Sudhakarrao Naik Institute of Pharmacy, Pusad

Program Outcomes [B.Pharm]

- **Pharmacy Knowledge:** Possess knowledge and understanding of the basic, core and current information associated with the pharmacy profession.
- **Planning Abilities:** Acquire effective planning abilities including time management, resource management and organizational skills. Develop and implement plans and organize work to meet deadlines.
- **Problem analysis:** Utilize the principles of scientific enquiry, critical analysis and problem solving skills for the provision of high quality, evidence-based pharmacy services and patient care.
- **Individual and team work:** Demonstrate ability to use skills to make decisions in complex situations where there are several factors that require analysis, interpretation and comparison. Interact with professional colleagues and demonstrate team-working and leadership abilities in various professional contexts.
- **Pharmaceutical Ethics:** Demonstrate exemplary professional, ethical and legal behaviors, complying with all federal, state and local laws and regulations related to pharmacy practice. Demonstrate the respect for patient privacy and autonomy, as well as sensitivity and responsiveness to diverse patient populations
- **Modern tool usage:** Create, choose, and utilize appropriate techniques and procedures, resources, and modern pharmacy related tools with an understanding of the limitations.
- **Communication:** Communicate effectively with the society and with pharmacy community for being able to understand and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- **The Pharmacist and society:** Apply reasoning informed by the related knowledge to assess communal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- **Environment and sustainability:** Comprehend the impact of the professional pharmacy in communal and environmental perspectives and demonstrate the knowledge for sustainable development.
- **Life-long learning:** Recognize the need for Life-long learning and have the preparation and ability to engage in independent and life-long learning in the extensive outlook of scientific and industrial change and needs.

Program Outcomes [M. Pharm]

Pharmaceutical Sciences knowledge: Apply the knowledge of science, pharmaceutical fundamentals, and a Pharmacy specialization to the solution of complex Pharmaceutical and Pharmacological problems.

- **Problem analysis**: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
- **Effective Communication**: Acquire excellent interpersonal oral communication and writing skills. Able to demonstrate knowledge and proficiency with current audio-visual presentation technologies and develop an ability to communicate scientific and research knowledge by adopting various modes of scientific communications (e.g., abstract, manuscripts, project reports, oral and poster presentations etc).
- **Conduct investigation of complex problems**: Design solutions for complex pharmaceutical problems and 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.
- **Social Interaction**: Develop interpersonal skills such as consulting and working with others, conflict management and leading others through the problem solving process. They will be able to lead and function both individually and as a member of a team.
- **Ethics**: Demonstrate honesty, integrity, ethical understanding, and respect for others and will carry out their professional responsibilities by adhering to high ethical standards.
- **Environment and Sustainability**: Recognize importance of environmental issues and sustainable development.
- **Self directed and Life-long Learning**: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes
- **Effective Citizenship**: Demonstrate compassionate social apprehension and equity centered national development, and the skill to act with an informed responsiveness of issues and participate in public life through volunteering.

Program Specific Outcomes [PSO]

- To create pharmacy graduates with strong basic concepts and high technical competence in pharmaceutical sciences and technology, who shall be able to use these tools in pharmaceutical industry and/or institutes where ever required for success.
- To provide students with a strong and well defined idea in the various fields of pharmaceutical sciences viz., pharmacology, pharmaceutics, pharmacognosy and pharmaceutical chemistry according to the requirement of pharmaceutical industries, Hospital and community Pharmacy .
- To promote the students to participate in life-long learning process for a highly productive career and to relate the concepts of Pharmaceutical Sciences towards serving the cause of the society.
- To promote the development of trained human resource in Pharmaceutical Sciences for dissemination of quality education with highly professional and ethical approach, strong communication skills, effective skills to work in a team with a multidisciplinary approach.
- To produce prospective information pools with interpersonal and joint skills to identify, assess and formulate problems and execute the solution in closely related pharmaceutical field.

