



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Kakinada-533003, Andhra Pradesh, India

M.Pharm in Pharmaceutics

Local needs:

A pharmacy provides medications and other healthcare products and services and helps people and society make the best use of them. Ensuring that patients receive the correct dosage of medication and that the dosage is regulated according to the patient's clinical response to the prescribed drug. Notifying doctors if a patient has an adverse effect to a drug and suggest an alternative treatment. Pharmacists play a major role in providing healthcare services by means of community pharmacy services in rural areas where physicians are not available or where physician services are too costly for meeting the healthcare necessities.

Regional needs:

The curriculum has been enriched with supportive topics, additional courses such as Computer applications in pharmacy, Communication skills, Pharmacovigilance, etc., The courses leading to more employability, skill development are continuously strengthened by updating the syllabi in accordance to the needs of the industry. Social and preventive pharmacy, environmental sciences, Pathophysiology, Pharmacovigilance, courses of pharmacy programmes meet the local and regional needs and demands of the public.

National and global developmental needs:

Drug regulatory affairs, modern pharmaceutical analytical techniques, modern pharmaceuticals, computer aided drug delivery system, molecular pharmaceuticals, pharmaceutical validation, etc., herbal drug technology, quality assurance, biostatistics and research methodology meets the national and global developmental needs and are reflected in Cos, Pos and PSOs of the B.Pharmacy/M.Pharmacy programmes. Employability is ensured through courses like herbal drug technology, Instrumental methods of analysis, skill development courses, Certificate courses, clinical research, clerkship, projects, internship, clinical pharmacokinetics and pharmacotherapeutics drug monitoring, biostatistics, industrial pharmacy, novel drug delivery systems.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: Able to apply the knowledge gained during the course of the program from pharmacology, pharmaceutics, medicinal chemistry and pharmaceutical analysis

PSO 2: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PSO 3: Able to do multidisciplinary jobs in the pharmaceutical industries in various branches and would be able to write effective project reports in multidisciplinary environment in the context of changing technologies.

PSO4: Able to communicate easily and comfortably. Would be able to perform multitasks in multi fields including pharmaceutical & cosmetics. Research area would be strong.



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PROGRAM OUTCOMES:

At the end of the program the student will be able to:

- PO1:Pharmaceutical Knowledge:-** Students gain a deep knowledge regarding human body, its related diseases, analytical skills, drug molecules (Active Pharmaceutical Ingredients) along with excipients, natural drug resources, chemistry involved in API including synthesis of commonly used drugs, effect of drug on human body, toxicity and impurity profile, ADME studies of drugs (behavior of drug in human body), dosage form studies including novel approaches, designing and development of formulation stability studies, analysis etc
- PO2:Research Analysis:** Students could apply the knowledge in research field to make new discoveries.
- PO3:Design & Development of Dosage Forms:** Various dosage forms could be prepared by the a pharmacy students in the pharmaceutical companies for the ease of patients.
- PO4:Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
- PO5: Modern Methods Usage:** Create, select, and apply appropriate techniques, resources, and modern methods with an understanding of the limitations and its usage. The student also learns to handle many instruments related to their studies which would help them work in a Pharmaceutical Industry, pharmacovigilance, regulatory requirements, legal processes etc.
- PO6:Pharmacy and Society:** Pharmacist provides complete healthcare data and practices to the people of the society and guides them to be healthy. The student also learns drug distribution system, patient counseling, industrial laws etc. Student gains expertise in storage and distribution of drugs with all precautions and in-depth knowledge of dose, adverse effect and other health related issues to deal with indoor and outdoor patients admitted in hospitals and also in public.
- PO7:Environment and Sustainability:** Understand the impact of the professional pharmacist in society and environment, and make an impact of it on the people of the society.
- PO8:Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the pharmacy practice. Student is also trained in ethical behavior with physician, nurses and other paramedical staff for protecting patient's health.
- PO9:Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams acts as a multidisciplinary person in every context.
- PO10 : Communication:** Communicate effectively on pharmaceutical activities with the community and with society.
- PO11:Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- PO12:Social Interaction:** Being a public welfare job a pharmacist would be able to interact with the people in a better way to cure them and make them feel healthy

COURSE OUTCOMES

Course Code	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
MPH101T	

After completion of course, students would be able to:

- CO1 Chemicals and Excipients
CO2 The analysis of various drugs in single and combination dosage forms
CO3 Theoretical and practical skills of the instruments



M.Pharm in Pharmaceutics

Course Code	Drug Delivery System
MPH102T	

After completion of course, students would be able to:

- CO1 The various approaches for development of novel drug delivery systems
- CO2 The criteria for selection of drugs and polymers for the development of delivering system.
- CO3 The formulation and evaluation of Novel drug delivery systems

Course Code	Modern Pharmaceutics
MPH103T	

After completion of course, students would be able to:

- CO1 The elements of preformulation studies.
- CO2 The Active Pharmaceutical Ingredients and Generic drug Product development
- CO3 Industrial Management and GMP Considerations.
- CO4 Optimization Techniques & Pilot Plant Scale Up Techniques
- CO5 Stability Testing, sterilization process & packaging of dosage forms

Course Code	Regulatory Affair
MPH104T	

After completion of course, students would be able to:

