Jordan Universsity of Science and Technology
Faculty of Graduate Studies

Course Curriculum for Master Degree in Clinical Pharmacy

The Master Degree in Clinical Pharmacy is awarded by the Faculty of Graduate studies at Jordan University of Science and Technology (JUST) upon the fulfillment of the following requirements:

1. Compliance with the JUST Master Degree regulations approved by the Dean Council (No. 492/2006), dated 8/8/2006.
2. Successful completion of (34) credit hours in one of the following tracks:

First: Thesis Track

1. **Compulsory Requirements: (15) credit hours as follows**

Course Code	Course Name	Credit Hours
PHAR 704	Clinical Practice 1	3
PHAR 707	Clinical Practice 2	3
PHAR 710	Research Methodology	2
PHAR 741	Therapeutics	3
PHAR 742	Advanced Therapeutics	3
PHAR 770	Seminar	1

2. Elective Requirements: (10) credit hours as follows*

Course Code	Course Name	Credit Hours
PHAR 743	Current Topics in Clinical Pharmacy	3
PHAR 744	Comprehensive Therapeutics	1
PHAR 745	Immunopharmacology	3
PHAR 748	Neuropharmacology	3
PHAR 754	Drug Delivery Systems	3
PHAR 764	Drug Metabolism	2
PHAR 765	Advanced Pharmacology	3
PHAR 766	Pharmacoeconomics	3
PHAR 767	Clinical Pharmacokinetics	3
PHAR 768	Clinical Pharmaceutical Microbiology	2
PHAR 769	Hospital Pharmacy and Communication Skills	3
PHAR 771	Clinical Research Techniques	3
PHAR 772	Parenteral Nutrition	2
PHAR 773	Case Studies in Clinical Biochemistry	2
PHAR 774	Drug Information	1
PHAR 775	Design of Clinical Trials	3
PHAR 776	Advanced Pharmacy Practice	3
PHAR 777	Design of Clinical Surveys	1
PHAR 778	Pharmaceutical Care	3
PHAR 779	Special Topics	3
MED 731	Pathophysiology	3
MED 753	Experimental Techniques in Pharmacology and Physiology	3
MED 754	Pharmacogenetics	3

* The student may study not more than 3 credit hours from courses of (700 or 800) level offered by other programs related to his field of study upon approval of the Dean based on the departmental committee recommendation and the approval of the faculty committee of graduate studies.

3. Master thesis (PHAR 799): Total of (9) credit hours as follows

Course Code	Course Name	Credit Hours
PHAR 799A	Master Thesis	9
PHAR 799B	Master Thesis	6
PHAR 799C	Master Thesis	3
PHAR 799D	Master Thesis	0

Second: Non–Thesis Track

1. **Compulsory Requirements: (24) credit hours as follows**

Course Code	Course Name	Credit Hours
PHAR 703	Clinical Training 1	3
PHAR 705	Clinical Training 2	3
PHAR 706	Clinical Training 3	3
PHAR 708	Clinical Training 4	3
PHAR 710	Research Methodology	2
PHAR 741	Therapeutics	3
PHAR 742	Advanced Therapeutics	3
PHAR 756	Biopharmaceutics and Pharmacokinetics	3
PHAR 770	Seminar	1

2. **Elective Requirements: (10) credit hours as follows***

Course Code	Course Name	Credit Hours
PHAR 743	Current Topics in Clinical Pharmacy	3
PHAR 744	Comprehensive Therapeutics	1
PHAR 745	Immunopharmacology	3
PHAR 748	Neuropharmacology	3
PHAR 754	Drug Delivery Systems	3
PHAR 764	Drug Metabolism	2
PHAR 765	Advanced Pharmacology	3
PHAR 766	Pharmacoeconomics	3
PHAR 767	Clinical Pharmacokinetics	3
PHAR 768	Clinical Pharmaceutical Microbiology	2
PHAR 769	Hospital Pharmacy and Communication Skills	3
PHAR 771	Clinical Research Techniques	3
PHAR 772	Parenteral Nutrition	2
PHAR 773	Case Studies in Clinical Biochemistry	2
PHAR 774	Drug Information	1
PHAR 775	Design of Clinical Trials	3
PHAR 776	Advanced Pharmacy Practice	3
PHAR 777	Design of Clinical Surveys	1
PHAR 778	Pharmaceutical Care	3
PHAR 779	Special Topics	3
MED 731	Pathophysiology	3
MED 753	Experimental Techniques in Pharmacology and Physiology	3
MED 754	Pharmacogenetics	3

* The student may study not more than 3 credit hours from courses of (700 or 800) level offered by other programs related to his field of study upon approval of the Dean based on the departmental committee recommendation and the approval of the faculty committee of graduate studies.

