

## Pharmaceutical Calculations – PHRD 4004

### I. Contact Information

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### II. Course Prerequisite

First year professional program standing. Credit or registration in PHRD 4020

### III. Course Description

Fundamentals of pharmaceutical measurement and calculations (2 cr hr)

### IV. Curricular Outcomes

**CAPE:**

*Domain 1 - Foundational Knowledge*

Develop, integrate, and apply knowledge from the foundational sciences to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care (1.1 Learner)

*Domain 2 – Essentials for Practice and Care*

Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities (2.1 Caregiver)

**ACPE Appendix 1 Required Element:**

Pharmaceutical Sciences (1PS04) – Pharmaceutical Calculations – Mastery of mathematical skills required to accurately prepare prescriptions (including extemporaneously compounded dosage forms) that are therapeutically sound and safe for patient use. Calculation of patient-specific drug dosing/delivery requirements.

V. **Course Specific Objectives** – Each topic covered in this course contains specific objectives for the learner. These objectives will be provided at the beginning of each lecture, and can be found in the corresponding chapters of the required text. Objectives tell learners what they will be able to do after instruction. These will provide a guideline for learning and assessment

VI. **Course Topics**

Fundamentals of pharmaceutical calculations; International system of units; Pharmaceutical measurement; Interpretation of prescriptions and medication orders; Density and specific gravity; Percent strength, Ratio strength, and other expressions of concentration; Calculation of doses – general considerations and patient parameters; Calculations involving units of activity and other measures of potency; Selected clinical calculations including: calculations of heparin dosing, calculating ideal and adjusted body weights, calculating estimated creatinine clearance rates, and utilization of equianalgesic dosing charts; Isotonicity; Electrolyte solutions – milliequivalents, millimoles, and milliosmoles; Intravenous infusions – parenteral admixtures, rate-of-flow calculations; Reducing and enlarging formulas; Use of a package insert; Selected calculations for NAPLEX review.

VII. **Instructional Methods and Activities**

Instructional methods may be synchronous or asynchronous and may include, but are not limited to, traditional lectures, flipped lectures, iRAT, tRAT, homework assignments, self-directed learning, case-based learning, problem-based learning, student-led reviews, group work, quizzes, and use of technology.

VIII. **Evaluation and Grade Assignment**

- This is a flipped classroom. Most class periods will consist of brief quiz based on lectures posted before the class period. Students should come to class prepared for the brief assessment which will open at the start of the class period for the first 10 minutes of class.
- At the end of the class period, the last 10-minutes of class, each student is expected to upload their in-class group work to moodle.
- There will be 3 examinations and a final examination (4 exams total). Due to the nature of this course, all examinations will be comprehensive.
- Exams may be fill in the blank, multiple choice, short answer, matching, or any other format deemed necessary by the course coordinator.
- After exams have been graded and an item analysis performed, questions may be discarded or otherwise adjusted at the discretion of the Course Coordinator. Afterward, grades will be released to students.
- Quizzes/assignments will be given as deemed necessary. Quizzes may be announced or unannounced, and will be given via Moodle. Students must have laptops and non-programmable calculators *at all class meetings*. Any homework assignments may be collected at any time, checked for completion, assigned points, and returned.

**Exam Behavior**

- ExamSoft will be used to administer exams; therefore, all students are required to have access to the most current version of the software.
- Exams **MUST** be downloaded from ExamSoft **PRIOR** to the date of the scheduled exam. Students will **NOT** be given extra time to allow for downloading at the time of the exam.
- Only a writing instrument and a non-programmable calculator should be at your desk during exams.
- You will be allowed to use blank scratch paper during the exam. For in person testing, scratch paper will be provided for you. No other paper items will be allowed during the exam unless supplied or requested by the faculty administering the exam. Scratch paper is to be turned in upon completion of the exam. Instructions on how to handle scratch paper for virtual testing will be announced and/or posted to Moodle.

