



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

M.Pharm in Pharmaceutical Analysis

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

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.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: Able to apply the knowledge gained during the course of the program from pharmacology, pharmaceuticals, 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.

PROGRAM OUTCOMES

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.



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

M.Pharm in Pharmaceutical Analysis

- 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 health care 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 team work:** 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 Analysis
MPL101T	

After completion of course, students would be able to:

- C01 The analysis of various drugs in single and combination dosage forms Theoretical and
- C02 Practical skills of the instruments



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

M.Pharm in Pharmaceutical Analysis

Course Code	Advanced Pharmaceutical Analysis
MPL102T	

After completion of course, students would be able to:

- CO1 Appropriate analytical skills required for the analytical method development.
- CO 2 Principles of various reagents used in functional group analysis that renders necessary support in research methodology and demonstrates its application in the practical related problems.
- CO 3 Analysis of impurities in drugs, residual solvents and stability studies of drugs and biological products

Course Code	Pharmaceutical Validation
MPL103T	

After completion of course, students would be able to:

- CO1 Explain the aspect of validation
- CO2 Carry out validation of manufacturing processes
- CO3 Apply the knowledge of validation to instruments and equipments Validate the manufacturing facilities

Course Code	Food Analysis
MPL104T	

After completion of course, students would be able to:

- CO1. Food constituents
- CO 2. Food additives
- CO 3. Finished food products
- CO 4. Pesticides in food
- CO 5. And also student shall have the knowledge on food regulations and legislations

Course Code	Pharmaceutical Analysis Practical I
MPL105PA	

After completion of course, students would be able to:

- CO1 Calibration of several instruments like PH meter, UV visible, FTIR, GC, HPLC instruments can be studied.
- CO2 Impurity profiling of drugs can be performed
- CO3 Assay of different pharmacopeial or official compounds can be performed by different titrations and instrumental techniques
- CO4 Quantitative determination of hydroxyl groups and amino groups can be performed
- CO5 Estimation of several components like sodium, potassium, Riboflavin and quinine sulfate can be studied by using flame photometry and fluorimetry

Course Code	Pharmaceutical Analysis Practical II
MPL105PB	

After completion of course, students would be able to:

- CO1 Analysis of pharmacopeial compounds and their formulations can be performed by using UV Visible Spectrophotometer
- CO2 Estimation of components containing formulations can be studied
- CO3 Experiments based on HPLC and Gas chromatography can be performed
- CO4 Determination of saponification value, iodine value, peroxide value, acid value in food products
- CO5 Determination of preservatives and pesticide residues in food products can be determined



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

M.Pharm in Pharmaceutical Analysis

Course Code	Advanced Instrumental Analysis
MPL201T	

After completion of course, students would be able to:

- C01 Interpretation of the NMR, Mass and IR spectra of various organic compounds
- C02 Theoretical and practical skills of the hyphenated instruments
- C02 Identification of organic compounds

Course Code	Modern Bio-Analytical Techniques
MPL202T	

Upon completion of the course, the student shall be able to understand

- C01 Extraction of drugs from biological samples
- C02 Separation of drugs from biological samples using different techniques
- C03 Guidelines for BA/BE studies

Course Code	Quality Control and Quality Assurance
MPL203T	

At the completion of this subject it is expected that the student shall be able to know

- C01 The cGMP aspects in a pharmaceutical industry
- C02 To appreciate the importance of documentation
- C03 To understand the scope of quality certifications applicable to Pharmaceutical industries
- C04 To understand the responsibilities of QA & QC departments

Course Code	Herbal and Cosmetic Analysis
MPL204T	

At completion of this course student shall be able to understand

- C01. Determination of herbal remedies and regulations
- C02. Analysis of natural products and monographs
- C03. Determination of Herbal drug-drug interaction
- C04. Principles of performance evaluation of cosmetic products

Course Code	Pharmaceutical Analysis Practical III
MPL205PA	

After completion of course, students would be able to:

- C01 Comparative studies of absorption spectra by UV and Wood word fiesure rule can be studied
- C02 Interpretation of organic compounds by techniques like FTIR,NMR and MS can be studied
- C03 Protocol preparation for the conduct of BA/BE studies according to the guidelines can be studied
- C04 Biomolecules separation utilizing various sample preparation techniques and quantitative analysis of components by gel electrophoresis and HPLC techniques can be performed

Course Code	Pharmaceutical Analysis Practical IV
MPL205PB	

After completion of course, students would be able to:

- C01 Quality control tests for tablets, capsules, parenterals and creams in both in process and finished products can be performed
- C02 Quality control test for several packaging materials can be studied
- C03 Preparation of master formula record and batch manufacturing record can be studied
- C04 Assay of Raw materials according to official monographs can be performed



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

M.Pharm in Pharmaceutical Analysis

Course Code	Research Methodology and Biostatistics
MRM301T	

After completion of course, students would be able to:

- C01 Recognize the value, scope, objective and requirements of research
- C02 Discuss the basic concept and importance of statistical analysis
- C03 Discuss the basic principles of medical research
- C04 Describe the guidelines for the maintenance of laboratory animals
- C05 Perform the profession of Pharmacy with code of conduct and ethics
- C06 Apply the principles of medical research for the development of knowledge in the field of medicine

Course Code	Journal club

Upon completion of the course the student shall be able to

- C01 Student shall able to publish research publications.
- C02 Usage of various domains for research publications
- C03 Knowledge about writing of research publications

Course Code	Discussion / Presentation(Proposal Presentation)

After completion of course student is able to know

- C01 Identify the research problem
- C02 Discuss research problem with team and peers for solution
- C03 Develop a protocol report on the critically appraised research problem
- C04 Present the critically appraised research problem in appropriate forum

Course Code	Research Work

After completion of course student is able to know

- C01 Work in a team and undertake a project in the area of Pharmaceutical Sciences
- C02 Apply concepts of pharmaceutical sciences for executing the project
- C03 Apply appropriate research methodology while formulating a project
- C04 Generate specifications, synthesize, analyse, develop and evaluate a project
- C05 Defend the project, exhibit, make a presentation and document the work

Course Code	Discussion/Final Presentation

After completion of course student is able to know

- C01 Identify the research problem
- C02 Discuss research problem with team and peers for solution
- C03 Develop a protocol report on the critically appraised research problem
- C04 Present the critically appraised research problem in appropriate forum