Qatar University
College of Pharmacy
MSc (Pharm) Study Plan Summary

The MSc (Pharm) degree program at the Qatar University College of Pharmacy has been uniquely designed to provide an optimal educational opportunity for students interested in pursuing a research career in the pharmaceutical sciences. The graduate program provides students with advanced knowledge and skills across the multiple disciplines with the pharmaceutical sciences and this is undertaken through a 3-phase study plan that is delivered by several faculty members over a 2-year period.

Phase I of the study plan involves one semester (10 Credit-Hours) of didactic course and graduate research seminar activity that is intended to address any potential deficiencies associated with the student's previous undergraduate experience, and to build introductory and developing knowledge and skills at an MSc level. For bridging purposes, students have access to course content (including learning resources and lecture capture) from our BSc (Pharm) program. During this phase, students are exposed to advanced topics in research design, biostatistics and ethics, life cycle of a pharmaceutical, communication skills and advanced topics in pharmacognosy, medicinal chemistry, pharmacology, pharmacokinetics and pharmaceutics. At the end of this semester, the student is expected to identify the discipline he/she would like to focus on for the balance of the program.

Phase II of the study plan involves one semester (11 Credit-Hours) of didactic course activity, graduate research seminar and laboratory experiences that are intended to build developing and mastery knowledge and skills at an MSc level, and to provide additional didactic and laboratory training to prepare the student to conduct research under the supervision of one or more faculty members.

Phase III of the study plan involves two semesters (12 Credit-Hours) of graduate research seminar and laboratory experiences that are intended to build mastery knowledge and skills at an MSc level AND to prepare the student to be a competent researcher in a laboratory setting.

Through this unique program design, students gain a better understanding and appreciation of the different disciplines of pharmaceutical sciences and are better prepared for collaborative research than many traditional graduate programs. Upon graduation, our students are well prepared for careers as faculty members in academic institutions, research scientists in pharmaceutical industry, and positions within regulatory health authority and health care institutions.

The following tables provide information about program learning outcomes, course learning outcomes and course descriptions for the 3-phase study plan that is undertaken by our graduate students.

#	Educational Outcome Domain	Description
1	Scholar	Graduates have and will apply the advanced knowledge and critical thinking skills required to master, generate, interpret and disseminate pharmaceutical knowledge
2	Collaborator	Graduates will work collaboratively with others within and external to the profession for the purpose of dissemination and extension of knowledge in the pharmaceutical sciences
3	Communicator	Graduates will communicate with diverse audiences in written and spoken English, using a variety of strategies that take into account the situation, intended outcomes of the communication and the target audience
4	Professional	Graduates will honour their roles as future pharmaceutical scientists through the fulfillment of their obligations to the profession, the community and society at large in accordance with of the vision, mission and goals of the College of Pharmacy
5	Ethical and Integrity	Graduates will conduct themselves in a manner that demonstrates an understanding and adherence to the principles of scholarly integrity and ethical research

#	Semester	Course	Course Name	Course Coordinators	1. Scholar	2. Collaborator	3. Communicator	4. Professional	5. Ethical and Integrity
					I - Introductory	D - Development and Practiced with Feedback			M - Mastery
1	1	PHAR620	Research Design, Ethics and Statistical Methodology I	MI, HY	I	-	-	-	I
2	2	PHAR621	Research Design, Ethics and Statistical Methodology II	MI, HY	D	-	-	-	D
3	1	PHAR625	Life cycle of a Medication: From Discovery to Market Withdrawal	AK, SK	I	I	-	I	-
3	1	PHAR640	Graduate Seminar I	HY, DH	I[1]	-	I[2]	I	-
4	2	PHAR641	Graduate Seminar II	AK, SM	D	-	D	D	-
5	3	PHAR642	Graduate Seminar III	HY, SK	D	-	D	D	-
6	4	PHAR643	Graduate Seminar IV	HY, SK	M	-	M	D	-
7	1	PHAR650	English-based Communication Skills for Graduate Students	SM, FM	D	-	I	-	I
6	2	PHAR660	Directed Studies in Pharmaceutical Sciences	Variable	D	D	-	D	D
10	1	PHAR670	Advanced Topics in Pharmaceutical Sciences I	DH, FM	I	D	-	-	-
11	2	PHAR671	Advanced Topics in Pharmaceutical Sciences II	Variable	D	-	-	-	-
12	2	PHAR680	Electives in Pharmaceutical Sciences	Variable	D	-	-	-	-
13	3	PHAR690	MSc (Pharm) Thesis	Variable	M	M[3]	M[3]	M	M
14	4	PHAR691	MSc (Pharm) Thesis	Variable	M	M[3]	M	M	M

