PROGRAM: MASTER OF PHARMACY

Specialisation: Pharmaceutics

VIJAYA INSTITUTE OF PHARMACEUTICAL SCIENCES FOR WOMEN
SRK FOUNDATION VIJAYAWADA
Permitted by Govt. of A.P; Approved by AICTE, New Delhi
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Program: M. Pharmacy

Duration: 2 years

Program Specific Outcomes (PSO):

Course: Pharmaceutics:

1. Impart knowledge on the novel drug delivery systems, approaches, criteria for selection of polymers and drugs and their formulation and evaluation.
2. To know various preformulating elements, industrial management and GMP considerations, Pilot Plant Scale Up Techniques, Stability testing, sterilization and packaging of dosage forms.
3. To impart knowledge and skills in generic drug development, various regulatory filings the approval process, and concept of generics across the globe.
4. To impart knowledge and skills for dose calculations, dose adjustments and apply biopharmaceutics theories in practical problem solving. The pharmacokinetic models, bioequivalence and potential clinical pharmacokinetic problem analysis
5. Skill development in Pharmaceutical research, Pharmacoinformatic, in drug development in Computational modeling, Preclinical development, clinical development, Artificial Intelligence and Robotics, and Computational fluid dynamics
6. To impart knowledge and skills necessary for cosmetics and cosmeceuticals, their safety and efficacy and current technologies in cosmetic industry
7. To gain knowledge in use of advanced instrumentation, formulation and evaluation of controlled release formulations, floating drug delivery systems, transdermal drug delivery systems, micromeritics, and mathematical simulations
8. To train the students and develop their technical skill knowledge in computer simulations, population modelings, in vitro and in vivo studies
9. To create a talent pool by involving students in research projects and to make students undertake research projects under faculty guidance for publication
10. To foster ambitious desire among students to undertake higher studies and career growth

Course: Pharmaceutical Analysis

1. Able to perform qualitative and quantitative analysis of drugs in different matrices by various spectroscopic, electro-analytical and chromatographic techniques

2. Able to perform stability studies, impurity profiling and metabolite profiling of drugs by hyphenated analytical techniques

3. Thorough knowledge about quality control, quality assurance of pharmaceuticals and regulatory guidelines

Course: Pharmacology

1. Ability to understand, establish the core mechanisms of action of drugs

2. Strengthen the basis, knowledge, criteria for selection of appropriate drug in different disease conditions based on their uses, side effects, etc.

3. Ability to estimate the kinetic profile of a drug in a patient body i.e., Pharmaco-therapeutic drug monitoring

4. Ability to carry out in vivo & in vitro experiments and provides strong base for planning of future research in drug discovery and clinical trails

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COURSE OBJECTIVES & OUTCOMES

SPECIALISATION: PHARMACEUTICS (MPH)

SEMESTER -I

MPH101T. MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)

OBJECTIVE: This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the UV-Visible spectroscopy, IR, flame and atomic absorption spectroscopy.
2. Know principles of NMR spectroscopy, instrumentation and applications.
3. Understand the principles of mass spectroscopy, different ionization techniques and applications of mass spectroscopy.
4. Understand the different chromatographic techniques like paper, ion exchange, gas, HPLC, etc
5. Know the principles and procedures of paper and capillary electrophoresis; XRD and its applications.
6. Understand the principles and procedures of immunoassays like radioimmunoassay, ELISA and bioluminescent assays.

MPH102T. DRUG DELIVERY SYSTEMS (Theory)

OBJECTIVE: This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand drug delivery system give a detailed information transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect.
2. Understand approaches, formulations, technologies, and systems for transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect with suitable drug delivery.
3. Know methods of manufacture and evaluation of various Sustained Release (SR) and Controlled Release (CR) formulations like Gastroprotective, Baccal, Transdermal and Occular drug delivery systems.
4. Understand recent developments in protein and peptide for parenteral delivery approaches will give new dimension of drug deliver for antibiotics, insulin, etc.