Course Outcomes [B.Pharm]

Semester-I

Course Code	Course title	Course Outcomes
T 1.1	Pharmaceutics-I	Upon completion of the course the student shall be able to • Know the history of profession of pharmacy official books and scope of pharmacy. • Understand the basics of different dosage forms and pharmaceutical calculations • Understand the professional way of handling the prescription • Preparation of various Pharmacopoeial preparations
T 1.2	Pharmaceutical Biochemistry-I	Upon completion of the course the student shall be able to • Understand scope of the subject in Pharmaceutical Sciences. • Know Biochemical morphology of prokaryotic and eukaryotic cell with mechanism of cellular transportation. • Understand the catalytic role of enzymes, enzyme inhibition, therapeutic and diagnostic applications of enzymes. • Recognise account for metabolism of carbohydrate and nucleic acid in physiological and pathological conditions. Utility and production of ATP.
T 1.3	Anatomy and Physiology-I	Upon completion of the course the student shall be able to • Know Basic terminologies used in anatomy and physiology. • Know different cellular structure along with their function and able to answer normal haemostasis of human body. • Understand gross anatomy and physiology of different organs associated with lymphatic system, cardiovascular system, endocrine system and different sense organ. • Determine normal blood count values along with their function in human body.
T 1.4	Pharmacognocy-I	Upon completion of the course the student shall be able to • Know and be able to use light microscopic techniques and the preparation of microscopic slides • To identify a selection of the most important medicinal plants, explain their uses and account for their pharmaceutically active compounds • Identification of powdered crude drugs and observation of plant anatomic features such as stomata, hairs and vascular tissue
T 1.5	Pharmaceutical Engineering-I	Upon completion of the course the student shall be able to • Know various unit operations used in pharmaceutical industries. • Understand material handling technique. • Explain preventive methods used for corrosion control in pharmaceutical industries. • Elaborate processes involved in pharmaceutical manufacturing process.

Semester-II

Course Code	Course title	Course Outcomes
T 2.1	Pharmaceutics-II	Upon completion of the course the student shall be able to • Understand the role of pharmaceutical additives in dosage forms. • Knows the principles involved and procedures adopted in dispensing of Liquid and semisolid preparations. • Understand the basics of Extraction and Galenicals with their applications. • Know various types Pharmaceutical incompatibilities.
T 2.2	Anatomy and Physiology-II	Upon completion of the course the student shall be able to • Understand gross anatomy and physiology of different organs

		associated with respiratory system, digestive system, muscular system, urinary system, reproductive system, nervous system and integumentory system. • Know physiological processes associated with respiratory system, digestive system, muscular system, urinary system, reproductive system, nervous system and integumentory system. • Able to record body temperature, breathing rate, ECG,identify different bones and their body location.
T 2.3	Pharmacognocy-II	Upon completion of the course the student shall be able to • Know Natural products with usage as drugs and other bioactive molecules from nature, their origin, identification, development, production, control and usage. • Understand the importance of natural products as drugs and drug precursors internationally and industrial is addressed • Know the role of Genetic manipulation, hybridization, polyploidy in medicinal plants.
T 2.4	Pharmaceutical Engineering-II	Upon completion of the course the student shall be able to • Elaborate the concept of crystallization. • Employ the equipments required for size reduction and drying. • Describe theories and types of mixing. • Summarize the concept of humidity and size separation. • Understand the types of hazards and methods for preventing them.
T 2.5	Pharmaceutical Biochemistry-II	Upon completion of the course the student shall be able to • Understand metabolism of lipids and nitrogen containing monomer in physiological and pathological conditions. • Understand the concept of nutrition, balanced diet and energy metabolism. • Know Account of acid-base balance and mineral metabolism, Biological oxidation. • Recognize methods and applications of biosignaling.
T 2.6	Mathematics	Upon completion of the course the student shall be able to:- • Know the theory and their application in Pharmacy • Solve the different types of problems by applying theory • Appreciate the important application of mathematics in Pharmacy