- All exams must be uploaded in ExamSoft immediately upon completion. In the event of a power outage or loss of Wi-Fi connection all students are required to upload the exam at the earliest possible reconnection time.
- The use of a programmable calculator or any electronic device capable of storing, receiving or transmitting data, is **prohibited** during an exam or quiz unless expressly authorized by the course instructor. Such devices must be turned off and left in another room.
- Students are not allowed to leave the testing area during an examination.
- Students wishing to review their exams with the course coordinator or designee must do so within 2 weeks of when the regular exam scores are posted, and within 1 week of the time that the score for the final exam is posted.
- For distance/virtual testing, the following will be required (in addition to the above)
  - Testing area must be quiet and free from distractions.
  - Testing area must be free from all resources with the exception of those required by the instructor.
  - Cell phones may be required to proctor examinations if examinations are not held in person.

<u>Assessment Method</u>	<u>Percent of Final Grade</u>
Beginning of class quizzes	14%
Group work	14%
Examinations	
Exam #1	18%
Exam #2	18%
Exam #3	18%
Final Exam	18%
Total percent	100%

**Bonus Points** – Half of the points earned on the Calculations portion of the Boot Camp exam will be added to the Final Exam score.

### **Grading Scale (Rounded to one decimal place only)**

89.5-100%	A
79.5 -89.4%	B
69.5 -79.4%	C
59.5 -69.4%	D
<59.5%	F

Undergraduate mid-term grades will be posted online for students to view via Banner. Mid-term grades indicate a student's status at mid-semester only and do not indicated the final outcome of a student.

### **Student Success – Early Intervention Policy** – (Modified with permission for this course)

Students scoring <70% on any exam **or** an overall average <70% will be required to participate in early intervention. For Pharmaceutical Calculations, early intervention includes the following:

- It is **YOUR RESPONSIBILITY** to know that you are required to participate in early intervention if you fall below a 70% on **ANY** exam **OR** have an exam average of <70% in the course. Until both are rectified, you are required to continue early intervention.

- Students in early intervention must review each failed exam's Exam-Soft generated missed item report with the course coordinator within one week of the failed exam.
- Class attendance will be mandatory until the student is no longer part of Early Intervention.
- Homework assignments will be mandatory until the student is no longer part of Early Intervention. Students must have all homework reviewed for completeness by the course coordinator or designee.
- Mandatory attendance at all Math Labs is required for students in early intervention.
- Mandatory attendance at all SI sessions.
- Students must meet with the Director of Student Success.

These requirements must be followed until the student has a class average >70%. **Failure to meet these requirements will result in the student's ineligibility to remediate.**

**Remediation Policy:** <http://www.ulm.edu/pharmacy/currents.html>

## IX. 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:

#### Required Textbook

Stoklosa and Ansel's Pharmaceutical Calculations. 16<sup>th</sup> ed. Stockton, Shelly J. Lippincott Williams and Wilkins (ISBN-978-1-9751-2855-5).

The textbook is available to you online through the College of Pharmacy (CoP) Library Resources TOOLBOX (on Moodle) under the LWW Health Library. Remember that this resource is only available to you while you are in the professional program.

#### Other Required Materials:

Laptop computers must be available **at all times**. Laptop privacy screen is required for all examinations.

Basic Calculator (non-programmable) for homework and classwork must be available **at all times**.

Pencil/Pen; Loose leaf paper and binder for homework; Scratch paper.

You MUST always have your homework with you during class.

### B. Attendance Policy:

The ULM College of Pharmacy follows the University Attendance Policy.

<http://catalog.ulm.edu/content.php?catoid=23&navoid=2875&hl=attendance&returnto=search#ClassAttendanceRegulationsExcusedAbsences>

### C. Excused Absence/Make-up Policy:

A student missing a graded exercise (exam, quiz, or assignment) must contact the course coordinator via email or phone prior to the graded exercise if possible. In case of an emergency, a student should contact OSPA. OSPA will then notify faculty. The student must contact the course coordinator within 48 hours of the emergency. Upon return to classes, the student should bring a valid written excuse to the OSPA. OSPA will verify the validity of the excuse on the same day it is dropped off. Students should then

present the validated excuse to the course coordinator. The course coordinator is the only person who can grant an "excused absence." Failure of the student to contact the course coordinator within 48 hours of the emergency will result in a zero (0) grade for that exercise. Make-up exams will be prepared at the same or higher level than the original exam. The format of the make-up exam may be written or oral. Failure to attend a scheduled make-up exam will result in a zero (0) grade for that exam. Students missing an exam due to a University approved excuse will take the make-up exam as determined by the course coordinator.