5. Understand vaccine delivery and different mode of application approach for clinical use. They know the different types of Drug carrier used in the process of drug delivery which serves to improve the selectivity, effectiveness, and/or safety of drug administration.
6. Know the latest drug delivery knowledge and think to develop new formulation based on the individual requirement.

MPH103T. MODERN PHARMACEUTICS (Theory)

OBJECTIVE: Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the science behind performing a Preformulation study before formulating a novel drug delivery system.
2. Understand the current good manufacturing practices that are implemented in various pharmaceutical industries.
3. Understand various validation protocols that are been followed in the pharmaceutical industries as per various regulatory guidelines.
4. Understand various optimization techniques that are used in prior to formulate any new dosage form.
5. Understand how to run the optimization softwares (For ex: Design expert and Minitab).
6. Understand about the science between compaction and compression of a tablet.
7. Understand about various dissolution parameters that have to be incorporated while performing dissolution studies.

MPH104T. REGULATORY AFFAIRS (Theory)

OBJECTIVE:

1. To understand the drug development process.
2. To know the filing process of IND, NDA and ANDA.
3. To understand the concept of regulations regarding clinical trials.
4. To know the chemistry, manufacturing controls and their importance.

OUTCOMES:

Upon completion of the course student will be able to

1. Identify the concepts of innovator and generic drugs and drug development process.
2. Describe the regulatory guidance and guidelines for filing and approval process.
3. Detail the preparation of dossiers and their submission to regulatory agencies in different countries.
4. Identify the post approval regulatory requirements for actives and drug products.
5. Express the submission of global documents in CTD/eCTD formats.
6. Define the clinical trials for approvals for conducting clinical trials.
7. Describe the Pharmaco Vigilence and process of monitoring in clinical trials.

MPH105PA. PHARMACEUTICS PRACTICAL – I (Practical)

Upon completion of the course student will be able to

1. Know Variability and Operation of commonly used analytical instruments like UV Vis spectrophotometer, HPLC, Gas Chromatography, Fluorimetry and Flame photometry.
2. Perform Analysis of various drugs and their formulation in single and combination dosage forms.
3. Have knowledge as well as hands on training with respect to the principles of formulation science such as Preformulation studies and Micromeritics.
4. Possess the knowledge about effect of compressional force on tablets Properties.

MPH105PB. PHARMACEUTICS PRACTICAL – II (Practical)

Upon completion of the course student will be able to

1. Get knowledge with respect to composition of dosage forms, selection of drugs and polymers for the development of delivering system
2. Formulate and evaluation of various customized, Sustained Release (SR) and Controlled Release (CR) formulations.
3. Formulate and evaluate various novel drug delivery systems: Floating DDS, Muco adhesive tablets and Trans dermal patches

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SEMESTER -II

MPH201T. MOLECULAR PHARMACEUTICS (Nano Tech and Targeted DDS) (Theory)

OBJECTIVE: This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the various approaches for development of novel drug delivery systems like Tumor targeting and Brain specific delivery.
2. Understand the criteria for selection of drugs and polymers for the development of NTDS
3. Know the need, concept, design and evaluation of various targeted drug delivery systems like Nano Particles, Liposomes, Niosomes, Aquasomes, Phytosomes, Electrosomes and Monoclonal Antibodies.
4. Understand gene therapy and different mode of application approach for clinical use.
5. Understand the formulation and evaluation of Aerosols and Intra Nasal Route Delivery systems.

MPH202T. ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS (Theory)

OBJECTIVE: This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics
2. Understand the use of raw data and derive the pharmacokinetic models and parameters that best describe the process of drug absorption, distribution, metabolism and elimination. Describe various pharmacokinetic parameters by using various mathematical models.
3. Know the critical evaluation of biopharmaceutic studies involving drug product equivalency
4. Understand the design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters
5. The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic
6. Understand the basic concepts of BA/BE studies and in-vitro -in-vivo correlations (IVIVC)

MPH203T. COMPUTER AIDED DRUG DELIVERY SYSTEM (Theory)

OBJECTIVE: This course is designed to impart knowledge and skills necessary for computer Applications in pharmaceutical research and development who want to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the

principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.