Semester-III

Course Code	**Course title**	**Course Outcomes**
T 3.1	Physical Pharmaceutics-I	Upon completion of the course the student shall be able to • Understand the different physical properties of drug or • Define and recall fundamental physical theories of matter in the development of dosage form. • Explain the concept of formulation and stabilization suspensions and emulsions. • Demonstrate the types and properties of colloids • Define the rate and order of reaction involved in stabilization of medicinal agents. • Illustrate the knowledge of solubility in pharmaceutical preparations. • Outline the concept of thermodynamics.
T 3.2	Pharmaceutical Microbiology	Upon completion of the course the student shall be able to • Understand classification, taxonomy, nutrition, cultivation and identification of bacteria, fungi, viruses actinomycetes, rickettasia and spirochaetes. • Describe microbial spoilage and preservation of pharmaceutical products, sterilization methods and sterility testing of pharmaceutical products as per I.P. and B.P. • Understand modes of microbial infection, transmission and control and prevention of bacterial, fungal, protozoal and viral diseases.

		• Understand basic concepts of immunology, antigen-antibody reactions and immunological preparations.
T 3.3	Pharmaceutical Organic chemistry-I	Upon completion of the course the student shall be able to • Know the structure, name and the type of isomerism of the organic compound. • Understand the preparation and reactions of various organic compounds. • Write the reaction, name the reaction and orientation of reaction. • Acquainted with reactivity & stability of compound.
T 3.4	Hospital and Community Pharmacy	Upon completion of the course, the student shall be able to • know various drug distribution methods in a hospital • appreciate the pharmacy stores management and inventory control • monitor drug therapy of patient through medication chart review and clinical review • obtain medication history interview and counsel the patients • identify drug related problems, adverse drug reactions • interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states • do patient counseling in community pharmacy; • Appreciate the concept of rational drug therapy.
T 3.5	Pharmaceutical Inorganic Chemistry	Upon completion of the course the student shall be able to • Know the sources of impurities and methods to determine the impurities and methods to determine the impurities in in-organic drugs and pharmaceutical. • Understand the medicinal and pharmaceutical importance of inorganic compounds.
T 3.6	Pathophysiology	Upon completion of the course the student shall be able to • Understand basic pathophysiology of diseases associated with cardiovascular System, disorders of Respiratory tracts, Disorders of Urinary tracts, Gastrointestinal tracts, • Understand basic pathophysiology of Nervous disorders, Endocrine disorders, Pain and inflammation. • Student must be able to know Neuropathophysilogy of Epilepsy, Parkinson's and Alzheimer's Disease, Psychosis , Schizophrenia and Depression.

Semester-IV

Course Code	**Course title**	**Course Outcomes**
T 4.1	Physical Pharmaceutics-II	Upon completion of the course the student shall be able to • Explain the concept of interfacial phenomena and rheology. • Illustrate drug molecular complexes and protein binding of drugs. • Demonstrate the micromeritics properties of powders. • Understand the principles of diffusion and dissolution.
T 4.2	Pharmaceutical Organic chemistry-II	Upon completion of the course the student shall be able to • Illustrate the concept of Stereochemistry • Define Free Radicals. Explain the Chemistry of free radicals. • Identify the products of various organic reactions by drawing appropriate mechanism • Compare various polycyclic compounds in accordance with their chemistry, method of preparation and reactions • Understand preparation of aldehydes, ketones, carboxylic acids, sulphonic acids and phenols • Make use of aldehydes, ketones, carboxylic acids, sulphonic acids and phenols for the preparation of various chemical moieties.
T 4.3	Pharmaceutical Analysis-I	Upon completion of the course the student shall be able to • Understand the principals of volumetric analysis.

