PHAR 7401
Principles of Biochemistry and Molecular Biology
Fall Semester 2025

Course Description
Qualitative and quantitative understanding and application of biochemistry focusing on the cellular pathways as it would pertain to pharmacy.

Additional Course Information
This course provides the theoretical building blocks necessary to understand the biochemistry pathways of the cell. The interrelationship between biochemical pathways and physicochemical drug properties influencing drug metabolism and pharmacologic response.

Course Credit: 4 credit hours

Pre-Requisites: N/A

Co-Requisites: N/A

Fundamental Knowledge
1. Biology.
2. Chemistry / organic chemistry fundamentals, including pH and pKa
3. Human anatomy and physiology

Class Meeting Days, Time & Location
Tuesday, 9:00-11:00 AM and Friday, 9:00-11:00 AM; W.T. Brookshire Hall (P1 classroom)

Course Coordinator
Santosh Aryal, Ph.D.
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Fisch College of Pharmacy (FCOP) and UT Tyler Policies
This is Part 1 of the syllabus. Part 2 contains UT Tyler and the FCOP policies and procedures. For experiential courses (i.e., IPPE and/or APPE), the Experiential Manual contains additional policies and instructions that supplement the Syllabus Part 1 and 2. Please note, the experiential manual may contain policies with different deadlines and/or instructions. The manual should be followed in these cases.

Required Materials

Most course required materials are available through the Robert R. Muntz Library. These materials are available either online* (http://library.uttyler.edu/) or on reserve. Specific book information can be found in the learning objective of respective topics in Canvas.

Recommended Materials

The course recommended materials are on reserve at the Robert R. Muntz Library. These materials are available either online* (http://library.uttyler.edu/) or through Access Pharmacy (http://accesspharmacy.mhmedical.com/) or on reserve.

1. Integrative Medical Biochemistry Examination and Board Review; Michael W. King, Ed by LANGE
2. Harper's Illustrated Biochemistry, 30e, Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil, Ed by LANGE
3. **Other required materials will be posted on the classes' Canvas site. The site address is: uttyler.edu/canvas.**

Additional Resources

1. Other texts will be available on Access Pharmacy (http://accesspharmacy.mhmedical.com/)

Course Format

The course may include, but are not limited to, the following activities:

1. Independent study of selected readings
2. Individual readiness assessment tests (iRATs)
3. Team-based learning, active learning strategies:
    a. Team readiness assessment tests (tRATs)
    b. Team application of content and concepts

Course Learning Outcomes (CLOs)

CLOs	PLO(s) Assessed for this CLO (1-12)	EPAs (1-13) Only map for Lab, IPPE, APPE. Otherwise delete	ACPE Appendix 1	ACCP Didactic Toolkit	NAPLEX (1.1-6.5)	MPJE (1.1-4.7)	Assessment Methods (1-13)
1. Understand and predict what would be the outcome of manipulating specific biochemical pathway.	1,7	N/A	Biochemistry	N/A	N/A	N/A	MCQ, Fill in, open ended
2. Describe how changes in normal physiology or disease affect a specific biochemical pathway.	1,7	N/A	Biochemistry	N/A	N/A	N/A	MCQ, Fill in, open ended
3. Summarize the role of biochemistry in drug metabolism.	1,7	N/A	Biochemistry	N/A	N/A	N/A	MCQ, Fill in, open ended

*The Curriculum Assessment Categories and guidance document found online at: Canvas | ORG-Pharmacy-Office of Academic Affairs | Modules | 1. Course Coordination & Teaching Resources

Course Assessment Methods

	Assessment Method	Description ***Please provide a brief description of each summative assessment that you plan to use in this course to allow us to identify which ACPE standards are being assessed***
1	Final Exam Multiple Choice or Multiple Selection Question(s)	*Standard MCQ and Select All that apply questions.*
2	Comprehensive Final Exam	*Standard MCQ and Select All that apply questions and* Open Ended Question(s)

Grading Policy & Grade Calculation

Grades will be determined based on evaluation of assignments, formative assessments (for learning), and summative assessments (for mastery). For all intents and purposes, final examinations are synonymous with summative assessments. Assessments may consist of, but are not limited to, multiple-choice, true/false, fill in the blank, short-answer, essay, and problem-based questions. They may also include a variety of formats beyond the traditional question-based written examination, as each CLO may require different methods to determine student achievement.

Assignments, formative, and summative assessments may be **cumulative.** Students are responsible for material presented during prior courses. The grading scale for all graded material is below. The final course grade will be assigned according to the calculated percentage and the percentages will not be rounded upward or downward. For additional information, see Part 2 of the syllabus.

During the time the course is in progress, students who obtain less than 75% on any summative assessment or a total course grade of less than 75% during a particular semester will receive an academic alert from the course coordinator and the Office of Academic Affairs and be subject to weekly in-course remediation with the course instructor(s).