#### **D. Academic Integrity:**

Faculty and students must observe the ULM published policy on Academic Dishonesty (see the ULM Student Policy Manual (<http://www.ulm.edu/studentpolicy/>)). All professional students will adhere to the standards set forth in the College of Pharmacy's Code of Conduct.

<http://www.ulm.edu/pharmacy/documents/ospa/codeofconduct.pdf>

Students are expected to work independently on examinations, quizzes, and assignments unless otherwise stated by the instructor.

*It is the student's responsibility to be familiar with and abide by all policies regarding academic dishonesty.*

Unless expressly allowed by the instructor, the use of artificial intelligence (AI) tools and applications (including ChatGPT, DALL-E, and others) to produce content for course assignments and assessments is a violation of the ULM College of Pharmacy's Code of Conduct and is prohibited.

Academic dishonesty will result in a referral to the Academic Standards and Ethics Committee. If the student is found guilty of Ethical and Professional misconduct by the committee, they will receive a zero for the assigned points (graded assignment or test) and up to an "F" in the course from the course coordinator in addition to any disciplinary action recommended by the Academic Standards and Ethics Committee. 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, ec.), collaboration on take home exams, or the use of unapproved information or electronic devices to assist in obtaining answers.

#### **Discipline/Course Specific Policies**

- Students are to exhibit professional behavior at all times.
- Students are expected to be prepared for class and to arrive on time. Tardiness and disruptiveness will not be tolerated. If you cannot make it to class before class begins, do not enter the classroom! This is not only disruptive to your professor but also to your peers. You will be considered absent for the day.
- Students using programmable calculators, cell phones, or any other non-approved device will receive a zero on that exam/quiz and will be reported to the Dean of Academic Affairs. Borrowing a calculator from someone else or using someone else's calculator during an examination or quiz will not be permitted.
- Students are expected to follow all policies. Failure to adhere to University, College of Pharmacy, and class policies will result in disciplinary action accordingly.

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

At minimum, students are expected to complete the on-line course evaluation to provide anonymous, constructive, specific comments regarding the course at the end of the semester. Additional assessment opportunities may also be offered. The Course Coordinator is always open to feedback throughout the semester.

**F. Student Services:**

Information concerning student services in the College of Pharmacy can be found in the College of Pharmacy Student Handbook. In particular, students should pay special attention to the College's technical standards and policies concerning students with special needs (<http://www.ulm.edu/studentpolicy/studentpolicy.pdf>). ULM student services, such as Student Success Center (<http://ulm.edu/cass/>), Counseling Center (<http://ulm.edu/counselingcenter/>), and

Student Health Services, is available at the following Student Service web site <http://ulm.edu/studentaffairs/>.

If you are having problems with emotional, social, and/or behavioral issues please call any of the mental health clinics on the ULM campus to make an appointment. All services are free to ULM students, staff, and faculty, and are strictly confidential.

- CoP Office of Student and Professional Affairs: 342-3800
- ULM Counseling Center: 342-5220
- Marriage and Family Therapy Clinic: 342-5678
- Community Counseling Center: 342-1263
- ULM HELPS (Helping Educators and Learners Prevent Suicide) Project Office: 342-1335

The University of Louisiana at Monroe strives to serve students with special needs through compliance with Sections 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. These laws mandate that postsecondary institutions provide equal access to programs and services for students with disabilities without creating changes to the essential elements of the curriculum. While students with special needs are expected to meet our institution's academic standards, they are given the opportunity to fulfill learner outcomes in alternative ways. Examples of accommodations may include, but are not limited to, testing accommodations (oral testing, extended time for exams), interpreters, relocation in inaccessible classrooms, permission to audiotape lectures, note-taking assistance, and course substitutions.

*Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds, including federal loans and grants. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation. If you encounter unlawful sexual harassment or gender-based discrimination, please contact Student Services at 318-342-5230 or to file a complaint, visit [www.ulm.edu/titleix](http://www.ulm.edu/titleix)*

**G. Emergency Procedures:**

Please review the emergency escape plan in the classrooms and hallways of the Bienville Building. Move quickly and orderly to the appropriate stairwell and exit the building. The meeting place for this class will be the far end of the North parking lot. 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 911 from a campus phone and **342-5350** from cell phones.