		• Carryout various volumetric analysis. • Develop analytical skill.
T 4.4	Pharmaceutical Biotechnology	Upon completion of the course the student shall be able to • Understand the genetic organization of genome and functions of DNA in the synthesis of RNAs and proteins. • Know genetic Recombination and development drugs produced by biotechnology. • Understand comprehensive study of cell and organ culture methods. • Understand the basics of fermentation technology with microbial transformation and enzyme immobilization.
T 4.5	Pharmacology-I	Upon completion of the course the student shall be able to • Identify the route of drug administrating, mechanism of action, combined effects of drug and pharmacological actions. • Understand Official bioassay of drugs as per IP • Recognize the Pharmacokinetics and pharmacodynamics of drug. • Demonstrate a fundamental knowledge in the field of cholinergic, adrenergic, serotonergic and dopamine path in CNS. • Demonstrate a mastery of technical and experimental methodologies required to conduct research in the field of animal study.
T 4.6	Basic Computer Applications	Upon completion of the course the student shall be able to • know the various types of application of computers in pharmacy • know the various types of databases • know the various applications of databases in pharmacy

Semester-V

Course Code	**Course title**	**Course Outcomes**
T 5.1	Pharmaceutics-III	Upon completion of the course the student shall be able to • Understand the basic design of preformulation of solid, liquid and semisolid dosage forms. • Analyzes compatibility with excipients and API. • Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality • Understand the concepts of Drug Regulatory affairs & NDA.
T 5.2	Medicinal Chemistry-I	Upon completion of the course the student shall be able to • Understand the chemistry of drugs with respect to their pharmacological activity. • Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs. • To understand the physiological aspect of drug molecule. • Know the structural activity relationship (SAR) ,IUPAC nomenclature and synthesis of drugs acting on Autonomic nervous system. • Write the chemical synthesis of above drugs.
T 5.3	Pharmaceutical Organic Chemistry-III	Upon completion of the course the student shall be able to • Elaborate the chemistry of heterocyclic compounds • Outline the concept of synthesis by using retro- synthetic approach. • Define combinatorial chemistry. Summarize the concept of combinatorial synthesis. • Explain the types and chemistry of Carbohydrates, proteins and amino acids. • Classify rearrangement reactions with their mechanism based on common migration centres. • Identify the products of various name reactions by drawing appropriate mechanism.
T 5.4	Pharmacognocy-III	Upon completion of the course the student shall be able to • Illustrate the drugs of natural origin with systematic practical approach. • Explain the Morphology and Microscopy of crude drugs

		along with chemical constituents. • Utilize the botanical characteristics of various families and enhance their ability in terms of practical aspects of the subject. • Identify the drugs of natural origin by morphological, microscopial, chemical and chromatography analysis. • To know the Biosynthetic pathways of plants for secondary metabolites
T 5.5	Pharmacology-II	Upon completion of the course the student shall be able to • Understand the Pharmacology of Chemotherapy and its relevance in the treatment of different infectious diseases • Understand Pharmacology of Autacoids and their antagonists • Know the synthesis, release, storage and pharmacology of Hormones and related drugs • Understand the pharmacological actions of different categories of drugs • Evaluate the potency of unknown compound with reference to standard compound using animal organs.
T 5.6	Biopharmaceutics-I	Upon completion of the course the student shall be able to • Understand the basic concepts in Biopharmaceutics and their significance. • Understand the factors involved in the absorption, distribution, metabolism and excretion and their significance. • Understand the concept of bioavailability and bioequivalence of drug products and their significance

Semester-VI

Course Code	**Course title**	**Course Outcomes**
T 6.1	Pharmaceutics-IV	Upon completion of the course the student shall be able to • Design the concept of cosmetic according to application on the different parts of body. • Employ the evaluation and packing skill for different form of cosmetics. • Know various types and Evaluation techniques of surgical dressings.
T 6.2	Medicinal Chemistry-II	Upon completion of the course the student shall be able to • Understand the chemistry of drugs with respect to their pharmacological activity and their SAR. • Know the structural activity relationship (SAR) and synthesis of Antibiotic, NSAIDs, Anti-infective, anti-invasive drugs. • Write the chemical synthesis of above drugs • Know the importance of SAR of drugs.
T 6.3	Pharmaceutical Analysis-II	Upon completion of the course the student shall be able to • Understand the precipitation techniques involved in gravimetric analysis for identification I.P. product and various extraction techniques. • Classify of various analytical techniques with interaction of matter with electromagnetic radiation and application of drug analysis. • Understand the principle and application Ultraviolet spectroscopy, Fluorescence spectroscopy, atomic emission/absorption spectroscopy with some miscellaneous method of analysis.
T 6.4	Pharmacognocy-IV	Upon completion of the course the student shall be able to • Know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents • Understand Alternative System of Medicine along with important drugs in Ayurvedic system of medicine. • Understand the extraction of Essential oil from herbal drugs • Identify and isolate phytoconstituents
T 6.5	Biopharmaceutics-	Upon completion of the course the student shall be able to

