

Theme, Subject and Competency	Required Core Courses							Required Courses for the MedChem track				Suggested electives for the MedChem track				Experiences						
	Term	F	F	Sp	F/Sp	F	F/Sp	F/Sp	Sp	F	F			Sp								
	Credit	1	4	4	2/2	3	1-2/1-2	1/1	4	3	3			3								
<p><b>*Exempt if PharmD from an ACPE accredited University</b></p> <p><b>**A total of 4 credits is required</b></p>	Principles of Biochem* PHARM 3011	Pharmacology and Ther* PHARM 3028	Foundations in Pharm Sci PHARM 3071	Grant Writing PHARM 3038	Statistics PHARM 3040 or equivalent	Journal Club** Student/mentor choice	Seminar** PHARM 3024	Pharmaceutical Analysis PAHRM 2001	Medicinal Chemistry PHARM 3032	Adv Organic Chemistry I Chem 2310				Adv Organic Chemistry 2 Chem 2320								
	Dissert/Thesis Research	Comprehensive Exam	Manuscripts	Presentations at Scientific Conferences	Teaching Microcredential																	
	<p><b>Learning Outcome from the Graduate Program Assessment Matrix:</b> Acquire expert knowledge of biological, chemical, and analytical processes related to pharmaceutical sciences. Master a field of scholarship related to a specific research topic.</p>																					
<b>LITERATURE REVIEW AND EVALUATION</b>																						
Extract literature from appropriate bibliographic sources.				X		X	X		X									X	X	X		X
Critique clinical and scientific evidence derived from literature.				X	X	X	X		X									X	X	X		
Describe the current state of knowledge about a biomedical, clinical, or public health problem.		X		X		X	X											X		X		
Interpret primary research literature within the pharmaceutical sciences				X		X	X		X											X	X	
<p><b>Learning Outcome from the Graduate Program Assessment Matrix:</b> Use the scientific method to generate, analyze, and interpret scientific data relevant to the identification, analysis, and use of therapeutic agents.</p> <ul style="list-style-type: none"> <li>Generate mechanistic hypotheses based on prior evidence</li> <li>Derive specific predictions that are hypothesis-driven</li> <li>Plan detailed experimental procedures that test specific predictions</li> <li>Gather data via experimentation</li> <li>Appropriately analyze and interpret data</li> </ul>																						
<b>HYPOTHESIS GENERATION</b>																						
Generate a relevant biomedical, clinical, public health, or translational research hypothesis.				X			X		X									X	X			

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Defend the clinical and public health implications of a given research hypothesis.				X			X										X	X					
<b>RESEARCH METHODS AND STUDY DESIGN</b>																							
Design appropriate experiments to address generated research questions in the pharmaceutical sciences.			X	X				X	X								X	X					
Conduct appropriate experiments to address generated research questions.			X	X				X	X								X						
Evaluate possible problems in the design and execution of a study in the pharmaceutical sciences.			X	X		X	X	X	X								X	X					
Describe the drug development process.			X					X															
<b>STATISTICAL METHODS AND DATA EVALUATION</b>																							
Apply fundamental principles of statistical analysis, such as power analysis, correlation, causation, regression, and summary statistics.				X	X	X											X	X	X				

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Select the appropriate statistical approach for the interpretation of preclinical and clinical datasets.					X	X														X	X	X	X	
Develop appropriate conclusions based on results from research data.			X	X		X	X	X	X											X	X	X	X	
<p><b>Learning Outcome from the Graduate Program Assessment Matrix:</b> Communicate scientific facts, research results and ideas in a clear and compelling way in both oral and written form.</p> <ul style="list-style-type: none"> <li>Write a scientific paper of sufficient quality to be published in a nationally recognized peer reviewed journal</li> <li>Apply knowledge and understanding of ethical research practices (e.g., ownership of data, authorship, falsification and misrepresentation of data, ethical use of animals in research, use of copyrighted material, plagiarism)</li> <li>Prepare a lecture or seminar that has focus and depth, and that presents information in a clear and informative way</li> <li>Write a meritorious grant proposal (i.e., one that is hypothesis-driven, scientifically justified, and appropriately analyzed and interpreted)</li> </ul>																								
<b>GRANTSMANSHIP</b>																								
Defend a written research proposal describing specific aims, significance, innovation, and approach.				X																X	X			
<b>PREPARATION AND DELIVERY OF ORAL AND WRITTEN SCIENTIFIC INFORMATION</b>																								
Develop presentations describing proposed research, research in progress, or research findings.						X	X		X											X	X		X	

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Assess the clinical implications of scientific information.						X	X											X	X	X		
Prepare publication/presentation quality abstracts, posters and manuscripts.				X			X											X	X	X	X	
Develop an appropriate response to constructive criticism of oral and written presentations.				X			X											X	X	X	X	
<b>SCIENTIFIC LEADERSHIP, MANAGEMENT, AND CROSS-DISCIPLINARY TEAMWORK</b>																						
Demonstrate professionalism, interpersonal skills and collegial approaches to teamwork.						X	X													X	X	X
Mentor students in research, clinical, or professional activities.																						X
Recognize the strengths and limitations of personal research skills.							X											X	X	X		
<b>ETHICAL CONDUCT OF RESEARCH</b>																						
Recognize scientific misconduct and conflict of interest.				X														X	X	X		

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