Standard Grade Calculation*	
Individual Assessments: 95%	
iRATs/Other Individual Activities	10%
Major Assessments (e.g., Midterm/Final Exams, OSCE)	85%
Team Assessments: 5%	
tRATs	3.0%
tCATs/Team Application(s)/Team Projects	2.0%
Total	**100%**

The final course letter grade will be as follows:

A	**90 - 100 %**
B	80 - 89.999 %
C	70 - 79.999 %
D	65.0 - 69.999 %
F	< 65.0 %

Appropriate Use of Artificial Intelligence

1. **AI is not permitted in this course at all.**

I expect all work students submit for this course to be their own. I have carefully designed all assignments and class activities to support your learning. Doing your own work, without human or artificial intelligence assistance, is best for your efforts in mastering course learning objectives. For this course, I expressly forbid using ChatGPT or any other artificial intelligence (AI) tools for any stages of the work process, including brainstorming. Deviations from these guidelines will be considered a violation of UT Tyler's Honor Code and academic honesty values.

PHAR 7401 Course Schedule

ACPE Appendix 1: Required Elements of the Didactic Doctor of Pharmacy Curriculum. Document the ACPE Appendix 1 heading in each of the topic listings as ACPE 1 Heading: Course Topic"

Principles of Biochemistry and Molecular Biology (PHAR 7401)

WEEK	DAY	TOPIC	Instructor	CLO[1]	Disease States
1	*T 8/26	1. Biochemistry: Course Introduction/Introduction to cell structure and function	Aryal	1, 2, 3	S20.99
	*F 8/29	Biological Molecules	Glavy	1, 2, 3	S20.99
2	*T 9/2	Protein Structure and Function	Aryal	1, 2, 3	S20.99
	*F 9/5	Biochemistry: Cellular membranes and membrane transport	Aryal	1, 2, 3	S20.99
3	*T 9/9	Biochemistry: Intracellular transport, cell movement, extracellular	Aryal	1, 2, 3	S20.99
	*F 9/12	Biochemistry: Signal transduction and regulation	Glavy	1, 2, 3	S20.99
4	*T 9/16	Biochemistry: Regulation of Cell Cycle	Glavy	1, 2, 3	S20.99 S7.05
	*F 9/19	Biochemistry: Enzymes Kinetics	Aryal	1, 2, 3	S20.99

5	*T 9/23	Biochemistry: Biochemistry of Nitric Oxide (NO)	Glavy	1, 2, 3	S20.99
	*F 9/26	Biochemistry: Regulation of Apoptosis	Glavy	1, 2, 3	S20.99
6	T 9/30	**EXAM 1**	Aryal		
	*F 10/3	Biochemistry: Introduction to metabolism	Aryal	1, 2, 3	S20.99 S01.08
7	*T 10/7	Biochemistry: Carbohydrate metabolism	Aryal	1, 2, 3	S20.99
	*F 10/10	Biochemistry: Energy Production	Aryal	1, 2, 3	S20.99
8	*T 10/14	Biochemistry: Lipid metabolism and dyslipidemia	Aryal	1, 2, 3	S01.08 Dyslipidemia
	*F 10/17	Biochemistry: Protein metabolism	Aryal	1, 2, 3	S20.99
9	*T 10/21	Biochemistry: Nucleotide metabolism	Aryal	1, 2, 3	S20.99
	*F 10/24	Biochemistry: Arachidonic acid metabolism/ Fever	Aryal	1, 2, 3	S18.22 Pediatric fever
10	*T 10/28	Biochemistry: Thrombosis	Aryal	1, 2, 3	S01.06 Venous Thrombosis
	*F 10/31	Biochemistry: Biochemistry of RBC and oxygen carrying	Aryal	1,2,3	S14.01 Anemia
11	*T 11/4	**EXAM2**	Aryal		
	*F 11/7	Biochemistry: Chromosomal abnormalities	Glavy	1, 2, 3	S20.99
12	*T 11/11	Biochemistry: DNA damage and repair	Glavy	1, 2, 3	S20.99,
	*F 11/14	Biochemistry: Gene expression and regulation	Glavy	1, 2, 3	S20.99
13	*T 11/18	Biochemistry: Molecular biology of a virus/Flu	Glavy	1, 2, 3	S15.05A Influenza
	*F 11/21	Biochemistry: Biotechnology/molecular biology/genetics	Glavy	1, 2, 3	S20.99

14	M-F	**Thanksgiving Break**	RELAX		
15	*T 12/2 *F 12/5	Translation Exam Preparation	Glavy Aryal/Glavy	1, 2, 3	S20.99
16	TBD	**Comprehensive Final Exam** **Please follow the OSA Schedule**	Aryal		
Please note that dates, topics, and assignments are subject to change. In the event of a change, you will be given ample notification of the change.					

ACKNOWLEDGING AND ACCEPTING THIS SYLLABUS: By taking any quizzes or exams or class and turning in it for grading, you are agreeing to the policies of this course outlined in this syllabus and any modifications hereafter (will be amended on-line).

NOTE: The Course Coordinator reserves the right to correct or amend/alter this syllabus as deemed necessary. The changes, if any, will be notified to all participants in advance and will be updated online accordingly.