	II	• Understand the basic concepts in pharmacokinetics and their significance. • Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism and excretion. • Understand various pharmacokinetic parameters, their significance and applications.
T 6.6	Clinical Pharmacy	Upon completion of the course the student shall be able to • Monitor drug therapy of patient through medication chart review and clinical review Obtain medication history interview and counsel the patients • Detect and assess adverse drug reactions and drug interaction. • Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states • Understand aspects of pharmacogenetics and clinical pharmacokinetics • Understand the basic design of clinical trials and also know institutional animal ethical committee and its function.

Semester-VII

Course Code	**Course title**	**Course Outcomes**
T 7.1	Pharmaceutics-V	Upon completion of the course the student shall be able to • Understand manufacturing techniques, considerations in development and formulation of Tablet, Capsule and Parenteral dosage forms and evaluate them for their quality • Know various packaging materials for pharmaceutical dosage forms • Understand importance of Good manufacturing practices in pharmaceuticals.
T 7.2	Medicinal Chemistry-III	Upon completion of the course the student shall be able to • Understand mode of action, chemistry, stereochemistry and recent development of the cardiovascular drugs. • Understand mode of action, chemistry, stereochemistry and recent development of the drugs acting on central nervous system • Employ IUPAC system and know Structural Activity Relationship (SAR) of cardiovascular and CNS acting drugs.
T 7.3	Pharmacology-III	Upon completion of the course the student shall be able to • Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. • Understand the pharmacology of drugs acting on cardiovascular system. Hematopoietic, Immunomodulators. • Explain the mechanism of action, drug interaction and use of CNS and GIT acting drugs. • Observe the effect of drugs on animals by simulated experiments • Evaluate pharmacological screening of drugs in animals
T 7.4	Pharmacognocy-V	Upon completion of the course the student shall be able to • Understand the role of medicinal plants in national and international economy • Application of the methods for the quality control and conformity of drugs from natural origin. • Overview of medicinal plants in treatment of certain disorders.
T 7.5	Pharmaceutical Analysis-III	Upon completion of the course the student shall be able to • Apply the theoretical consideration of thermo analytical method and electrochemical method. • Understand principle basic concept and application of Polarimetry, Refractometry and Nephelo-turbidometry. • Understand theoretical concept of Raman spectroscopy and theoretical with practical concept of FTIR.
T 7.6	Pharmaceutical	Upon completion of the course the student shall be able to

	Jurisprudence	• Understand the Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals. • Understand various Indian pharmaceutical Acts and Laws • Understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals • Understand the code of ethics during the pharmaceutical practice