- CO1 The Concepts of innovator and generic drugs, drug development process
- CO2 The Regulatory guidance's and guidelines for filing and approval process
- CO3 Preparation of Dossiers and their submission to regulatory agencies in different countries
- CO4 Postapproval regulatory requirements for actives and drug products
- CO5 Submission of global documents in CTD/eCTD formats
- CO6 Clinical trials requirements for approvals for conducting clinical trials
- CO7 Pharmacovigilance and process of monitoring in clinical trials

Course Code	Pharmaceutics Practical I
MPH105PA	

After completion of course, students would be able to:

- CO1 Analysis and estimation of pharmacoepial compounds and their formulations by using uv visible spectrophotometer
- CO2 Experiments based on HPLC and Gas chromatography can be performed
- CO3 Estimation of several components like sodium ,potassium, Riboflavin and quinine sulfate can be studied by using flame photometry and fluorimetry
- CO4 Several Preformulation studies of tablets can be studied
- CO5 Micromeritic properties of powders and granules can be studied

Course Code	Pharmaceutical Practical II
MPH105PB	

After completion of course, students would be able to:

- CO1 Study of effect of particle size and binders on dissolution of a tablet
- CO2 To plot heckal plot, higuiche and peppas plot and also dermine similarity factors
- CO3 Invitro drug profiling of CR/SR of marketed formulations can be performed
- CO4 Formulation and evaluation of sustain release matrix tablets, osmotically controlled DD, floating DDS mucoadhesive tablets and transdermal patches



M.Pharm in Pharmaceutics

Course Code	Molecular Pharmaceutics (Nano Technology and Targeted DDS) (NTDS)
MPH201T	

After completion of course, students would be able to:

- CO1 The various approaches for development of novel drug delivery systems.
- CO2 The criteria for selection of drugs and polymers for the development of NTDS
- CO3 The formulation and evaluation of novel drug delivery systems

Course Code	Advanced Biopharmaceutics & Pharmacokinetics
MPH202T	

After completion of course, students would be able to:

- CO1 The basic concepts in Biopharmaceutics and pharmacokinetics.
- CO2 The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
- CO3 The critical evaluation of biopharmaceutic studies involving drug product equivalency.
- CO4 The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
- CO5 The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

Course Code	Computer Aided Drug Development
MPH203T	

After completion of course, students would be able to:

- CO1 History of Computers in Pharmaceutical Research and Development Computational Modeling of Drug Disposition
- CO2 Computers in Preclinical Development
- CO3 Optimization Techniques in Pharmaceutical Formulation Computers in Market Analysis
- CO4 Computers in Clinical Development Artificial Intelligence (AI) and Robotics Computational fluid dynamics (CFD)

Course Code	Formulation Development of Pharmaceutical and Cosmetic Products
MPH204T	

COURSE OUTCOMES

After completion of course, students would be able to:

- CO1 The scheduled activities in a Pharmaceutical firm.
- CO2 The pre formulation studies of pilot batches of pharmaceutical industry. The significance of dissolution and product stability

Course Code	Pharmaceutics Practical III
MPH205PA	

After completion of course, students would be able to:

- CO1 To study effect of different factors like temperature change non solvent addition, incompatible polymer addition in microcapsule preparation
- CO2 Formulation and evaluation of gelatin, liposomes and Spherules
- CO3 Comparative studies of dissolution and two different marketed products
- CO4 Invitro cell studies for permeability and metabolism
- CO5 Pharmacokinetic and IVIVC data analysis by using Winnoline software



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Course Code	Pharmaceutics Practical IV
MPH205PB	

After completion of course, students would be able to:

- CO1 Designing of experiments and formulation data analysis by using Design Expert Software
- CO2 Study of Pharmacokinetic and pharmacodynamics by computer simulations
- CO3 Development and evaluation of shampoo, creams and tooth paste bases.
- CO4 Study of use of optimization techniques in formulation and development of tablets.

Course Code	Research Methodology and Biostatistics
MRM301T	

After completion of course, students would be able to:

- CO1 Recognize the value, scope, objective and requirements of research
- CO2 Discuss the basic concept and importance of statistical analysis
- CO3 Discuss the basic principles of medical research
- CO4 Describe the guidelines for the maintenance of laboratory animals
- CO5 Perform the profession of Pharmacy with code of conduct and ethics
- CO6 Apply the principles of medical research for the development of knowledge in the field of medicine

Course Code	Journal club

After completion of course, students would be able to:

- CO1 Student shall able to publish research publications
- CO2 Usage of various domains for research publications
- CO3 Knowledge about writing of research publications

Course Code	Discussion / Presentation(Proposal Presentation)

After completion of course, students would be able to:

- CO1 Identify the research problem
- CO2 Discuss research problem with team and peers for solution
- CO3 Develop a protocol report on the critically appraised research problem
- CO4 Present the critically appraised research problem in appropriate forum

Course Code	Research Work

After completion of course, students would be able to:

- CO1 Work in a team and undertake a project in the area of Pharmaceutical Sciences
- CO2 Apply concepts of pharmaceutical sciences for executing the project
- CO3 Apply appropriate research methodology while formulating a project
- CO4 Generate specifications, synthesize, analyse, develop and evaluate a project
- CO5 Defend the project, exhibit, make a presentation and document the work



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Course Code	Discussion/Final Presentation
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After completion of course, students would be able to:

- CO1 Identify the research problem
- CO2 Discuss research problem with team and peers for solution
- CO3 Develop a protocol report on the critically appraised research problem
- CO4 Present the critically appraised research problem in appropriate forum