



**Applied Science University**  
**Faculty of Pharmacy**  
**Master of Pharmaceutical Sciences**

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**Course Description**

**7091011 Advanced Pharmaceutical Organic Chemistry**

This course prelude to the common organic reactions (classical and recent) includes their generic names, mechanism, reagents, conditions, the required starting materials and their generated products. It involves a review of the stereochemistry of organic compounds, advanced synthetic strategies and retro-synthetic analysis, synthesis of complex natural products with biologically interesting molecules such as anti-hypertensive agents, anticoagulants, antibiotics antiviral agents and hormones.

**7091012 Advanced Methods in Drug Analysis and Identification**

This course takes account of analytical methods; development and quality control for pharmaceuticals and validation of these methods in accordance with the regulatory requirements. It also includes identification methods of drug substances using spectroscopic techniques. Moreover, it includes a practical application of pharmaceutical analysis and stability of drugs, analysis and dissolution testing, analysis and bioavailability studies, drug metabolism and drug interaction.

**7091013 Advanced Drug Delivery**

This course is designed to cover the theoretical aspects related to control drug delivery systems. Coating, sustained parenterals, transdermal, microemulsions, microencapsulation, and oral drug limitations and their solutions. 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.

**7091014 Advanced Biopharmaceutics and Pharmacokinetics**

This course talk about advanced topics in pharmacokinetics; introduction to mathematical techniques required for the treatment of complex pharmacokinetic modeling. It also includes some advanced techniques which provide the basis for in-vitro/in-vivo correlation of biopharmaceutical data. Additionally, application of pharmacokinetic principles to clinical practice and its relevance to the safe and effective management are included. Moreover it includes statistical design and analysis of bioavailability and bioequivalence studies

**7091015 Advanced Research Methodology**

This course provides students with knowledge and skills required to conduct research in a scientific approach. Practical application of different aspects and special problems encountered in research is also discussed (study design; study evaluation; study presentation).

**7091016 Advanced Biostatistics and Biometrics**

This course focuses upon organizing and summarizing data; sampling methods and statistical distributions; estimation and hypotheses about means, proportions and variances based on large and small samples; analysis of variance; regression analysis (simple and multiple); Chi-square-tests; nonparametric methods; and correlation coefficient, environmental and bio statistical data.

**7091017 Seminar**

This course aims at teaching the student how to search the available (chemical; phytochemical ; ....) literature concerning a specific topic in these areas, write a scientific report and to present the topic orally using the available multimedia techniques.

**7091018 Advanced Clinical Pharmacology and therapeutics**

The course includes advanced pharmacology from pharmaceutical point of view with a special emphasis on the treatment of patients. The course also contains topics that discuss drugs which affect major organ systems, autonomic nervous system, the central nervous system and chemotherapy.

**7091019 Advanced Physical Pharmacy**

This course comprises the physicochemical properties for drugs as molecules and in their preparations that affect the stability and the bioavailability of drugs, which determine the approach to be taken in the preformulation and further development stages, as well as surface and interface properties like surface and interfacial tension, electrical properties. Also it includes, other related topics such as solubility, diffusion, dissolution, adsorption, surfactant systems, colloidal dispersions and phase equilibrium.

**7091020 Advanced Pharmaceutical Biotechnology**

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.

**7091021 Advanced Aspects of Drug Discovery**

The core topics include: Drug Discovery Design Methods & Applications: Virtual screening, structure-based drug design, cheminformatics and molecular modelling supporting drug discovery and design. As well as Introduction to Drug Targets and the Molecular Basis of Disease; History of Drug Discovery and Lead Identification; Drug discovery through the molecular sciences involves a combination of modern methods of lead identification, activity optimization, synthesis and/or isolation, and characterization. A number of aspects of small molecules as drugs will be discussed in this module.

- 7091022    Advanced Medicinal Chemistry**  
The course deals with new trends in medicinal chemistry and drug discovery. Detailed discussion of receptor theories and quantitative structure activity relationships will be discussed. Advanced topics in the metabolism of xenobiotics and related organic compounds are studied in details.
- 7091023    Advanced Pharmaceutical Microbiology**  
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.
- 7091024    Research Project in Pharmaceutical Sciences**  
Student will perform independent research for six credit hours, focusing on a research topic that is selected in consultation with their faculty supervisor. The project will be eventually examined and evaluated by a specialized committee set up for this purpose.
- 7091025    Advanced Pharmaceutical Technology**  
This course covers the fundamental concepts of dosage forms, updating theories and technology used to formulate and evaluate dosage forms, the impact of different parameters on the manufacturing and bioavailability of finished products. Control of cross contamination during processing of dosage forms, industrial scale production and problems associated with its production, and advanced techniques adopted in the evaluation of pharmaceutical dosage forms will be included.
- 7091026    Pharmaceutical Quality Assurance & Validation**  
This course deals with the quality assurance programs applied in pharmaceutical practice and validation of these programs. Control programs for raw materials, in-process and finished products are discussed. Sampling and sampling programs, record handling and documentation are also included.
- 7091027    Advanced Phytotherapy**  
This course insight into dosage forms 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.

**7091028**

**Advanced Natural Products Chemistry**

This course covers the chemistry of new natural products; research methods and their application in pharmaceutical technology. Emphasis on the occurrence of various natural products with biological activity and topics like microbiological conversion of chemical compounds, fungus, algae and microorganism secondary metabolites, marine natural compounds will be discussed. This course also includes a practical part in which the student will face all the practical aspects deal with the activity guided isolation and fractionation ,different methods of extraction, purification and structure elucidation of compounds in their pure forms.