Semester-VIII

Course Code	**Course title**	**Course Outcomes**
T 8.1	Pharmaceutics-VI	Upon completion of the course the student shall be able to • Understand the criteria for selection of drugs and polymers for the development of prolonged Action Pharmaceuticals, their formulation and evaluation. • Recognize various approaches for development of novel drug delivery systems. • Know process validation methods for Tablets and suspension • Know types and applications of polymers in formulation design • Understand protocol and methods for stability testing
T 8.2	Medicinal Chemistry-IV	Upon completion of the course the student shall be able to • Understand the role of drug design and QSAR in drug discovery process • Know role of Enzymes and Peptides in drug design • Comprehend molecular modeling with respect to Molecular mechanics, Conformational analysis and Energy minimization methods. • Understand Concept of gene therapy , nucleotidomimetics and genetic engineering in medicinal chemistry.
T 8.3	Pharmaceutical Analysis-IV	Upon completion of the course the student shall be able to • Understand the CGMP, GMP, TQM concept with importance of documentation and calculation. • Identify and Separate various organic compounds by chromatographic technique. • Understand principle, basic theory, instrumentation of N.M.R and Mass spectroscopy. • Principal and application of E.S.R, X-Ray Diffraction and R.I.A.
T 8.4	Pharmacognocy-VI	Upon completion of the course the student shall be able to • Know and be able to explain the basic principles of drug development from natural products • To apply the knowledge about photosynthesis and the formed compounds structure and classification • Have sufficient knowledge in plant morphology and anatomy to be able to read and understand scientific literature. • Able to plan and carry out laboratory procedures for extraction, isolation and identification of natural products.
T 8.5	Clinical Pharmacotherapeutics	Upon completion of the course the student shall be able to • Understand the pharmacotherapy of Cardiovascular diseases, Haematological diseases and Endocrine problems • Understand the pharmacotherapy of Gastrointestinal Diseases and Neuro-psychiatric disorders: • Employ the knowledge of microbes and chemotherapeutic agents in disease conditions and their treatment. • Understand the toxicology of chemicals and treatment of Poisoning
T 8.6	Communication Skills	Upon completion of the course the student shall be able to • Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation • Communicate effectively (Verbal and Non Verbal) • Manage the team effectively as a team player • Develop interview skills • Develop Leadership qualities and essentials

Course Outcomes [M.Pharm]

Semester- I [Common to all branches]

Course Code	Course title	Course Outcomes
MC-101	Research Methodology and Biostatistics	Upon completion of the course, student shall be able to • Know purpose, documentation and report writing of research • Understand, use various methods and tools in research • Recognize cost analysis of Clinical trials and projects • Comprehend statistical analysis of data
MC-102	Biotechnology and Bioinformatics	At the completion of this subject it is expected that students will be able to • Understand about the latest technology development in biotechnology technique, tools and their uses in drug and vaccine development. • Understand and perform genetic engineering techniques in gene manipulation, r-DNA technology and gene amplification. • Know concept of Immunology and enzyme immobilization. • Understand aspects and application of bioinformatics in pharmaceutical industries and drug discovery.
MC-103	Quality control of pharmaceutical products	At completion of this course it is expected that students will be able to • Elaborate aspects of GMP and Validation. • Establish safety guidelines, which prevent laboratory hazards. • Understand stability studies of drugs and biological products • Acquainted with the analysis of various drugs in single and combination dosage forms • Comprehend theoretical and practical skills of the instruments handling.
MC-104	Drug Regulatory Affairs	At completion of this course it is expected that students will be able to • Understand the regulatory and ethical requirements. • Establish regulatory guidelines for drug and drug products. • Understand the Regulatory requirements for contract research organization. • Know various Indian pharmaceutical Acts and Laws.
MC-105	Product development and formulation	At completion of this course it is expected that students will be able to • Understand the new product development process • Acquainted with Physicochemical properties of drug and additives in the development of new formulation. • Explain formulation development of various pharmaceutical dosage forms.

M.Pharm [Pharmaceutics]