OUTCOMES:

Upon completion of the course student will be able to

1. Explain about the role of computers in pharmaceutical research, various modelling approaches and parameters used in modelling.
2. Understand about basics and guidelines of Quality by Design (QbD)
3. Understand about computation modelling techniques of ADME process for a drug
4. Understand about the concept of optimization and they can design a formulation of emulsion and microemulsion using software's like design expert.
5. Understand about legal aspects involved in using computers in pharmaceutical research
6. Understand about using of computer aided designs in in-vitro dissolution studies.
7. Understand about usage of computers in stimulating whole organisms and tissues.
8. Understand the regulations involved in clinical data collection and management.
9. Understand about current status of pharmaceutical automation and its future trends

MPH204T. FORMULATION DEVELOPMENT OF PHARMACEUTICAL AND COSMETIC PRODUCTS (Theory)

OBJECTIVE: This course is designed to impart knowledge and skills necessary to train the students on par with the routine of Industrial activities in R&D and F&D.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the science behind performing a Preformulation study before formulating a novel drug delivery system.
2. Learn about various pre-formulation parameters that have to be studied before formulating a novel drug delivery system.
3. Learn about basics and recent developments in excipient science.
4. Learn about the importance of solubility for a drug and methods to enhance the solubility.
5. Learn about basics of drug dissolution and various parameters involved in in vitro drug dissolution studies.
6. Know about the standard stability testing procedures for formulated dosage forms using ICH guidelines.
7. Understand about basics and legal aspects of cosmeticology and various formulations like dentifrices, lipsticks, nail polish and baby products etc.

MPH205PA. PHARMACEUTICS PRACTICAL III (Practical)

Upon completion of the course student will be able to

1. Know the effect of temperature, nonsolvent, incompatible polymer addition on preparation of microcapsules.
2. Design and perform in-vitro evaluation studies for various novel drug delivery systems: Alginate beads, gelatin /albumin microspheres, liposomes / niosomes and spherules.
3. Perform in-vitro dissolution of marketed products and interpretation of dissolution data.

4. Calculate the various pharmacokinetic parameters of drugs and pharmaceutical products in animal models / Software.

MPH205PB. PHARMACEUTICS PRACTICAL IV (Practical)

Upon completion of the course student will be able to

1. Learn how to use the Design Expert Software in the formulation design and data analysis.
2. Calculate the various pharmacokinetic and pharmacodynamics parameters using Computer Simulations / Computational Modelling.
3. Formulate and evaluate various cosmetic products and Multi Vitamin Syrup.
4. Know the optimization techniques in Formulation Development of Tablets.

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SEMESTER -III

MRM301T. Research Methodology and Biostatistics (Theory)

Upon completion of the course student will be able to

1. Identify the concepts of medical research and values in medical ethics.
2. Define the CPCSEA guidelines for laboratory animal facility.
3. Describe the declaration of Helsinki and basic principles for medical research.
4. Understand Basic statistical methods which are used in collecting data study and analyse. Observe Errors relating experimentation
5. Perceive relation between components also measure and study linearly. We can observe one component influence with multiple factors.
6. Know testing of the hypothesis and understand how far population parameter significant based on estimator with the help of parametric tests. Non parametric tests can also observed.
7. Define analysis of variance helps in study total variation
8. Know application of Analysis in field or lab experimental to design and factorial experiments.
9. Apply the knowledge in research objects about reliability and validity experimental study

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SEMESTER -IV

Journal club

Upon completion of the course student will be able to

1. Critically appraise the research article of their specialization published in reputed journals. Students are trained for inquiry based learning and critical thinking skills.
2. Access journals by adopting search engines and made to collect relevant data, analyse and comment on the findings with the submission of the document evidence and present on the same for assessment

