

Course Description
Curriculum (5+6)

Program:	Master in pharmaceutical sciences	Department:	Pharmaceutical sciences
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Course No.	Course Name	Hrs.	Teaching method
1101718	Advanced pharmaceutical organic chemistry	3	Online

This course includes the common organic reactions (classical and recent) including their mechanism, reagents, conditions, the required starting materials and their generated products.

Advanced synthetic strategies and retro-synthetic analysis, synthesis of complex natural products with biologically interesting molecules such as antibiotics, anti – hypertensive agents, hormones anticoagulants and antiviral agents.

1101701	Drug analysis and identification	3	Direct
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This 3-credit hour's course is a continuation of Analytical and Instrumental pharmacy courses and deals with the rational process of analyzing drugs from their precursors. Main goals of education based on the course of Instrumental Pharmaceutical Analysis are introduction of students with principals of instrumental analysis and assumption of knowledge about theory and principles on which techniques of analytical measurements are established. Comprehension of analytical instruments, their parts and the way measurements are performed. It is necessary for students to learn the skills for practical applying of knowledge learned in theory. In the laboratory students practically use learnt measurement techniques and become experienced in modern analytical techniques

1101702	Pharmaceutical technology	3	online
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This course covers the fundamentals of drug delivery systems and novel dosage form design. It starts by providing the students with the basic knowledge of drug delivery in addition to technologies, different approaches and factors affecting the design of novel delivery systems.

The course also emphasizes the diverse dosage form designs intended for different routes of administration as oral, transdermal, ophthalmic, and nasal routes. The use of different drug-carriers (as liposomes, and micro- & Nano-carriers) for drug targeting will be illustrated. In addition, strategies and techniques for peptide and protein delivery and drug delivery to the CNS will also be discussed in this course.

1101703	Research methodology	1	Online
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Practical application of different aspects and special problems encountered in research.

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1101704	Advanced Physical pharmacy	2	Direct
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This course includes the physicochemical properties for drugs as molecules and in their preparations, which affect the stability and the bioavailability of drugs and determine the approach to be taken in the pre-formulation and further development stages. The course includes surface and interface properties like surface and interfacial tension, electrical properties. The course also includes, among other related topics, surfactant systems, colloidal dispersions and phase equilibria.

1101722	Applied biopharmaceutics& pharmacokinetic	2	Blended
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This course will discuss briefly the various effects of physicochemical properties of active ingredients, pharmaceutical dosage forms, physiological factors and routes of administration on drug bioavailability. In order to evaluate the pharmacological activities and/or toxicities of a drug, the concept of Pharmacokinetics, including its linked models and other factors that might affect drug's kinetics (i.e. drug Absorption, Distribution, Metabolism, and Excretion) will be discussed. Handling kinetic data and using the mathematical calculations to solve problems that might pharmacist face in clinical set up. Emphasis will be placed upon the prediction of plasma levels of drugs under varying conditions applying different pharmacokinetic parameters and correlate this level plasma level with their pharmacological responses. In addition, this course is intending to study the performance of the drug in vivo by introducing and discussing how to design and analyze bioavailability and bioequivalence studies.

1101707	Research projects in pharmaceutical sciences	1	Blended
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Individual research under the direction of a faculty member (s) and committee leading to preparation, completion, and oral defense of a research project.

1101719	Pharmaceutical Biostatistics	3	Blended
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Organizing and summarizing data, sampling methods and statistical distributions (binomial, Poisson, normal, χ^2 , t and f), sampling methods and distributions, estimation and hypotheses about means, proportions and variances based on large and small samples, analysis of variance (one-way, two-way, factorial designs, Latin square), regression analysis (simple and multiple), Chi-square tests, correlation coefficient and nonparametric methods.

1101709	Pharmaceutical biotechnology	3	Blended
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The course includes general molecular biology and genetics: construction and application of expression vectors, genetic diversity and disease, oncogenes and cancer. It also enclosed medical dimensions of molecular biology such as vaccine and DNA fingerprint determination, in addition to gene therapy; retrovirus, IVF and cells fusion. This course also includes the use of genetic engineering in drug targeting and plants where genetic transformation and chimeric gene vectors will be discussed.

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1101710 Phytotherapy 3 Blended

This course insight into dosage forms of application and effect of the most important herbal remedies and fields of applications. It also includes medicinal plants, phytopharmaceuticals and their effects on CNS, Cardiovascular system, Respiratory system, Digestive system and Urinary tract. Quality control of herbal medicines and poisonous plants are included.

1101711 Advanced Pharmaceutical microbiology 3 Blended

The course includes studies on the microbiological quality assurance where the students will study how to handle pharmaceutical preparation samples and will be familiar with the conventional and rapid microbiological methods used for identification of bacteria and fungi.

They will also study how to evaluate different sterilizing processes. During the course, students will be exposed to the effect of the material and design of the container and closures on the activity and stability of pharmaceutical preparation, with special emphasis on microbiological point of view. They will also be familiar with modern biotechnology in production of substances from microorganisms such as antibiotic and insulin. A section on the genetic and biochemical basics of resistance of microorganisms to biocides is included.