Semester - II

Course Code	Course title	**Course Outcomes**
MPH-201	Novel Drug Delivery System	Upon completion of this course it is expected that students will be able to, • Design, Characterization and study of sustained and controlled release drug delivery systems • Explore the classification and applications of polymers in formulation of controlled release drug delivery systems • Comprehend formulation and evaluation of transdermal, mucoadhesive, Intrauterine and ocular drug delivery systems • Explain concept and various approaches of targeted drug delivery system • Understand biochemistry of proteins and applications in drug delivery systems.
MPH-202	Bio Pharmaceutics and Pharmacokinetics	Upon completion of this course it is expected that students will be able to, • The basic concepts in biopharmaceutics and pharmacokinetics. • The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. • The concepts of non-linear pharmacokinetics and its causes. • The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. • The potential of drug-Protein binding
MPH-203	Industrial Pharmacy	On completion of this course it is expected that students will be able to understand- • Understand various preformulation parameters alongwith physicochemical characterization of new drug molecule. • Significance of pilot plant and manage the scale up process in pharmaceutical industry. • Recent advances in tablet and capsule technology • Explore different coating techniques and advances in microencapsulation techniques. • Understand optimization techniques and parameters. • Employ methods of bioavailabilty enhancement
MPH-204	Advanced Pharmaceutics and Cosmetology	Upon completion of the course, student shall be able to • Explain Stability Testing, sterilization process & packaging of dosage forms. • Know factor of Bioavailability, In-vitro in-vivo correlation and bioequivalence. • Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms. • Understand Manufacturing and evaluation techniques of cosmetics.
MPH-205	Selected topics in Pharmaceutics	Upon completion of the course the student shall be able to • Formulate, manufacture and evaluate parenterals, multiple emulsion, reconstituted suspension and nanosuspensions dosage forms. • Understand significance of various packaging materials used for pharmaceuticals • Understand applications of excipients in pharmaceutical formulations • Explain thermodynamics and applications of surfactant system in micellization, suspension and emulsions. • Understand solubilization and methods of solubilization.

Semester- III

Course Code	Course title	**Course Outcomes**
MPH-301	Seminar on research envisaged for dissertation	• Ability to Ability to implement and execute well defined objective. • Ability to utilize technical resources • Ability to write technical documents and give oral presentations related to the work completed.
MPH-302	Seminar on recent trends in Pharmaceutical sciences	Ability to Ability to implement and execute well defined objective. Ability to review literature thoroughly Ability to utilize technical resources in data collection Ability to write technical documents and give oral presentations related to the work completed.

Semester- IV

Course Code	Course title	**Course Outcomes**
MPH-401	Dissertation	After graduation on a more specialized field, a PG student has • To obtain skills and techniques for professional scientific research • To be able to establish research problems in the specific research area of and provide original solutions. • To manage data collection and analysis methodologies. • To have a high level of analytical and critical skills. • To be able to write scientific articles in international level • To be able to protect the basic research positions, both in speaking and in writing.
MPH-402	Seminar (on dissertation)	• To be able to defend the basic research positions and give oral presentations related to the work completed.
MPH-403	Viva-voce	• Ability to face viva-voce related to the work completed and defend the research position

M.Pharm [Pharmacology]

Semester - II

Course Code	Course title	**Course Outcomes**
MPL-201	Advanced Pharmacology And Toxicology	Upon completion of the course the student shall be able to • Explain the mechanism of drug actions at cellular and molecular level • Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases • Understand the Concept of gene therapy in the treatment of Diseases • To study different techniques of molecular pharmacology. • Understand the toxicology of chemicals and treatment of Poisoning
MPL-202	Advanced Clinical Pharmacokinetics	Upon completion of the course the student shall be able to • To study drug distribution & determination of different pharmacokinetic parameters. • Know Compartment modeling and their limitation: • Understand bioequivalence and Therapeutic Drug Monitoring • To learn non-linear pharmacokinetics
MPL-203	Topics In Pharmacology	Upon completion of the course the student shall be able to • Apply the basic pharmacological knowledge in the

		prevention and treatment of various diseases. • Understand the Pharmacology of Chemotherapy and its relevance in the treatment of different infectious diseases • Understand Pharmacology of Autacoids and their antagonists • To study antigens, antibody its importance in immune-pharmacology • Understand phases of clinical trial, ethics and protocol preparation of clinical trial.
MPL-204	Biological Evaluation (Priclinical Pharmacology)	Upon completion of the course the student shall be able to • To know care, maintenance & breeding techniques for laboratory animals. • Understand Organization of Preclinical screening program • To learn methods for *in-vivo & in-vitro* screening for different category of drugs • Understand Concept of transgenic animals • To Know Toxicity testing of drugs
MPL-205	Receptor In Pharmacology	Upon completion of the course the student shall be able to • To study molecular mechanism of drug its interaction with receptor, ion channels and their modulators • To learn different classes and subclasses of receptor • Understand Presynaptic receptor for catecholamines • To acquire knowledge of second messenger receptors