MRW 403. Project Work

Upon completion of the course student will be able to

1. Generate the topic for the project and Collect the information from the relevant sources
2. Assemble the information into a more realistic draft ethically and conclude the contents.
3. Students prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

Discussion / Final Presentation

Upon completion of the course student will be able to

1. Prepare the presentation based on the results obtained in the research work
2. Explain outcome of their project along with further scope for research. This develops their oratory and leadership skills

Program: MASTER OF PHARMACY

Specialisation: **Pharmaceutical Analysis**

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COURSE: PHARMACEUTICAL ANALYSIS (MPA)

SEMESTER -I

MPA101T. MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Theory)

OBJECTIVE: This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the UV-Visible spectroscopy, IR, flame and atomic absorption spectroscopy.
2. Know principles of NMR spectroscopy, instrumentation and applications.
3. Understand the principles of mass spectroscopy, different ionization techniques and applications of mass spectroscopy.
4. Understand the different chromatographic techniques like paper, ion exchange, gas, HPLC, etc
5. Know the principles and procedures of paper and capillary electrophoresis; XRD and its applications.
6. Understand the principles and procedures of potentiometry and thermal analytical techniques like DSC and TGA.

MPA102T. ADVANCED PHARMACEUTICAL ANALYSIS (Theory)

OBJECTIVE: This subject deals with the various aspects of Impurity, Impurities in new drug products, in residual solvents, Elemental impurities, Impurity profiling and characterization of degradants, Stability testing of phytopharmaceuticals and their protocol preparation. It also covers the biological testing of various vaccines and their principle and procedure.

OUTCOMES:

Upon completion of the course student will be able to

1. Know about impurities classification, residual solvents classification and limits.
2. Understand the classification of elemental impurities, factors affecting stability and stability commitment
3. Understand accelerated stability studies, stability zones, photostability testing and stability of biological products.
4. Understand the regulatory requirements and HPTLC fingerprinting.
5. Know bioassays of vaccines and PCR instrumentation
6. Understand the principles and procedures of different immunoassays.

MPA103T. PHARMACEUTICAL VALIDATION (Theory)

OBJECTIVE: The main purpose of the subject is to understand about validation and how it can be applied to industry and thus to improve the quality of the products. The subject covers the complete information about validation, types, methodology and application.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand introduction of Qualification and Validation involving Validation Master Plan, DQ, IQ, OQ, PQ, RQ, FAT, SAT.
2. Know qualification of analytical instruments and glassware
3. Know Advanced Validation of Utility Systems (Water, HVAC, Compressed air and Nitrogen) and Cleaning Validation.
4. Know Analytical Method Validation according to USP and ICH guidelines.
5. Understand Rigorous detailing of General principles of Intellectual Property.

MPA104T. FOOD ANALYSIS (Theory)

OBJECTIVE: This course is designed to impart knowledge on analysis of food constituents and finished food products. The course includes application of instrumental analysis in the determination of pesticides in variety of food products.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the flavour studies and to detect spoilage of food.
2. Understand the advanced analytical methods for estimation of concentration of carbohydrates, vitamins, fats, amino acids, proteins in food.
3. Understand the process of determining nutritional quality
4. Know very well about Chromatography techniques like GC-MS, LC- MS, Electrophoresis, HPLC, HPTLC, SFC, HPCPC, RIA, ELISA in analysis of food adulterants.
5. Understand how to select a suitable analytical method for qualitative and quantitative analysis of a pesticide residues in food substance.
6. Know about the use of BIS MARK, AGMARK on food substances.

