

Theme, Subject and Competency	Required core courses							Required courses for the Pharmaceutics track							Required experiences							
	Term	F	F	S	F/Sp	F	F/Sp	F/Sp	Sp	F	F	S										
	Credit	1	4	4	2/2	3	1-2/ 1-2	1/1	4	4	3.5	1										
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<p>Learning Outcome from the Graduate Program Assessment Matrix: 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>																						
LITERATURE REVIEW AND EVALUATION																						
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		
Describe the current state of knowledge about a biomedical, clinical, or public health problem.		X		X		X	X				X							X		X		
Interpret primary research literature within the pharmaceutical sciences				X		X			X											X	X	

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	<p>Learning Outcome from the Graduate Program Assessment Matrix: 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"> Generate mechanistic hypotheses based on prior evidence Derive specific predictions that are hypothesis-driven Plan detailed experimental procedures that test specific predictions Gather data via experimentation Appropriately analyze and interpret data 																										
	HYPOTHESIS GENERATION																										
	Generate a relevant biomedical, clinical, public health, or translational research hypothesis.				X				X												X	X					
	Defend the clinical and public health implications of a given research hypothesis.								X													X	X				
	RESEARCH METHODS AND STUDY DESIGN																										
	Design appropriate experiments to address generated research questions in the pharmaceutical sciences.			X	X					X		X										X	X				

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Conduct appropriate experiments to address generated research questions.			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	X				
Describe the drug development process.			X					X	X		X												
STATISTICAL METHODS AND DATA EVALUATION																							
Apply fundamental principles of statistical analysis, such as power analysis, correlation, causation, regression, and summary statistics.				X	X	X			X									X	X	X			
Select the appropriate statistical approach for the interpretation of preclinical and clinical datasets.					X	X			X									X	X	X	X		
Define bias in clinical and translational research.					X																		
Develop appropriate conclusions based on results from research data.			X	X		X	X	X										X	X	X	X	X	

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<p>Learning Outcome from the Graduate Program Assessment Matrix: 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"> Write a scientific paper of sufficient quality to be published in a nationally recognized peer reviewed journal 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) Prepare a lecture or seminar that has focus and depth, and that presents information in a clear and informative way Write a meritorious grant proposal (i.e., one that is hypothesis-driven, scientifically justified, and appropriately analyzed and interpreted) 																							
GRANTSMANSHIP																							
Defend a written research proposal describing specific aims, significance, innovation, and approach.				X															X	X			
PREPARATION AND DELIVERY OF ORAL AND WRITTEN SCIENTIFIC INFORMATION																							
Develop presentations describing proposed research, research in progress, or research findings.						X	X												X	X			
Assess the clinical implications of scientific information.						X	X				X								X	X	X		

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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	

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SCIENTIFIC LEADERSHIP, MANAGEMENT, AND CROSS-DISCIPLINARY TEAMWORK																										
Demonstrate professionalism, interpersonal skills and collegial approaches to teamwork.						X	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					

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	ETHICAL CONDUCT OF RESEARCH																					
	Recognize scientific misconduct and conflict of interest.				X																X	

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