attitudes, and values associated with mature critical thinking.
      - i. Evaluate personal assumptions, biases, prejudices, and opinions.
      - ii. Display openness to new ideas and a tolerance for ambiguity.
      - iii. Display inquisitiveness and commitment to the pursuit of truth.
      - iv. Adopt multiple perspectives in personal thinking to avoid ethno-centricity and intolerance.
  - 7. Demonstrate Appropriate Interpersonal, Professional, and Ethical Behaviors.
    - A. Maintain professional competence.
      - i. Continually strive to maintain knowledge and maintain professional competence.
      - ii. Continually assess his or her learning needs and develop the ability to respond appropriately.
    - C. Identify, analyze, and resolve ethical problems involved in pharmacy practice.
    - H. Demonstrate appropriate interpersonal, intergroup, and cross-cultural behaviors that promote respect and trust from peers, patients, and community members.
- b. **This course will indirectly address the following College of Pharmacy competencies:**

## V. Course Topics

Cancer chemotherapy/Introduction to Antineoplastics  
 Alkylating agents  
 Antimetabolites/Nucleoside analogs  
 Antitumor Antibiotics  
 Antimitotic/Natural products/Hormonal therapy/  
 Angiogenesis inhibitors/Antibody-cancer immunotherapy

General Principles of Cancer Treatment

Specific Cancer Types:

Breast Cancer

Lung Cancer

Colorectal Cancer  
Prostate Cancer  
Lymphomas  
Gynecologic Cancers  
Acute and Chronic Leukemias  
Melanoma  
Supportive Care:  
Chemoprotectants  
Emesis  
Bone Marrow Suppression  
Targeted Therapy  
Bone Marrow and Solid Organ Transplant

Anemia:  
Overview of anemia  
Iron deficiency anemia  
B12 deficiency  
Folic acid deficiency  
Anemia of chronic disease  
Hemolytic anemia  
Sickle cell anemia

## VI. Instructional Methods and Activities

Lectures and case discussions with assigned outside reading.

## VII. Evaluation and Grade Assignment

There will be three exams, one for Medicinal Chemistry, one for Pharmacology and one for Therapeutics. Exams II and III may be comprehensive in nature.

There may be quizzes at the discretion of the faculty member.

The final grade will be determined on percentage of total points available for the entire course.

Grading Scale:

90.0 – 100%	A
80.0 – 89.9%	B
70.0 - 79.9%	C
60.0 – 69.9%	D
<60.0%	F

## VIII. Class Policies and Procedures

At a minimum, all policies stated in the current ULM *Student Policy Manual & Organizational Handbook* should be followed (see <http://www.ulm.edu/studentpolicy/>). Additional class policies include:

### A. Textbook(s) and Materials: (Include required and recommended items)

1. Required
  - a. Foye's Principles of Medicinal Chemistry. 6<sup>th</sup> Edition, Williams D.A., Lemke T.L. Lippincott Williams & Wilkins, PA, 2007
  - b. Goodman and Gilman's "Pharmacological Basis of Therapeutics", Hardman JG, Limbird LE. McGraw Hill Medical, New York 2001.

- c. Pharmacotherapy: Principles & Practice. Chisholm-Burns, M.A. McGraw Hill Medical, New York, 2008
- d. Review articles on anticancer agents which will be supplied during that semester
- e. Texts used in previous courses may be required for review

**B. Attendance Policy:**

Class attendance is required. Class attendance is regarded as an obligation as well as a privilege, and students are expected to know attendance regulations and to attend regularly and punctually at classes in which they are enrolled. Failure to do so: (1) may prevent access to the classroom during regularly scheduled times; (2) may jeopardize a student's scholastic standing; and (3) may lead to suspension from the college or University. Students shall submit excuses for all class absences to professor within three class days after returning to classes. Professors shall accept an official University excuse. With the following exceptions professors are to determine whether absences are excused or unexcused: 1) Absences arising from authorized trips away from the University or from special duties at the University shall be excused. 2) Absences arising from a student's confinement in a hospital or other in-patient facility or doctor's excused absences shall be excused. Students are responsible for verifying this information to the faculty. 3) Absences arising from a death in the immediate family shall be excused. The immediate family is defined as spouse, child, step-child, mother, father, sister, brother, grandmother, grandfather, step-mother, step-father, step-brother, step-sister, aunt, uncle, mother-in-law or father-in-law.

**C. Make-up Policy:**

Excused make-ups will be within one week of the student's return to class at the convenience of the instructor. Excused absences will be determined using the guidelines stated in the University Catalog.

**D. Academic Integrity:**

Faculty and students must observe the ULM published policy on Academic Dishonesty (see Page 4, *ULM Student Policy Manual* <http://www.ulm.edu/studentpolicy/>).