MPA105PA. PHARMACEUTICAL ANALYSIS PRACTICAL - I (Practical)

Upon completion of the course student will be able to

1. Calibration of glassware and pH meter
2. Calibration of UV-Visible spectrophotometer and FTIR spectrophotometer
3. Calibration of GC and HPLC
4. Cleaning validation of any one equipment and Impurity profiling of drugs
5. Assay of official compounds by different titrations and instrumental techniques
6. Estimation of riboflavin/quinine sulphate by fluorimetry; Estimation of sodium/potassium by flame photometry
7. Quantitative determination of hydroxyl group and amino group, and Colorimetric determination of drugs by using different reagents

MPA105PB. PHARMACEUTICAL ANALYSIS PRACTICAL - II (Practical)

Upon completion of the course student will be able to

1. Learn about the determination of total reducing sugar, proteins, vitamins content in foods
2. Determine the saponification value, Iodine value, Peroxide value, Acid value of food products.
3. Understand the selection of analytical methods for analysis of synthetic colors in food products
4. Know very well about determination of concentration of preservatives and pesticides residue in food products
5. Understand the selection of various analytical methods for determining food additives
6. Determine density and specific gravity of food substances.

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SEMESTER -II

MPA201T. ADVANCED INSTRUMENTAL ANALYSIS (Theory)

OBJECTIVE: The subject is designed to impart basic knowledge about chromatographic and spectroscopic techniques like HPLC, affinity chromatography, SFC and CE; NMR and mass spectroscopic techniques. Develop student's ability to interpret the spectra's.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the basic principles of HPLC and applications of HPLC.
2. Understand the chromatographic techniques like size exclusion, ion exchange, ion pair, affinity, gas and HPTLC.
3. Know basic concepts about SFC, CE and CE-MS hyphenation.
4. Understand the principles of mass spectroscopy, different ionization techniques, mass analysers and MS/MS systems.
5. Understand the NMR spectroscopy, 2D NMR techniques and LC-NMR hyphenation

MPA202T. MODERN BIO-ANALYTICAL TECHNIQUES (Theory)

OBJECTIVE: The course will impart basic knowledge about extraction of drugs and metabolites from biological matrices, biopharmaceutical factors affecting drug bioavailability, toxicokinetic and PK-PD interactions. It also provides knowledge about cell culture techniques and metabolite profiling studies by using liver microsomes.

OUTCOMES:

Upon completion of the course student will be able to

1. Perform extraction of drugs and metabolites from biological samples and validation of bio-analytical methods
2. Know factors affecting bioavailability, transport models and permeability methods.
3. Understand drug interactions, microsomal assays and toxicokinetic; and applications of LC-MS in bioactivity screening and proteomics.
4. Know cell culture techniques, cell viability assays and flow cytometry.
5. Explain Metabolite identification by microsomal approaches and drug product performance

MPA203T. QUALITY CONTROL AND QUALITY ASSURANCE (Theory)

OBJECTIVE: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It covers the important aspects like cGMP, QC tests, documentation, quality certifications, GLP and regulatory affairs.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand concepts of QC/QA, GLP, ICH Guidelines Q-Series. Purchase specifications, selection of vendors and maintenance of stores
2. Know cGMP guidelines in accordance to USFDA including CDER, CBER, PIC, WHO, EMEA for industrial management and CPCSEA guidelines.
3. Understand detailed analysis of raw materials, IPQC, finished products and developing specifications according to ICH Q6 and Q3.
4. Know characteristic documentation in pharmaceutical industry
5. Understand clear perspective of manufacturing operations and controls.

MPA204T. HERBAL AND COSMETIC ANALYSIS (Theory)

OBJECTIVE: This course is designed to impart knowledge on analysis of herbal products. Regulatory requirements, herbal drug interaction with monographs. Performance evaluation of cosmetic products is included for the better understanding of the equipments used in cosmetic industries forth purpose.