Program Phase	Course Type	Course #	Course Name	Credit-Hour by Year and Semester				Course Description	Student Learning Outcomes
				First Year		Second Year			At the conclusion of these courses, MSc (Pharm) students will master the ability to:
				Fall	Spring	Fall	Spring		
1	Core	PHAR620	Research Design, Ethics and Statistical Methodology I	2	0	0	0	This graduate course aims to expand upon principles, application and controversies pertaining to bench and clinical research design and statistical methodology delivered at the undergraduate level. Topics will also include topics such as basic concepts and principles of research design and statistics, common statistical procedures in pharmaceutical sciences, statistical software e.g. SPSS and data management, grantsmanship, research ethics, co-authorship,and associated topics. This will be taught course involving faculty within the college and invited faculty from other departments and/or institutions.	1.Outline the use and interpretation of statistical tests; 2.Summarize data using appropriate tables and graphical methods; 3.Explain key technical terms and concepts relating to data analysis and interpretation; 4.Compute descriptive and inferential statistics; 5.Conduct various statistical analysis of data using SPSS software; 6.Describe the steps and requirements needed to obtain ethics approval and to explain the rationale for ethics approval for research involving both animal and human subjects; and 7.Recognize and explain the safety requirements and regulations needed in the lab environment and employ such knowledge in constructing a safe and healthy environment in the research laboratory.
	Core	PHAR625	Life Cycle of a Medication: From Discovery to Market Withdrawal	2	0	0	0	This graduate course aims to provide students with an understanding of the process of drug discovery and development from the identification of novel drug targets to the introduction of new drugs into clinical practice and eventual withdrawal. To promote an interdisciplinary approach to the topics, this will be a team taught course involving faculty within the college and invited faculty from other departments and/or institutions.	1. Discuss the significance of nature as a source of novel prototypes for development into pharmaceutical products; 2. Outline suitable strategies for isolation and purification of novel compounds of potential medicinal value; 3. Explain the tools of semisynthesis and total synthesis in drug discovery and in addressing the issue of scarce supply of natural medicines; 4. Recognize the importance of Structure Activity Relationship (SAR) studies in improving the pharmacokinetics characters of drugs; 5. Discuss appropriate pharmacological approaches to evaluate the pharmaceutical potential of natural extracts and pure substances; 6. Explain how biopharmaceutics and pharmacokinetics studies contribute to the development of a new drug; 7. Summarize the different phases of clinical trials and the FDA regulations governing them; 8. Discuss the marketing of a newly introduced drug taking into account epidemiological and pharmacoeconomic considerations; and 9. Explain why and how a drug may be withdrawn from the market.
	Core	PHAR640	Graduate Seminar I	1	0	0	0	This graduate course aims to provide students with the opportunity to participate in the formal discussion of research topics in an interdisciplinary formal presentation environment involving other students, faculty and guests external to the college and campus. The existing biweekly faculty research seminars will be expanded to include graduate student involvement as presenters and attendees. Graduate students will be expected to deliver a minimum of one formal presentation each academic year.	1. Discuss, evaluate and criticize the provided research literature and compare it to basic concepts and other work in the literature; 2. Analyse and break down the information provided in seminars and use it to construct questions that open channels of positive discussions around the topic provided; and 3. Develop and improve their general critical thinking skills.
	Core	PHAR650	English-based Communication Skills for Graduate Students	2	0	0	0	This graduate course aims to provide students with the opportunity to further enhance their oral and written communication skills to prepare students for employment in an academic and/or research environment. This includes the writing skills for a research paper and a thesis/dissertation, responding to journal reviewers, grant writing and related topics. In addition to theory, students will be given opportunities to practice their communication skills and will receive extensive feedback from both the instructors and colleagues.	1. Outline the key aspects of various scientific research papers and grant applications; 2. Compose various scientific research papers and grant applications; 3. Question and defend various scientific research papers and grant applications; 4. Prepare and deliver effective oral presentations; and 5. Prepare and deliver effective poster presentations.