3. **Passing the Comprehensive Exam (Phar. 798): Zero Credit Hour.**

Course descriptions

PHAR 703 Clinical Training 1: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, this course includes 2 clinical rotations accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. During that period, students will be required to produce detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients and answer questions of other health care providers.

PHAR 704 Clinical Practice 1: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, this course includes a clinical rotation accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. Within each rotation, the students will be required to produce a detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients and answer questions of other health care providers.

PHAR 705 Clinical Training 2: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, this course includes 2 clinical rotations accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. Within each rotation, the students will be required to produce a detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients, and answer questions of other health care providers.

PHAR 706 Clinical Training 3: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, this course includes 2 clinical rotations accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. Within each rotation, the students will be required to produce a detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients, and answer questions of other health care providers.

PHAR 707 Clinical Practice 2: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, this course includes a clinical rotation accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. Within each rotation, the students will be required to produce a detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients, and answer questions of other health care providers.

PHAR 708 Clinical Training 4: (3 Credit Hours)

This course provides the means by which the students will extend their clinical knowledge and skills, This course includes 2 clinical rotations accomplished in 8 weeks in different clinical departments in the hospital or in hospital pharmacy department. Within each rotation, the students will be required to produce a detailed evaluation of a wide range of patients, evaluate critically drug therapy, educate patients, and answer questions of other health care providers.

PHAR 710 Research Methodology: (2 Credit Hours)

The course involves the study of the different aspects of scientific research including data analysis and problems that may face the researcher. The course also introduces research methodologies, the application of research approaches to health professions, and the statistical techniques used in comparing researches results and ethics.

PHAR 741 Therapeutics: (3 Credit Hours)

This course covers the pharmacotherapy for neurological, psychiatric, cardiovascular, and infectious diseases/disorders in relation to the pathophysiologic conditions of the patient. The course discusses concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. Students learn methods of interacting and supporting other members of the medical care team by developing and evaluating patient's therapeutic plans, and offering alternative therapeutic options/plans when needed.

PHAR 742 Advanced Therapeutics: (3 Credit Hours)

This course covers the pharmacotherapy for respiratory, endocrine, gastrointestinal, renal, urological, hematological, oncologic diseases/disorders in relation to the pathophysiologic conditions of the patient. The course discusses concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring, and evaluation of the therapeutic outcomes. Students learn methods of interacting and supporting other members of the medical care team by developing and evaluating patient's therapeutic plans, and offering alternative therapeutic options/plans when needed.

PHAR 743 Current Topics in Clinical Pharmacy: (3 Credit Hours)

This course will cover common topics related to clinical pharmacy.

PHAR 744 Comprehensive Therapeutics: (1 Credit hour)

The course discusses the pharmacotherapy of a multi-disease state taking in consideration the interactions in the treatment of multiple pathological conditions in a single patient.

PHAR 745 Immunopharmacology: (3 Credit Hours)

This course covers new aspects in immunopharmacology, immuno-interactions, and immuno-responses in various illnesses. The course also includes different strategies used for prevention and treatment of immunological diseases, and discusses the immunosuppressant drugs used in cancer therapy and in tissue transplantation.

PHAR 748 Neuropharmacology: (3 Credit Hours)

This course includes an in-depth coverage of the physiology and pharmacology of synaptic mechanisms in the central and peripheral nervous system with emphasis on mechanisms of drug and neurotransmitter action as well as current research procedures used to study those actions. Pathophysiologic states which justify the use of these agents are also discussed.

PHAR 754 Drug Delivery Systems: (3 Credit Hours)

This course is designed to cover the theoretical aspects related to controlled drug delivery systems, this include properties affecting system design, methodologies in various drug delivery

systems, dosage forms with prolonged and sustained action, physical, chemical and pharmacokinetics consideration encountered in the design of drug delivery systems will also be discussed.

PHAR 756 Biopharmaceutics and Pharmacokinetics: (3 Credit Hours)

This course includes a study of the physicochemical, physiological, pathological and pharmaceutical factors affecting the absorption, distribution and elimination of drugs from the body. A review of basic pharmacokinetic principles and elaboration on model assignment and nonlinear pharmacokinetics of drugs will be presented. The course will also include detailed discussion of interpretation of plasma drug concentrations, protein binding and its effect on the disposition of drugs, and principles of therapeutic drug monitoring.

PHAR 764 Drug Metabolism: (2 Credit Hours)

This course includes an advanced study of the kinetics of drug metabolism, the study of linear and non-linear kinetics of drug elimination, the kinetics of drug metabolites, and the kinetics of drug interactions.