OUTCOMES:

Upon completion of the course student will be able to

1. Learn about the Quality control of crude drugs
2. Understand the advanced analytical methods for estimation of adulterants and deterioration of herbal drugs
3. Understand the process of detection of herbal drugs and monographs of herbal dugs
4. Know very well about herbal drug- drug interactions
5. Know about the evaluation of cosmetic products

MPA205PA. PHARMACEUTICAL ANALYSIS PRACTICAL III (Practical)

Upon completion of the course student will be able to

1. Know comparison of absorption spectra by UV and Wood ward – Fiesure rule and Interpretation of organic compounds by FT-IR
2. Know Interpretation of organic compounds by NMR and MS
3. Understand determination of purity by DSC in pharmaceuticals and Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra
4. Perform bio molecules separation utilizing various sample preparation techniques and quantitative analysis of components by gel electrophoresis and HPLC techniques.
5. Perform Isolation of analgesics from biological fluids (Blood serum and urine).
6. Know protocol preparation and performance of analytical / bioanalytical method validation, and protocol preparation for the conduct of BA/BE studies according to guidelines.

MPA205PB. PHARMACEUTICAL ANALYSIS PRACTICAL IV (Practical)

Upon completion of the course student will be able to

1. Perform in process and finished product quality control tests for tablets, capsules, parenterals and creams.
2. Perform quality control tests for primary and secondary packing materials, and assay of raw materials
3. Know testing of related and foreign substances in drugs and raw materials, and preparation of Master Formula Record and Batch Manufacturing Record
4. Perform quantitative analysis of rancidity in lipsticks and hair oil, and determination of aryl amine content and Developer in hair dye
5. Know determination of foam height and SLS content of Shampoo, and determination of total fatty matter in creams
6. Know determination of acid value and saponification value, and determination of calcium thioglycolate in depilatories

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SEMESTER -III

MRM301T. Research Methodology and Biostatistics (Theory)

Upon completion of the course student will be able to

1. Identify the concepts of medical research and values in medical ethics.
2. Define the CPCSEA guidelines for laboratory animal facility.
3. Describe the declaration of Helsinki and basic principles for medical research.
4. Understand Basic statistical methods which are used in collecting data study and analyse. Observe Errors relating experimentation
5. Perceive relation between components also measure and study linearly. We can observe one component influence with multiple factors.
6. Know testing of the hypothesis and understand how far population parameter significant based on estimator with the help of parametric tests. Non parametric tests can also observed.
7. Define analysis of variance helps in study total variation
8. Know application of Analysis in field or lab experimental to design and factorial experiments.
9. Apply the knowledge in research objects about reliability and validity experimental study

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SEMESTER -IV

Journal club

Upon completion of the course student will be able to

3. Critically appraise the research article of their specialization published in reputed journals. Students are trained for inquiry based learning and critical thinking skills.
4. Access journals by adopting search engines and made to collect relevant data, analyse and comment on the findings with the submission of the document evidence and present on the same for assessment

MRW 403. Project Work

Upon completion of the course student will be able to

4. Generate the topic for the project and Collect the information from the relevant sources
5. Assemble the information into a more realistic draft ethically and conclude the contents.
6. Students prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

Discussion / Final Presentation

Upon completion of the course student will be able to

3. Prepare the presentation based on the results obtained in the research work
4. Explain outcome of their project along with further scope for research. This develops their oratory and leadership skills

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COURSE: PHARMACOLOGY (MPL)

SEMESTER -I

MPL101T. Modern Pharmaceutical Analytical Techniques (Theory)

OBJECTIVE: This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

OUTCOMES:

Upon completion of the course student will be able to

1. Understand the UV-Visible spectroscopy, IR, flame and atomic absorption spectroscopy.
2. Know principles of NMR spectroscopy, instrumentation and applications.
3. Understand the principles of mass spectroscopy, different ionization techniques and applications of mass spectroscopy.
4. Understand the different chromatographic techniques like paper, ion exchange, gas, HPLC, etc
5. Know the principles and procedures of paper and capillary electrophoresis; XRD and its applications.
6. Understand the principles and procedures of potentiometry and thermal analytical techniques like DSC and TGA.

MPL102T. ADVANCED PHARMACOLOGY-I (Theory)

OBJECTIVE: The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, this subject helps the students to understand the concepts of drug action and mechanisms involved.