1101712 Drug design and discovery 3 Blended

This course includes discussion and presentation of the basic principles of designing a dosage form from the pharmaceutical point of view starting with prodrugs and modification of conventional drugs. The course also includes a presentation of the modes of degradation of drugs and enhancing their stability within the dosage form.

1101713 Chemistry of Natural products 3 Blended

This course includes the principles of natural products chemistry and research methods and their application in pharmaceutical technology. However, emphasis on the occurrence of various natural products with biological activity will be discussed: in plants and other natural sources. General methods of isolation and purification by modern methods of chromatography, confirmatory tests and structure elucidation by the aid of instrumental analysis is covered. This course also includes a practical part in which the student will face all the practical aspects deal with the different methods of extraction, purification and structure elucidation of compounds in their pure forms.

1101714 Cosmetics 3 Blended

This course includes advanced cosmetic formulations for skin, hair, nail and dental products. New active materials and excipients, efficacy testing of cosmetics. It also includes legislation and safety regulations for cosmetics, stability testing and perfume manufacturing.

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1101715 Drug formulation and drug delivery 3 Blended

This course is designed to cover the theoretical aspects related to controlled drug delivery systems. This includes drug properties affecting system design, methodologies utilized in various drug delivery systems, dosage forms with prolonged and sustained action. Physical, chemical and pharmacokinetic considerations encountered in the design of drug delivery systems will also be discussed.

1101716 Selected topics in pharmaceutical quality control and quality assurance 3 Blended

In this course, specified aspects in the quality control of pharmaceuticals are discussed, quality in the analytical laboratories, laboratory health and safety, identification and evaluation of hazards, chemical hygiene programs, waste management, GMP regulations and auditing are also included.

1101720 Advanced pharmacy management 3 Blended

The "Advanced Pharmacy Management" course is tailored to empower pharmacy professionals with the advanced competencies and knowledge essential for excelling in managerial roles within the ever-evolving healthcare industry. Drawing upon the foundational principles of pharmacy practice, this course provides a comprehensive exploration of strategic management, leadership strategies, and innovative practices pivotal for effective pharmacy administration. Participants will gain insights into the intricacies of modern pharmacy management, equipping them with the skills necessary to navigate the complexities of the healthcare landscape successfully.

1101721 Advanced pharmacology 3 Blended

The "Advanced Pharmacology" course is designed for healthcare professionals seeking an in-depth understanding of pharmacological principles and their advanced applications. This course builds upon foundational pharmacology concepts, delving into sophisticated topics essential for comprehensive clinical decision-making.

1101717 Selected topics in medicinal chemistry 3 Blended

This course delves into the advanced principles and applications of medicinal chemistry, focusing on the molecular aspects of drug design, synthesis, and mechanisms of action. Through a combination of lectures, discussions, and practical exercises, students will explore the intricate relationship between chemical structure and biological activity, aiming to develop a comprehensive understanding of the principles underlying the design and optimization of therapeutic agents. Emphasis will be placed on contemporary topics and cutting-edge techniques in medicinal chemistry research.

1101723 Topics in pharmaceutical industry 3 Blended

This course covers contemporary issues relevant to professionals in pharmaceutical production, emphasizing regulatory compliance, emerging technologies, market trends, and ethical considerations. The interdisciplinary nature of the course addresses diverse dosage form preparations, including solid, liquid, and semisolid formulations. Tailored for master's level students, the program fosters critical thinking and adaptability, preparing graduates to

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navigate the complexities of pharmaceutical manufacturing, contribute to the industry, and innovate in dosage form development.

1101724 Pharmaceutical instrumental analysis 3 Blended

This course provides students with a comprehensive understanding of advanced analytical techniques essential for quality control, research, and development. This course delves into a wide range of instrumental methods, including chromatography, spectroscopy, mass spectrometry, and electrophoresis, providing a comprehensive understanding of their applications in pharmaceutical analysis. Students will gain hands-on experience with state-of-the-art analytical instruments, learning to interpret complex data and troubleshoot analytical challenges. Emphasis is placed on the integration of instrumental analysis within regulatory frameworks, ensuring compliance with industry standards.

1101727 Stability of pharmaceuticals 3 Blended

This course deals with the extensive examination of pharmaceutical stability. Special emphasis is given to physical and chemical instability of pharmaceutical substances in the pharmaceutical dosage form. The course also covers the following topics: design of stability studies, kinetic evaluation of stability data, study of the factors that affect the rate of drug degradation, mechanism of drug degradation and prediction of shelf life. The course also discusses the design of stability protocol for pharmaceutical product according to regulatory guidelines.

1101725 Sterile product manufacturing 3 Blended

This course deals with covers the fundamental principles, technologies, and regulatory requirements essential for the production of sterile pharmaceutical products. In this course the students will learn how to develop a drug into a parenteral dosage form. It includes product ideal properties and manufacturing considerations, suitable additives solvents, packaging systems, aseptic processing, methods of sterilization, and methods of getting rid of pyrogen. The course also discusses manufacturing of parenteral products and quality control. Due to the sensitivity of this dosage form special emphasis will be given to quality assurance aspects of it manufacturing including clean room design and its operation.

1101798 Comprehensive Exam 0 Blended

Exam run after student successively pass 33 credit hours, include two papers the first one cover topics field of total 12 credit hours and second paper cover topics field of total 11 credit hours.