

List of Courses for Master in Pharmacogenomics

Pharmaceutical Biochemistry & Toxicology and Pharmacology Departments

Prerequisite: Pharmacogenomics Diploma

(24 Cr Hr.: General courses; 12 Cr Hr, Special courses; 12 Cr Hr) +20 Cr Hr thesis)

List of General Master Courses

No.	Course No.	Course Title	Credit hours	
			L	P
First Semester (6 cr. h)				
1	0600701	Basics of Research and Ethics	2	--
2	0600702	Computer Sciences	2	--
3	0600703	Applied Statistics	2	--
Second Semester (6 cr. h)				
4	0600705	Modern Pharmaceutical Research Techniques	2	--
5	0600706	Basics of Pharmacological Research	2	--
		Elective course	2	--
Elective courses				
6	0600704	Advanced chromatographic methods of analysis	2	--
7	0600708	Principles of Drug Discovery and Development	2	--

List of Special Master Courses

No.	Code No.	Course Title / (Code)	Credit hours	
			L	P
First Semester (6 cr. h)				
1	0608705	Analytical Technology	2	1
2	0602705	Applications of Pharmacogenomics in cancer	3	---
Second Semester (6 cr. h)				
3	0608706	Genomics of Common and Rare Inherited Diseases	3	---
4	0602706	Application of Genomics and pharmacogenomics in infectious diseases	3	---
Master Thesis (20 cr. h)				

Description of Master General Course

First semester courses (Total 6 cr. h)

Course Name	Credit hours		Code No.
	L	P	
Basics of Research and Ethics	2	--	0600701
<p>Description: This course is designed to promote a deeper understanding of basics and skills that are important throughout students' research career. This course provides the students with the principles of scientific writing and publishing a biomedical manuscript, ethical considerations in publishing (plagiarism, fabrication, falsification, duplicate publication, redundant publication and policies for handling such misconduct), successful drafting of a grant proposal, and reference citations management (e.g. EndNote & Mendeley software). Guidelines for ethical use of animals in research, dealing with human in clinical trials, good laboratory and clinical practice and safety measures of the use of laboratory solvents and chemicals are also discussed.</p>			

Course Name	Credit hours		Code No.
	L	P	
Computer Sciences	2	--	0600702
<p>Description: This course provides the students with basic knowledge about the internet, the World Wide Web and introduces basic software and hardware concepts and terminology, as well as, the types of application software. Introduction to algorithms, Java programming language and Python programming languages is also included.</p>			

Course Name	Credit hours		Code No.
	L	P	
Applied Statistics	2	--	0600703
<p>Description: The course provides an introduction to important topics in statistics applied to pharmacy-based research. Emphasis is placed on the types and the appropriate use of statistical analysis of data and their graphical presentations. Practical examples drawn from scientific research are used to illustrate statistical concepts. Students learn different statistical methods using computer-based statistical packages. Various experimental designs and methods for statistical analysis appropriate to the research question, disease, research phase, and therapy under consideration are discussed.</p>			

Second semester courses (Total 6 cr. h)

Course Name	Credit hours		Code No.
	L	P	
Modern Pharmaceutical Research Techniques	2	--	0600705
<p>Description: This course covers modern techniques commonly used in pharmaceutical research. These includes spectroscopic techniques e.g. IR, NMR, and X-Ray and mass to be studied from an applied point of view. Modern microscopical techniques such as confocal, TEM, SEM, fluorescent microscopy and others are taught to explore their utility in research. Thermal analysis (e.g. DSC) and advanced techniques in particle size analysis are also covered. Furthermore, basics of cell culture techniques and manipulations are taught to highlight their usefulness and application in pharmaceutical research.</p>			

Course Name	Credit hours		Code No.
	L	P	
Basics of Pharmacological Research	2	--	0600706
<p>Description: The course provides basic knowledge about the concepts of pharmacological studies and sources of errors in screening procedures. It introduces concise up to date comprehensive information about the screening methods of drugs as antihypertensive, anti-inflammatory drugs, psychotropic and neurotropic agents and other commonly used groups of drugs.</p>			

Elective courses (2 hrs):

Course Name	Credit hours		Code No.
	L	P	
Advanced Chromatographic Methods of Analysis	2	--	0600704

Description: The course aims to give post-graduates a more specified knowledge on chromatographic techniques that are not covered in undergraduate courses and fundamental aspects of the hyphenation of liquid/gas chromatography (LC and GC) and mass spectrometry (MS). It also covers the applications of these techniques in pharmaceutical, environmental analysis and drug determination in biological fluids. In addition, the course is designed to familiarize students with data evaluation and interpretation together with performing the validation parameters and performance criteria for an analytical method. Students will be provided with an opportunity to test their methods and compare their validity to compendial or commonly adopted procedures.

Course Name	Credit hours		Code No.
	L	P	
Principle of Drug Discovery and Development	2	--	0600708

Description: The course covers the principles of drug discovery in the areas of development of modern and innovative therapeutic substances as well as natural products. The course covers, in particular, how the chemical structure and physical properties of a drug are related to its biological activity. Factors related to drug development, e.g. biopharmaceutics, pharmacokinetics; and membrane drug transporters are included. Molecular aspects of receptors as targets for drug discovery and drug discovery through enzyme inhibition are also discussed. The drug development pipeline from lead discovery to clinical trials is introduced. Introductory concepts around regulatory affairs, patenting, registration and marketing are covered in the context of new drug discovery.

Description of Master Special Courses

First semester courses (Total 6 cr.h)

Course Name	Credit Hours		Code No.
	L	P	
Analytical Technology	2	1	0608705

Description: This course focuses on the available analytical and bioinformatics high-throughput platforms, and its application to pharmacogenomics. In brief, the candidate will learn the analytical basis of omic procedures employed in pharmacogenomics, to process and mine the analytical data, and to transfer it to clinicians and pharmacists to personalize patient treatments. During the course candidates will also learn to design new omic analyses in drug discovery environments, and to apply state-of-the-art methodologies to phenotype patients under several pathologies.

Course Name	Credit Hours		Code No.
	L	P	
Application of pharmacogenomics in cancer	3	--	0602705

Description: This course provides an overview of somatic and germline Pharmacogenetics in cancer patients. It illustrates pharmacogenomic-based diagnostics in oncology and pharmacogenomic factors that are associated with inter-individual differences in toxicity and therapeutic response of many chemotherapy agents. The course introduces different types of biomarkers that are associated with the response and toxicities of chemotherapeutics. Patient cases and clinical recommendations are also presented.

Second semester courses (Total 6 cr.h)

Course Name	Credit Hours		Code No.
	L	P	
Genomics of Common and Rare Inherited Diseases	3	----	0608706
<p>Description: This course offers a broad understanding of current knowledge on rare and complex diseases through a genomic lens. In addition to, molecular and genomic technologies used to elucidate human disorders brings readers closer. In addition to challenges associated with performing analysis and the opportunities to understand pathophysiology of disease. In this course, specific areas are to be discussed including large scale sequencing project in rare diseases, comparative genomics, epigenome-wide analysis, and proteomics.</p>			

Course Name	Credit Hours		Code No.
	L	P	
Application of Genomics and pharmacogenomics in infectious diseases	3	----	0602706
<p>Description: This course discusses the potential application of genomics and pharmacogenomics in disease monitoring, treatment, and control in individuals and populations by improving diagnostic accuracy. In addition, the course discusses the use of genomic technologies such as the genome-wide association studies and next-generation sequencing in infectious diseases.</p>			