OUTCOMES:

Upon completion of the course student will be able to

1. Know basic concepts of Pharmacology, mechanism of action of drugs, Pharmacokinetics and drug discovery.
2. Understand the basics of physiology and neurotransmitters and their roles. To gain knowledge on the drugs acting on ANS, CNS and muscle relaxants.
3. Describe the role of neurotransmitters in the CNS and pharmacology of various classes of drugs acting on CNS.
4. Impart knowledge on the pathophysiology of disease of CVS and drugs acting on it and hematopoietic system.
5. Familiarize about Physiological and pathological role of autocoids.

MPL103T. PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-I (Theory)

OBJECTIVE:

Students will be able to explore various screening models for different diseases to study novel drugs.

OUTCOMES:

Upon completion of the course student will be able to

1. Perform acute toxicity studies as per OECD guidelines.
2. Learn design of ADR monitoring protocol
3. Explain In-silico docking studies
4. Explain about ADR reporting

MPL104T. CELLULAR AND MOLECULAR PHARMACOLOGY (Theory)

OBJECTIVE: The subject imparts a fundamental knowledge on the structure and functions of cellular components and help to understand the interaction of these components with drugs. This information will further help the student to apply the knowledge in drug discovery process.

OUTCOMES:

Upon completion of the course student will be able to

1. Know in detail about the cell structure, cell organelles, genome structure, gene expression and gene mapping and gene sequencing methods and the cell cycle and it's pathways like intrinsic and extrinsic pathways, apoptosis, necrosis and autophagy.
2. Know the intra cellular and extra cellular signalling pathways, Ligand gated ion channel, different types of receptors and secondary messengers and different pathways like cyclic AMP, Cyclic Mitogen Activated Protein Kinase, Janus kinase and Signal transducer and activator of Transcription.
3. Know different types of genomic tools like DNA Electrophoresis, PCR, Microarray technique, SDS page, ELISA and western blotting techniques and explain the R DNA technology, Gene therapy
4. Understand the usage of proteomics, genomics Metabolomics, Fuctionomics, Nutrigenomics, Immunotherapeutic, Glucose uptake assay, Biosimilars, Flow cytometry, Calcium influx assay in the pharmaceutical field.
5. Understand the cell culture methods, medium used, types of cell cultures and cryopreservation methods

MPL105PA. PHARMACOLOGY PRACTICAL - I (Practical)

Upon completion of the course student will be able to

1. Do dose calculation in pharmacological experiments
2. Learn about anti-ulcer activity using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model experimentation.
3. Explain about screening of drugs acting on GIT
4. Study Insulin hypoglycemic effect in rabbit
5. Explain about acute toxicity studies

MPL105PB. PHARMACOLOGY PRACTICAL - II (Practical)

Upon completion of the course student will be able to

1. Understand the different methods of isolation of DNA from various sources (Onion, Cauliflower, Bacteria, Goat liver)
2. Know the isolation of RNA from yeast
3. Learn about the estimation of DNA/RNA by spectroscopic method
4. Understand the estimation of protein by lowry's method in biological sample.
5. Know the methods of gene amplification by PCR and protein quantification by western blotting.
6. Learn about the cell viability and DNA fragmentation assays

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SEMESTER -II

MPL201T. ADVANCED PHARMACOLOGY - II (Theory)

OBJECTIVE: The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, the subject helps the student to understand the concepts of drug action and mechanism involved.

OUTCOMES:

Upon completion of the course student will be able to

1. Have cognizance underlying mechanism of drug actions at cellular, molecular level and learnt to explain the receptor signal transduction processes.
2. Gain knowledge on the mechanisms involved in the formation, release, possible physiological role, pharmacological actions and therapeutic potential.
3. See through the pathophysiology and pharmacotherapy of certain mediators.
4. Be familiar to explain the molecular pathways affected by drugs on GIT.
5. Acknowledge better understanding in free radical Pharmacology and of recent drugs used in treatment of diseases.

MPL202T. PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II (Theory)

OBJECTIVE:

Screening of drug's to relevant diseases using different methods and learning the detailed guidelines for Preclinical studies.