Cheating, plagiarism, or other inappropriate conduct will not be tolerated. Academic cheating includes but is not limited to the accomplishment or attempted accomplishment of the following:

1. Copying or obtaining information from another student's test paper.\*
2. Using, during a test, materials not authorized by the person giving the test. \*\*
3. Collaborating, conspiring, or cooperating during an in-class or take-home test with any other person by giving or receiving information without authority.
4. Stealing, buying, or otherwise obtaining all or part of an unadministered test.
5. Selling or giving away all or part of an unadministered test or any information concerning specific questions and items on an unadministered test.

6. Requesting, bribing, blackmailing, or in any other way causing any other person to obtain an unadministered test or information about an unadministered test or a test in the process of being administered.
7. Substituting for another student, or permitting any other person to substitute for oneself to take a test.
8. Submitting as one's own, in fulfillment of academic requirements, any work prepared totally or in part by another person.
9. Any selling, giving, or otherwise supplying to another student for use in fulfilling academic requirement any work.
10. Submitting artificially produced data or information in the place of descriptive, experimental, or survey results.
11. Any other devious means of securing an unearned grade in a non-credit course or in a course offered for credit.
12. Using, during a test, any electronic storage device, wireless and/or internet-based technology, or any other means that provides information not authorized for use during the testing period.

\*A student looking on another student's paper is considered cheating.

\*\*The presence on one's person (or in close proximity thereto) of a condensation of test information which could be regarded as a "cheat sheet" will be considered adequate evidence to establish cheating.

Plagiarism is the use of any other person's work (such work need not be copyrighted) and the unacknowledged incorporation of that work in one's own work offered for credit.

#### Censures (Penalties)

Academic dishonesty will result in a referral to Committee on Ethical and Professional Standards with a recommendation for a grade of "F" for the course and expulsion from the College. Academic dishonesty includes but is not limited to the use of information taken from others work or ideas, the provision of help to others on non-collaborative evaluations (tests, quizzes, etc.), collaboration on take home exams, or the use of unapproved information or electronic devices to assist in obtaining an answer to the question.

#### **E. Course Evaluation Policy:**

At a minimum, students are expected to complete the on-line course evaluation. (Also, include any additional course-specific policies related to evaluation of the course.)

#### **F. Student Services:**

Information about ULM student services, such as Student Success Center (<http://ulm.edu/cass/>), Counseling Center (<http://ulm.edu/counselingcenter/>), Special Needs (<http://ulm.edu/counselingcenter/special.htm>) and Student Health Services, is available at the following Student Services web site <http://ulm.edu/studentaffairs/>

#### **G. Emergency Procedures:** (Include appropriate emergency information)

Please review the emergency escape plan in the classrooms and hallways of Sugar Hall. Move quickly and orderly to the appropriate stairwell and exit the

building. The meeting place for this class will be at the College of Pharmacy sign at the edge of the front (West) parking lot in the front of the College of Pharmacy Building across the street from Sugar Hall. Under no circumstances is the elevator to be used for emergency evacuation. Any student needing assistance should notify the professor immediately. For emergencies, to contact University Police, call **1-911** from landlines and **342-5350** from cell phones.

## IX. Tentative Course Schedule

Topic	Lecturer	Week
<b>Overview of Hematology &amp; Oncology/Introduction</b>	Cockerham	1
<b>Medicinal Chemistry</b>		
Cancer chemotherapy/Introduction to Antineoplastics	Jois	1-2
Alkylating agents	Jois	
Antimetabolites/Nucleoside analogs	Jois	
Antitumor Antibiotics	Jois	
Antimitotic/Natural products/Hormonal therapy/	Jois	
Angiogenesis inhibitors/Antibody-cancer immunotherapy	Jois	
<b>Pharmacology</b>		
Cancer chemotherapy/Introduction to Antineoplastics	Shah	3-6
Alkylating agents	Shah	
Antimetabolites/Nucleoside analogs	Shah	
Antitumor Antibiotics	Shah	
Antimitotic/Natural products/Hormonal therapy/	Shah	
Angiogenesis inhibitors/Antibody-cancer immunotherapy	Shah	
<b>Therapeutics</b>		
General Principles of Cancer Treatment	Cockerham/Cox	7-10
Breast Cancer	Cockerham/Cox	
Lung Cancer	Cockerham/Cox	
Colorectal Cancer	Cockerham/Cox	
Prostate Cancer	Cockerham/Cox	
Lymphomas	Cockerham/Cox	
Acute and Chronic Leukemias	Cockerham/Cox	
Gynecologic Cancers	Cockerham/Cox	
Melanoma	Cockerham/Cox	
Supportive Care: Chemoprotectants Emesis Bone Marrow Suppression	Cockerham/Cox	
Targeted Therapy	Cockerham/Cox	
Bone Marrow Transplant	Cockerham/Cox	
Anemia: Overview of anemia Iron deficiency anemia B12 deficiency Folic acid deficiency Anemia of chronic disease Hemolytic anemia Sickle cell anemia	Cockerham/Cox	11-12
<b>Pharmacokinetics</b>		
Methotrexate Pharmacokinetics	Cockerham/Cox	12
Cyclosporine/Tacrolimus Pharmacokinetics		

*The instructor reserves the right to adjust the schedule as needed.*