**The course coordinator reserves the right to adjust the syllabus or schedule, in accordance with University and College policies and procedures.**

- H.** Federal Regulations require determination and verification of every students' physical location while enrolled in classes (where they are physically located while taking classes), regardless of the delivery

method (on campus, online). At the beginning of every semester and whenever physical location changes, students must update or verify their current location through banner [https://ssb-prod.ec.ulm.edu/PROD/bwggkogad.P\\_SelectAtypUpdate](https://ssb-prod.ec.ulm.edu/PROD/bwggkogad.P_SelectAtypUpdate). Students should do this by the end of the first week of classes.

- I. This course is a major requirement for the Doctor of Pharmacy degree. Completion of degree requirements leads to eligibility for professional licensure and/or certification in Louisiana upon graduation. Federal Regulations require universities to provide information to students about the alignment between Louisiana's requirements and those of other states. ULM has created a web page with discipline-specific information containing hyperlinks to Licensure Boards in the United States. <https://www.ulm.edu/professional-licensure-disclosures/index.html>. Program Directors and/or faculty will discuss this information with you during advising or other program meetings but is also available to answer questions that address any concerns you might have. It is also important to note that licensure or certification requirements are subject to change. Although ULM Program Directors annually review and update licensure information for every state, the faculty recommends that before enrolling in a program and throughout enrollment, students communicate with the applicable state board to confirm understanding and whether upon completion of ULM's program, they will meet requirements.

## X. Tentative Course Schedule

All classes will be held synchronously unless otherwise stated below. All synchronous lectures will be recorded and posted to the PHRD 4004 Moodle Course.

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

DATE	TOPIC	CHAPTER	Professor
Aug 27	Syllabus Brief review of Concepts from Chapters 1 & 2 (Orientation, Bootcamp) Continuation of Chapter 4	4	McGee
Aug 29	Density and Specific Gravity	5	McGee
Sept 3	Percent Concentration and Ratio Strength	6	McGee
Sept 5	Calculation of Doses – General Considerations	7	McGee
Sept 10	Sensitivity Requirement; Percent Error; Aliquot Method of Weighing and Measuring	3	McGee
<b>Sept 12</b>	<b>Exam #1 – 7:30am until 8:50am</b>		
Sept 17	Units, Measures of Potency	9; Appendix A	McGee
Sept 19	Patient Parameters	8	Cockerham
Sept 24	Selected Clinical Calculations (Heparin dosing)	10	Cockerham
Sept 26	Selected Clinical Calculations – (Equianalgesic Dosing); Morphine Milligram Equivalents (MMEs) – Not in book.	10; additional documents in Moodle	McGee
Oct 1	Selected Clinical Calculations (Creatinine Clearance, IBW, AdjBW, Monitoring)	10	Cockerham
Oct 3	Isotonicity	11	McGee
Oct 8	<b>Exam #2 – 7:30am until 8:50am</b>		
Oct 10	Electrolyte Solutions: Milliequivalents/Millimoles/Milliosmoles	12	McGee

Oct 15	IV Infusions, Parenteral Admixtures, Rate of Flow Calculations	13	
Oct 17	Fall Break – No Class		
Oct 22	Powder Volume/Package Inserts	Slides	
Oct 24	Altering Product Strength, Stock Solution	15	McGee
Oct 29	Altering Product Strength, Alligation	15	McGee
Oct 31	Selected Calculations in Contemporary Compounding	17	McGee
Nov 5	<b>Exam #3 -7:30am until 8: 50am</b>		
Nov 7	Selected Calculations in Contemporary Compounding	17	McGee
Nov 12	Selected Calculations in Contemporary Compounding	17	McGee
Nov 14	Reducing and Enlarging Formulas	16	McGee
Nov 19	Pulling it all Together – Selected Exercises #1 – <i>Dr. Ashley Barbo</i>	Worksheets	Barbo
Nov 21	Pulling it all Together – Selected Exercises #2 – <i>Dr. Ashley Barbo</i>	Worksheets	Barbo
Nov 26	Final Exam Review		McGee
Nov 28	No Class – Thanksgiving Break		
Dec 3	Open Class Period – Content to be announced		McGee
Dec (5-10?)	<b>COMPREHENSIVE FINAL EXAMINATION 9:00am until 11:00am</b>		