OUTCOMES:

Upon completion of the course student will be able to

1. Identify drug interactions and rationalize the prescription
2. Discuss the therapeutic approach to management of selected diseases
3. Prepare individualized therapeutic plans based on diagnosis
4. Perform patient counselling
5. Conduct planned experiments and prepare laboratory report in a standard format

MPL203T. PRINCIPLES OF DRUG DISCOVERY (Theory)

OBJECTIVE: The subject imparts basic knowledge of drug discovery process. This information will make the student competent in drug discovery process.

OUTCOMES:

Upon completion of the course student will be able to

1. Identify the concepts of modern drug discovery process.
2. Describe the lead identification – combinatorial chemistry and high through put screening and computational prediction of protein structure.
3. Explain the rational drug design and virtual screening methods.
4. Identify the molecular docking and Quantitative analysis of Structure Activity Relationship.
5. Express the QSAR statistical methods and pro-drug design.

MPL204T. EXPERIMENTAL PHARMACOLOGY (Theory)

Upon completion of the course student will be able to

1. Analyse prescriptions for drug interaction
2. Formulate and prepare parenteral formulations and powders
3. Perform inventory analysis
4. Answer drug information queries through literature search
5. Conduct planned experiments and prepare laboratory report in a standard format

MPL205PA. PHARMACOLOGY PRACTICAL - III (Practical)

Upon completion of the course student will be able to

1. Determine the potency of a substance on isolated tissues.
2. Explain the effect of drugs either alone or in combination on isolated frog's rectus abdominus muscle and frog's heart
3. Know principles of bioassay, its types including advantages and disadvantages
4. Explain and perform matching point, bracketing and interpolation bioassay to find unknown concentration of Acetylcholine.
5. Estimate PA2 values of various antagonists using suitable isolated tissue preparations.
6. Study the effects of various drugs on isolated heart preparations
7. Recording of rat BP and heart rate
8. Recording of rat ECG

MPL205PB. PHARMACOLOGY PRACTICAL IV (Practical)

Upon completion of the course student will be able to

1. Know regulatory guidelines for conducting toxicity studies
2. Perform toxicity studies in animals
3. Perform reproductive toxicology studies, Genotoxicity and Chromosomal abberations
4. Do IND enabling studies and its importance
5. Know about toxicokinetic, toxicokinetic evaluation in preclinical studies, saturation kinetics

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MASTER OF PHARMACY

SEMESTER -III

MRM301T. Research Methodology and Biostatistics (Theory)

Upon completion of the course student will be able to

1. Identify the concepts of medical research and values in medical ethics.
2. Define the CPCSEA guidelines for laboratory animal facility.
3. Describe the declaration of Helsinki and basic principles for medical research.
4. Understand Basic statistical methods which are used in collecting data study and analyse. Observe Errors relating experimentation
5. Perceive relation between components also measure and study linearly. We can observe one component influence with multiple factors.
6. Know testing of the hypothesis and understand how far population parameter significant based on estimator with the help of parametric tests. Non parametric tests can also observed.
7. Define analysis of variance helps in study total variation
8. Know application of Analysis in field or lab experimental to design and factorial experiments.
9. Apply the knowledge in research objects about reliability and validity experimental study

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MASTER OF PHARMACY

SEMESTER -IV

Journal club

Upon completion of the course student will be able to

5. Critically appraise the research article of their specialization published in reputed journals. Students are trained for inquiry based learning and critical thinking skills.
6. Access journals by adopting search engines and made to collect relevant data, analyse and comment on the findings with the submission of the document evidence and present on the same for assessment

MRW 403. Project Work

Upon completion of the course student will be able to

7. Generate the topic for the project and Collect the information from the relevant sources
8. Assemble the information into a more realistic draft ethically and conclude the contents.
9. Students prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

Discussion / Final Presentation

Upon completion of the course student will be able to

5. Prepare the presentation based on the results obtained in the research work
6. Explain outcome of their project along with further scope for research. This develops their oratory and leadership skills