PHAR 765 Advanced Pharmacology: (3 Credit Hours)

This course will discuss comprehensively the principles of cellular, molecular, and clinical pharmacology. This course includes also an in-depth assessment of selected groups of drugs with specific emphasis on the sites and mechanisms of drug action and current research procedures used for investigation of these sites and mechanisms.

PHAR 766 Pharmacoeconomics: (3 Credit Hours)

At the conclusion of this course, the students should be able to understand the role of outcome research and pharmacoeconomics in the evaluation of pharmaceutical and pharmacy services, identify and describe different types of clinical, economic, and humanistic evaluations, describe the methods, steps, and techniques used to conduct pharmacoeconomic evaluations, understand methods to collect data that may be useful in drug use evaluation, drug use policy and decision-making, including retrospective and prospective data. Be able to read, interpret, and evaluate published pharmacoeconomic studies.

PHAR 767 Clinical Pharmacokinetics: (3 Credit Hours)

The course includes the study of biological and physiochemical factors affecting drug bioavailability and efficacy, as well as the effect of dosage form design. The course also emphasizes on the study and application of theories describing drug kinetics.

PHAR 768 Clinical Pharmaceutical Microbiology: (2 Credit Hours)

The course covers the modes of action, resistant development, and microbiological assays of antimicrobial agents in clinical use. The course also includes the important aspects in choosing antibiotics for treatment and the method of their preservation. Biotechnology used for drug production is also discussed.

PHAR 769 Hospital Pharmacy and Communication Skills: (3 Credit Hours)

This course covers a detailed discussion of the practice of Hospital Pharmacy including the different duties of the hospital pharmacists, namely: organization of the hospital and hospital pharmacy, purchase and inventory control, the Pharmacy and Therapeutics Committee, the Hospital Formulary, unit dose system, preparation of intravenous admixture services, patient education and counseling. Communication skills with medical staff and patients will also be covered.

PHAR 770 Seminar: (1 Credit Hour)

This course covers selected topics in clinical pharmacy and therapeutics presented by students as seminars.

PHAR 771 Clinical Research Techniques: (3 credit Hours)

This course covers the practical methods and applications for various laboratory equipments for research or routine use purposes. Emphasis will be on research techniques related to the fields of clinical pharmacy and clinical pharmacology.

PHAR 772 Parenteral Nutrition: (2 Credit Hours)

This course is designed to explore the wide scope of human parenteral nutrition. This course covers types of malnutrition, components of nutritional screening and assessment, complications

and indications of parenteral nutrition therapy, nutrient-drug interactions, and monitoring parameters and nutritional requirements in nutritional support of most of the common diseases and specific states

PHAR 773 Case Studies in Clinical Biochemistry: (2 Credit Hours)

The course is designed as a case-oriented approach to study the biochemical changes of human diseases. The course will emphasize on biochemical investigation and laboratory findings of each disease through presenting selected cases that cover most of the common diseases.

PHAR 774 Drug Information: (1 Credit Hour)

The course deals with different drug information resources. A systematic approach to the search for drug information will be emphasized.

PHAR 775 Design of Clinical Trials: (3 Credit Hours)

The course deals with various clinical trial designs and carefully considers the medical, ethical and therapeutic requirements. Since there are various designs, the course also deals with the statistical methods used in the analysis and interpretation of results emerging from such clinical trials.

PHAR 776 Advanced Pharmacy Practice: (3 Credit Hours)

This course covers pharmacy practices applied in drug management at the various levels of health services. This involves drug management of the outpatient and inpatient pharmacies, and drug stores. The course also reviews the legislations and regulatory procedures applied to drug management and record keeping. In addition, methods used for the assessment for the needs of medicines and medical supplies are studied.

PHAR 777 Design of Clinical Surveys: (1 Credit Hour)

The course includes topics on clinical survey design requirements such as clarity and integrity. It also reviews the common errors in the design of surveys and the appropriate ways of avoiding them. The ethical, medical and social considerations as integral parts of each survey are also discussed.

PHAR 778 Pharmaceutical Care: (3 Credit Hours)

This course focuses on teaching the students how to provide comprehensive pharmaceutical care for the patients in order to achieve the optimum goal and improving the quality of life. Through this course the student will enhance his/her skills in assessing drug therapy, developing and monitoring pharmacy care plans, and communicating recommendations to the other health care providers.

PHAR 798 Passing the Comprehensive Exam: (Zero Credit Hours)

In this course the student will set for an exam that includes all topics addressed throughout his academic program either from inside faculty of pharmacy or outside faculty of pharmacy. Comprehensive exam will be held inside school of pharmacy under the supervision of specialized faculty members.

PHAR 799 Master Thesis: (9 Credit Hours)

Individual research under the direction of a faculty member (s) and committee leading to preparation, completion, and oral defense of a thesis.