	Core	PHAR670	Advanced Topics in Pharmaceutical Sciences I	3	0	0	0	This graduate course aims to provide intensive individualized instruction in the intended area of specialization (pharmacognosy, medicinal chemistry, pharmacology, pharmacokinetics, pharmaceutics). The specific topics will be determined by the Primary Faculty Supervisor with approval by the Graduate Student Supervisory Committee. Whenever applicable, graduate students in two or more specialties (e.g. medicinal chemistry and pharmacognosy) will undertake combined course work.	1. Compare the different chromatographic techniques used for natural product isolation and purification; 2. Select a suitable chromatographic method for isolation of a specific natural product or natural product class; 3. Identify different spectroscopic techniques (mass spectrometry and NMR) that are used in structure elucidation and their application in drug discovery; 4. Identify the principles of differential scanning colourimetry and its practical application; 5. Recognize the different pharmacological screening techniques and their applications; 6. Recognize the importance and application of cell culture techniques; 7. Examine various techniques used in molecular biology (western, southern and northern blots and DNA mobility assays) and their application to biomedical research; 8. List the different chromatographic analysis techniques and their applications in hospital and laboratory settings; and 9. Outline different animal handling concepts and techniques.
2	Core	PHAR621	Research Design, Ethics and Statistical Methodology II	0	2	0	0	This graduate course aims to expand upon principles, application and controversies pertaining to bench and clinical research design and statistical methodology delivered at the undergraduate level. Topics will also include topics such as pharmaceutical experimental research design and data management, advanced pharmaceutical statistics concepts, scientific paper writing skills, publication process, intellectual property and critical thinking in research. This will be taught course involving faculty within the college and invited faculty from other departments and/or institutions.	1. Outline the use and interpretation of statistical tests; 2. Summarize data using appropriate tables and graphical methods; 3. Compute more advance inferential statistics; 4. Conduct various statistical analysis of data using SPSS software; 5. Describe the steps for writing a scientific paper, prepare a scientific article and describe the requirements for publishing an article in a journal; and 6. Describe the meaning of intellectual property and rights of the respective parties.
	Discipline Specific	PHAR641	Graduate Seminar II	0	1	0	0	This graduate course aims to provide students with the opportunity to participate in the formal discussion of research topics in an interdisciplinary formal presentation environment involving other students, faculty and guests external to the college and campus. The existing biweekly faculty research seminars will be expanded to include graduate student involvement as presenters and attendees. Graduate students will be expected to deliver a minimum of one formal presentation each academic year.	1. Discuss, evaluate and criticize the provided research literature and compare it to basic concepts and other work in the literature; 2. Analyse and break down the information provided in seminars and use it to construct questions that open channels of positive discussions around the topic provided; and 3. Develop and improve their general critical thinking skills.
	Discipline -specific	PHAR660	Directed Studies in Pharmaceutical Sciences	0	2	0	0	This graduate directed studies course aims to provide students with a closely supervised research experience and will involve the completion of a project under the supervision of the primary faculty supervisor or a designated faculty member. Projects could include experiences in an external laboratory for the purpose of gaining knowledge and skills pertaining to experimental techniques not available in the QU setting.The goal of this course is to provide an opportunity for students to further enhance their research skills. Projects will be variable in focus, with clearly defined and achievable research objectives, study design and activities. The activities undertaken by the students will provide them with hands on experience with the conduct of a research project including database design, data management, analysis and interpretation.	1. Improve their understanding and abilities to conduct pharmaceutical sciences-related research; 2. Enhance the students understanding of topics or issues addressed within didactic courses and/or complement the existing curricular content; and 3. Provide the students with hands on experience with the conduct of a research project.
	Discipline -specific	PHAR671	Advanced Topics in Pharmaceutical Sciences II	0	3	0	0	This graduate course aims to provide intensive individualized instruction in the intended area of specialization (pharmacognosy, medicinal chemistry, pharmacology, pharmacokinetics, pharmaceutics, pharmacogenomics). The specific topics will be determined by the Primary Faculty Supervisor with approval by the Graduate Student Supervisory Committee. Whenever applicable, graduate students in two or more specialties (e.g. medicinal chemistry and pharmacognosy) will undertake combined course work.	The learning outcomes for this course will be dependent upon focus area chosen.
	Elective	PHAR680	Electives in Pharmaceutical Sciences	0	3	0	0	This graduate elective course will focus on either of the following areas: Principles of Drug Design, Biotransformation of Drugs, Pharmaceutical Biotechnology or another area within pharmaceutical sciences. Other electives will be added according to demand and availability.	Students will have further improved their understanding and abilities to conduct laboratory research. The activities undertaken are expected to provide the students with hands on experience and the experience to technically carry out a research project.