Semester- III

Course Code	Course title	**Course Outcomes**
MPL-301	Seminar on research envisaged for dissertation	• Ability to Ability to implement and execute well defined objective. • Ability to utilize technical resources • Ability to write technical documents and give oral presentations related to the work completed.
MPL-302	Seminar on recent trends in Pharmaceutical sciences	Ability to Ability to implement and execute well defined objective. Ability to review literature thoroughly Ability to utilize technical resources in data collection Ability to write technical documents and give oral presentations related to the work completed.

Semester- IV

Course Code	Course title	**Course Outcomes**
MPL-401	Dissertation	After graduation on a more specialized field, a PG student has • To obtain skills and techniques for professional scientific research • To be able to establish research problems in the specific research area of and provide original solutions. • To manage data collection and analysis methodologies. • To have a high level of analytical and critical skills. • To be able to write scientific articles in international level • To be able to protect the basic research positions, both in speaking and in writing.
MPL-402	Seminar (on dissertation)	• To be able to defend the basic research positions and give oral presentations related to the work completed.
MPL-403	Viva-voce	• Ability to face viva-voce related to the work completed and defend the research position

M.Pharm [Industrial Pharmacy]

Semester - II

Course Code	Course title	**Course Outcomes**
MIP-201	Advanced Industrial Pharmacy – I	Upon completion of the course, student shall be able to understand • Principles of Improved tablet production and design. • Significance of pilot plant and manage the scale up process in pharmaceutical industry. • Mechanisms, tools and applications of various industrial processes viz. drying, Pelletization, Evaporation and Compression.
MIP-202	Advanced Industrial Pharmacy – II	Upon completion of the course, student shall be able to • Understand Industrial Management and GMP Considerations. • Provide comprehensive knowledge on the safety management • Know Human resource planning, Job design, Job enlargement and enrichment.
MIP-203	Pharmaceutical process validation and production management	At completion of this course, it is expected that students will be able to understand • The concepts of calibration, qualification and validation • The qualification of various equipments and instruments • Process validation of different dosage forms • Validation of analytical method for estimation of drugs • Production planning control and management
MIP-204	Selected topics in industrial pharmacy – I	Upon completion of the course, student shall be able to understand • The various approaches for development of controlled drug delivery systems. • The criteria for selection of drugs and polymers for the development of delivering system • The formulation and evaluation of controlled drug delivery systems.
MIP-205	Selected topics in industrial pharmacy – II	Upon completion of the course, student shall be able to understand • Optimization Techniques in pharmaceutical processing. • Stability aspects, testing and protocols. • Know factor of Bioavailability, In-vitro in-vivo correlation and bioequivalence. • Significance, types and selection criteria for Pharmaceutical packaging materials. • Formulation and evaluation of cosmetics.

Semester- III

Course Code	Course title	**Course Outcomes**
MIP-301	Seminar on research envisaged for dissertation	• Ability to Ability to implement and execute well defined objective. • Ability to utilize technical resources • Ability to write technical documents and give oral presentations related to the work completed.
MIP-302	Seminar on recent trends in Pharmaceutical sciences	Ability to Ability to implement and execute well defined objective. Ability to review literature thoroughly Ability to utilize technical resources in data collection Ability to write technical documents and give oral presentations related to the work completed.

Semester- IV

Course Code	Course title	**Course Outcomes**
MIP-401	Dissertation	After graduation on a more specialized field, a PG student has • To obtain skills and techniques for professional scientific research • To be able to establish research problems in the specific research area of and provide original solutions. • To manage data collection and analysis methodologies. • To have a high level of analytical and critical skills. • To be able to write scientific articles in international level • To be able to protect the basic research positions, both in speaking and in writing.
MIP-402	Seminar (on dissertation)	• To be able to defend the basic research positions and give oral presentations related to the work completed.
MIP-403	Viva-voce	• Ability to face viva-voce related to the work completed and defend the research position