Program Phase	Course Type	Course #	Course Name	Credit-Hour by Year and Semester				Course Description	Student Learning Outcomes
				First Year		Second Year			At the conclusion of these courses, MSc (Pharm) students will master the ability to:
				Fall	Spring	Fall	Spring		
3	Discipline-s	PHAR642	Graduate Seminar III	0	0	1	0	This graduate course aims to provide students with the opportunity to participate in the formal discussion of research topics in an interdisciplinary formal presentation environment involving other students, faculty and guests external to the college and campus. Live links to Shafallah Center and other academic/health care delivery institutions within and external to Qatar will complement this experience.The existing biweekly faculty research seminars will be expanded to include graduate student involvement as presenters and attendees. Graduate students will be expected to deliver a minimum of one formal presentation each academic year.	1. Discuss, evaluate and criticize the provided research literature and compare it to basic concepts and other work in the literature; 2. Analyse and break down the information provided in seminars and use it to construct questions that open channels of positive discussions around the topic provided; and 3. Develop and improve their general critical thinking skills.
	Thesis	PHAR690	MSc (Pharm) Thesis	0	0	5	0	This graduate course will consist of a major research project which has been approved by the Graduate Student Supervisory Committee, the creation of a formal structured document to describe background, hypothesis, methods, results, conclusions, limitations, future research requirements and bibliography associated with the research project, and finally the thesis defense.The thesis will be defended by the student in a formal oral examination process in the final semester.The course will be considered pass/fail and span two semesters.	The learning outcomes for this course will be dependent upon the research project undertaken.
	Discipline-s	PHAR643	Graduate Seminar IV	0	0	0	1	This graduate course aims to provide students with the opportunity to participate in the formal discussion of research topics in an interdisciplinary formal presentation environment involving other students, faculty and guests external to the college and campus. Live links to Shafallah Center and other academic/health care delivery institutions within and external to Qatar will complement this experience.The existing biweekly faculty research seminars will be expanded to include graduate student involvement as presenters and attendees. Graduate students will be expected to deliver a minimum of one formal presentation each academic year.	1. Discuss, evaluate and criticize the provided research literature and compare it to basic concepts and other work in the literature; 2. Analyse and break down the information provided in seminars and use it to construct questions that open channels of positive discussions around the topic provided; and 3. Develop and improve their general critical thinking skills.
	Thesis	PHAR691	MSc (Pharm) Thesis	0	0	0	5	This course will consist of a major research project which has been approved by the Graduate Student Supervisory Committee, the creation of a formal structured document to describe background, hypothesis, methods, results, conclusions, limitations, future research requirements and bibliography associated with the research project, and finally the thesis defense.The thesis will be defended by the student in a formal oral examination process in the final semester.The course will be considered pass/fail and span two semesters.	The learning outcomes for this course will be dependent upon the research project undertaken.
TOTAL				**10**	**11**	**6**	**6**		